

# Impact of EU Funding on Rural and Regional Development Management

---

Andrić, Berislav; Šostar, Marko; Bodegrajac, Tatjana

Source / Izvornik: **Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"**, 2018, 18, 17 - 21

Journal article, Published version

Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:112:166525>

Rights / Prava: [In copyright](#) / [Zaštićeno autorskim pravom](#).

Download date / Datum preuzimanja: **2025-02-23**



**VELEUČILIŠTE U POŽEGI**  
STUDIA SUPERIORA POSEGANA

Repository / Repozitorij:

[Repository of Polytechnic in Pozega - Polytechnic in Pozega Graduate Thesis Repository](#)



**Volume 18, Issue 2/2018**

**PRINT ISSN 2284-7995**

**E-ISSN 2285-3952**



# **SCIENTIFIC PAPERS**

**SERIES “MANAGEMENT, ECONOMIC  
ENGINEERING IN AGRICULTURE AND RURAL  
DEVELOPMENT”**

**Publishers:**

**University of Agricultural Sciences and Veterinary Medicine of Bucharest, Romania.** Address: 59 Marasti, District 1, 011464 Bucharest, Romania, Phone: + 40213182564, Fax: +40213182888, www.managusamv.ro  
**S.C. Editura Ceres S.A.,** Address: 1, Piata Presei Libere, District 1, Bucharest, 013701, Phone/Fax: +40213179023, Email: edituraceres@yahoo.com  
All rights reserved

**The publishers are not responsible for the content of the scientific papers and opinions published in the Volume. They represent the authors' point of view.**

**EDITORIAL BOARD**

**Editor in Chief: Prof. Ph.D. Toma Adrian DINU**

**Executive Editor: Prof. Ph.D. Agatha POPESCU**

**Members:**

**Prof. Ph.D. H.C. Miguel Moreno MILLAN**, University of Cordoba, Spain  
**Prof. Ph.D. Doc. Svend RASMUSSEN**, University of Copenhagen, Denmark  
**Prof. Ph.D. Mogens LUND**, Institute of Food and Resource Economics, Copenhagen, Denmark  
**Associate Professor Ph.D. Ove MADSEN**, Grinsted Agricultural Academy, Denmark  
**Prof. Ph.D. Pascal Anton OLTENACU**, Oklahoma State University, Stillwater, United States of America  
**Prof. Ph.D. Rangesan NARAYANAN**, University of Nevada, Reno, United States of America  
**Ph.D. Patrick ANGEL**, US Department of the Interior, Office of Surface Mining Appalachian Regional Office, U.S.A.  
**Prof. Ph.D. Gerhard MOITZI**, University of Natural Resources and Applied Life Sciences, Vienna, Austria  
**Prof. Ph.D. Paolo GAJO**, University of Florence, Italy  
**Prof. Ph.D. Diego BEGALLI**, University of Verona, Italy  
**Prof. Ph.D. Alistair Mc CRACKEN**, The Queen's University, Belfast, United Kingdom  
**Ph.D. Hab. Stefan MANN**, Research Station Agroscope, Federal Office for Economics, Tanikon, Switzerland  
**Prof. Ph.D. Drago CVIJANOVIC**, Institute of Agricultural Economics, Belgrade, Serbia  
**Prof. Ph.D. Jonel SUBIC**, Institute of Agricultural Economics, Belgrade, Serbia  
**Prof. Ph.D. Nebojsa RALEVIC**, University of Belgrade, Serbia  
**Associate Professor Ph.D. Zuzana PALKOVA**, Slovak University of Agriculture, Nitra, Slovakia  
**Acad. Prof. Ph.D. Hab. Pavel MOVILEANU**, The Agricultural State University of Moldova, Chisinau, Republic of Moldova  
**Associate Professor Ph.D. Veronica PRISĂCARU**, The Agricultural State University of Moldova, Chisinau, Republic of Moldova  
**Associate Professor Ph.D. Veronica MOVILEANU**, The Agricultural State University of Moldova, Chisinau, Republic of Moldova  
**Associate Professor Ph.D. Hab. Mariana DOGA-MIRZAC**, Moldova State University, Chisinau, Republic of Moldova  
**Prof. Ph.D. Mamdouh Abbas HELMY**, Modern University for Technology and Information, Cairo, Egypt  
**Prof. Ph.D. Christopher Ogbonna EMEROLE**, Abia State University, Uturu, Nigeria  
**Associate Prof. Ph.D. Rashid SAEED**, International Islamic University, Islamabad, Pakistan  
**Ph.D. Cecilia ALEXANDRI**, Institute for Agricultural Economics, Romanian Academy, Bucharest, Romania  
**Prof. Ph.D. Emilian MERCE**, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania  
**Prof. Ph.D. Gheorghe MUREȘAN**, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania  
**Associate Professor Ph.D. Radu Lucian PĂNZARU**, University of Craiova, Romania  
**Prof. Ph.D. Stejărel BREZULEANU**, University of Agricultural Sciences and Veterinary Medicine of Iasi, Romania  
**Associate Professor Ph.D. Gavrilă ȘTEFAN**, University of Agricultural Sciences and Veterinary Medicine, Iasi, Romania  
**Prof. Ph.D. Vasile GOSA**, University of Agricultural Sciences and Veterinary Medicine of Banat Timisoara  
**Prof. Ph.D. Nicoleta MATEOC-SÎRB**, University of Agricultural Sciences and Veterinary Medicine of Banat, Romania  
**Associate Professor Ph.D. Tiberiu IANCU**, University of Agricultural Sciences and Veterinary Medicine of Banat Timisoara  
**Associate Professor Ph.D. Ioan BRAD**, University of Agricultural Sciences and Veterinary Medicine of Banat Timisoara  
**Prof. Ph.D. Ioan Nicolae ALECU**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Manea DRĂGHICI**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Mihai BERCA**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Gina FÎNTÎNERU**, University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania  
**Prof. Ph.D. Romeo Catalin CRETU**, University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania  
**Prof. Ph.D. Cristiana TINDECHE**, University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania  
**Associate Professor Ph.D. Elena TOMA**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Ion DONA**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Elena ȘTOIAN**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Adelaida Cristina HONTUS**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Prof. Ph.D. Daniela CRETU**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Associate Professor Ph.D. Silviu BECIU**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania  
**Associate Professor Ph.D. Adrian TUREK-RAHOVEANU**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania

**Publication Committee:**

**Lecturer Eng. Teodora Popescu, Lecturer Ph.D. Mariana BURCEA, Lecturer Ph.D. Ionela VLAD,  
Lecturer Ph.D. Eugenia ALECU, Eng. Valentin SERBAN**

This volume includes the scientific papers presented at the International Conference “Agriculture for Life, Life for Agriculture”, June 7-9, 2018, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania, Section 7: Management and Economics of Rural Areas, Topics: Production economics, Farm management and agromarketing, Agricultural policies, Agribusiness and agricultural extension, Agritourism and Rural development, Environmental economics, Educational management in agronomic education, Trade in agricultural products, Insurance and reinsurance in agriculture, Food legislation, Food industry equipment and installations, Rural Statistics.

## C O N T E N T

---

### 1.THE ROLE OF DESTINATION MANAGEMENT ORGANIZATIONS (DMOS) FOR SUSTAINABLE RURAL TOURISM IN BULGARIA

Krasimir ALEKSANDROV, Ivan KILIMPEROV..... 11

### 2.IMPACT OF E.U. FUNDING ON RURAL AND REGIONAL DEVELOPMENT MANAGEMENT

Berislav ANDRLIC, Marko SOSTAR, Tatjana BODEGRAJAC..... 17

### 3.ANALYSIS OF MARKETING STRUCTURE AND PROBLEMS IN GARLIC PRODUCTION: THE CASE OF KASTAMONU PROVINCE

Beyza BAYRAKLI, Mevlüt GÜL..... 21

### 4.STRUCTURE OF BULGARIAN AGRICULTURE 10 YEARS AFTER THE ACCESSION TO THE EU

Rositsa BELUHOVA-UZUNOVA, Krum HRISTOV,  
Mariyana SHISHKOVA..... 29

### 5.SYMBIOTIC FIXATION OF NITROGEN IN BELMONDO PEA VARIETY IN A SUGGESTED CROP ROTATION SYSTEM - TECHNICAL, ECOLOGICAL AND ECONOMIC EFFICIENCY

Mihai BERCA, Valentina-Ofelia ROBESCU, Gabriel CROITORU,  
Roxana HOROIAŞ..... 35

### 6.FACTORS AFFECTING COTTON PRODUCTION DECISIONS OF FARMERS: EASTERN MEDITERRANEAN REGION, TURKEY

M. Emin BİLGİLİ, Hilal YILMAZ, Selcan AKKOYUN, Yasemin VURARAK,  
Mevlüt GÜL..... 41

### 7.ALLOCATIVE EFFICIENCY OF GROUNDNUT (*Arachis hypogea l.*) PRODUCTION IN BAUCHI STATE, NIGERIA

Salihu Umaru BIYE, Haruna LAWAL, Abubakar Umaru JONGUR..... 51

### 8.STRUCTURAL CHANGE IN THE ROMANIAN AGRICULTURE: IMPLICATIONS FOR THE FARMING SECTOR

Elena BULARCA (OLARU), Elena TOMA..... 59



**9.THE ANALYSIS OF NATIONAL PROGRAMME FOR RURAL DEVELOPMENT MEASURES AND THE EVOLUTION OF AGRICULTURAL HOLDINGS IN THE PERIOD 2007-2016 AT THE LEVEL OF OLT COUNTY**

**Aurelian BULIGA-ȘTEFĂNESCU, Raluca NECULA..... 67**

**10.CONSIDERATIONS ON AGRICULTURAL PRODUCT QUALITY MANAGEMENT**

**Ion CERTAN..... 75**

**11.ASPECTS IN THE TRADE OF THE AGRICULTURAL PRODUCTS IN THE REPUBLIC OF MOLDOVA**

**Ion CERTAN, Simion CERTAN..... 85**

**12. MARKETING STRATEGIES FOR ROMANIAN TRADITIONAL PRODUCTS**

**Iuliana CETINA, Dumitru GOLDBACH, Natalia MANEA,  
Loredana POPESCU..... 93**

**13.THE SOCIO-ECONOMIC DEVELOPMENT LEVEL OF THE ROMANIAN RURAL SPACE**

**Lorena CHIȚEA, Ion DONA, Mihai CHIȚEA..... 101**

**14.RESEARCH ON THE EUROPEAN FLOWER MARKET AND MAIN SYMBOLIC VALUES OF THE MOST TRADED SPECIES**

**Irina-Adriana CHIURCIU, Iuliana ZAHARIA, Elena SOARE, Carina DOBRE,  
Anamaria-Aurelia MORNA..... 107**

**15.THE POTENTIAL OF MOLDOVA'S PRODUCTS ON GLOBAL AGRI-FOOD MARKETS**

**Liliana CIMPOIES, Cornel COSER..... 119**

**16.DETERMINANTS OF THE GROWTH OF EXPORT OF AGRICULTURAL PRODUCTS IN THE REPUBLIC OF MOLDOVA**

**Maria COJOCARU, Tatiana DIACONU..... 125**

**17.ASPECTS REGARDING REQUIREMENTS OF THE RAPESEED CULTURE TOWARDS THE CLIMATIC CONDITIONS. CASE STUDY: THE IALOMIȚA COUNTY, ROMANIA**

**Dana Maria CONSTANTIN (OPREA), Elena GRIGORE, Elena BOGAN,  
Marina Aurelia ANTONESCU..... 131**

**18.THE ROLE OF EFFICIENT MICROORGANISMS IN THE PROCESS OF OBTAINING THE BIOCOMPOST**

**Larisa CREMENEAC, Tatiana BOCLACI..... 135**

**19.ANALYSIS OF THE TOURISTS' OPINION CONCERNING THE INVESTMENTS IN THE DANUBE DELTA**

**Romeo Cătălin CREȚU, Petrică ȘTEFAN, Ioan Iulian ALECU, Silviu Viorel ANDREI..... 141**

**20.HOUSEHOLDS IN ROMANIA AND THEIR RELATION WITH THE ECONOMIC GROWTH: STUDY CASE FOR 2010-2016**

**Corina CRUCERU..... 149**

**21.DETERMINING EGG CONSUMPTION LEVEL AND PREFERENCES OF FAMILIES IN ISPARTA PROVINCE IN TURKEY**

**Vecdi DEMIRCAN, Suna ONCEBE, Sumeyye Nergis TERZI..... 155**

**22.DETERMINATION OF CONSUMERS' CONSCIOUSNESS LEVEL ON FOOD SAFETY: CASE OF ISPARTA, TURKEY**

**Vecdi DEMIRCAN, Hacer CELİK ATES, Deniz SARICA, Nadiye CAVDAR..... 163**

**23.INPUT USAGE AND PROBLEMS IN CHICKPEA PRODUCTION IN KÜTAHYA PROVINCE, TURKEY**

**Aybike ERTÜRK, Mevlüt GÜL..... 171**

**24.ANALYSIS OF PRODUCTION AND TRADE OF CHICKPEA IN TURKEY AND THE WORLD**

**Aybike ERTÜRK, Mevlüt GÜL..... 179**

**25.ECO-INNOVATION PARKS FOR A GREEN DEVELOPMENT IN SMALL AND MEDIUM SIZED ENTERPRISES**

**Dumitru Florin FRONE, Simona FRONE..... 187**

**26.THE COMPETITIVENESS OF ANIMAL PRODUCTS FROM THE REPUBLIC OF MOLDOVA: THE VALUE CHAIN APPROACH**

**Artur GOLBAN, Rita GOLBAN, Alexandru GORGOS..... 195**

**27.THE IMPORTANCE OF THE GUESTHOUSES IN THE TOURISM OF THE BRASOV COUNTY, ROMANIA**

**Mircea Adrian GRIGORAS, Agatha POPESCU, Brîndușa Antonia GRIGORAȘ ..... 201**

**28. TECHNICAL EFFICIENCY OF DAIRY CATTLE FARMS IN EAST MEDITERRANEAN REGION OF TURKEY**

Mevlüt GÜL, Hilal YILMAZ, Oguz PARLAKAY, Selcan AKKOYUN,  
Mehmet Emin BILGILI, Yasemin VURARAK, Hatice HIZLI,  
Numan KILIÇALP..... 213

**29. COST AND PROFITABILITY OF GARLIC PRODUCTION IN KASTAMONU PROVINCE**

Mevlüt GÜL, Beyza BAYRAKLI, Bahri KARLI,  
Metin Göksel AKPINAR..... 227

**30. INTERNATIONAL EXPERIENCE IN THE FIELD OF SUPPORTING THE WINE TOURISM**

Tatiana IATISIN, Tatiana COLESNICOVA, Mihail CIOBANU..... 233

**31. ANALYSIS OF THE COMPETITIVENESS OF THE VEGETABLE SECTOR OF THE REPUBLIC OF MOLDOVA**

Anatolie IGNAT, Sergiu TIRIGAN, Eugenia LUCASENCO..... 241

**32. RISK MANAGEMENT, A MORE EFFICIENT ABSORPTION METHOD FOR THE EUROPEAN STRUCTURAL AND INVESTMENT FUNDS**

Robert-Anton V. ION, Dorina Nicoleta MOCUTA ..... 247

**33. THE EVOLUTION OF AGRICULTURAL HOLDINGS IN MACRO-REGION FOUR (SOUTH WEST-OLTENIA) AFTER ROMANIA'S INTEGRATION INTO THE EUROPEAN UNION**

Niculina IONIȚĂ, Liviu MĂRCUȚĂ, Alina Gabriela MĂRCUȚĂ..... 255

**34. ASPECTS OF GENDER EQUALITY IN ROMANIA**

Adina Magdalena IORGA..... 259

**35. YOUNG PERSONS INSERTION ON THE LABOR MARKET. CASE STUDY IN ROMANIA AND BULGARIA**

Andrei Radu IOVA, Daniela CREȚU..... 265

**36. INFLUENCE OF DAILY SUPPLEMENTATION OF CARIB PODS (*Ceratonia Siliqua* L.) AS POLYPHENOL RICH PLANTS ON RUMEN FERMENTATION AND LAMBS GROWTH PERFORMANCE**

Mohamed Samir KHALEL, Mohamed Helmy YACOUNT,  
Ayman Abdel-Mohsen HASSAN, Amr Mohamed SHWERAB,  
Dorina MOCUTA, Adrian TUREK-RAHOVEANU..... 273

<b>37.OPPORTUNITIES FOR THE DEVELOPMENT OF RURAL TOURISM IN SMALL SETTLEMENTS</b>	
Ivanka LULCHEVA.....	283
<b>38.REFORMS AND AGRICULTURAL POLICIES IN ROMANIA (1918-2018)</b>	
Aurel LUP, Liliana MIRON, Indira Denis ALIM.....	289
<b>39.COMPARATIVE ANALYSIS OF THE FIRST THREE ROMANIAN AGROTURISTIC MACROREGIONS</b>	
Ancuța MARIN.....	301
<b>40.AN ANALYTICAL REVIEW OF CROPPING SYSTEM RESEARCH IN INDIA- A CASE STUDY</b>	
Suresh Kumar MUDDA, Rajendra Prasad VANA.....	305
<b>41.MANAGEMENT OF AGRICULTURAL CULTURE ESTABLISHMENT WORKS</b>	
Olimpia PANDIA, Ion SĂRĂCIN, Alexandru Ioan SĂRĂCIN.....	315
<b>42.ASPECTS REGARDING THE LIVING STANDARD OF THE RURAL POPULATION IN THE SOUTH MUNTENIA REGION OF DEVELOPMENT, ROMANIA</b>	
Ionut Daniel PETRE.....	319
<b>43.E-BUSINESS APLICATION TO IMPROVE TRACEABILITY AND SUPPLY CHAIN FOR FRESH FOOD</b>	
Ruxandra – Eugenia POP, Alexandra BRĂTULESCU.....	329
<b>44.DEMOGRAPHIC AND ECONOMIC CHANGES CHARACTERIZING THE RURAL POPULATION IN ROMANIA</b>	
Agatha POPESCU, Toma Adrian DINU, Elena STOIAN.....	333
<b>45.A STATISTICAL OVERVIEW ON THE AGROTOURIST GUESTHOUSES VERSUS TOURIST GUESTHOUSES OF THE COUNTY OF SIBIU, ROMANIA</b>	
Agatha POPESCU.....	347
<b>46.PARTNERSHIP WITH STUDENTS AS A FACTOR OF HIGHER EDUCATION INSTITUTION’S PERFORMANCE AND COMPETITIVENESS</b>	
Veronica PRISACARU, Alina CARADJA.....	359

**47.FACTORS OF COMPETITIVENESS OF THE HIGHER EDUCATION INSTITUTIONS OF THE REPUBLIC OF MOLDOVA UNDER CONDITIONS OF MARKETIZATION OF PROFESSIONAL EDUCATION**

**Veronica PRISACARU, Alina CARADJA..... 367**

**48.EDUCATION MANAGEMENT IN THE FIELD OF LIFE SCIENCES-SKILLS NEEDED TO START AND DEVELOP AN INNOVATIVE SME**

**Nicoleta RADU, Ana Aurelia CHIRVASE, Narcisa BABEANU, Ovidiu POPA, Francois HASTARAN, Birute VELYKIENE, Mihaela BEGEA..... 375**

**49.THE ECONOMIC IMPACT OF EMIGRANT'S INCOME IN THE REPUBLIC OF MOLDOVA**

**Olga SÂRBU, Liliana CIMPOIEȘ..... 383**

**50.STATUS OF WOMAN IN ROSE FARMING IN ISPARTA-TURKEY**

**Deniz SARICA, Vecdi DEMİRCAN, Hacer CELİK ATES\*, Barina TURAN, Sevgi CETINKAYA..... 391**

**51.ECONOMIC ANALYSIS OF BEEKEEPING FARMS: A CASE STUDY OF ISPARTA PROVINCE IN TURKEY**

**Duygu SERT, Vecdi DEMİRCAN..... 397**

**52.THE OPPORTUNITIES OF CREDITING IN BANKING SYSTEM IN REPUBLIC OF MOLDOVA**

**Angela ȘESTACOVSCAIA..... 403**

**53.ANALYSIS OF TOURIST MOVEMENT IN IAȘI COUNTY**

**Cristina SIMEANU, Benone PĂȘĂRIN, Claudiu ROȘCA, Daniel SIMEANU..... 409**

**54. EDUCATION IN RURAL AREAS IN THE SELECTED EU COUNTRIES ON THE EXAMPLE OF EDUCATIONAL FARMS**

**Alexandru SIN, Czesław NOWAK, Małgorzata BOGUSZ, Elżbieta KMITA-DZIASEK, Magdalena KOWALSKA..... 415**

**55.RESULTS OF FARMS SPECIALIZING IN PRODUCTION OF CATTLE FOR FATTENING IN SELECTED EUROPEAN UNION COUNTRIES**

**Aldona SKARŻYŃSKA, Łukasz ABRAMCZUK..... 421**

**56.RESEARCH ON CHERRIES SECTOR IN ROMANIA**

**Elena SOARE, Iuliana DOBRE..... 431**

<b>57. MEASURES TO SUPPORT AGRICULTURE IN THE PERIOD 2014-2020</b>	
<b>Maria SPONTE (PIȘTALU).....</b>	<b>441</b>
<b>58. ASSESSING THE IMPACT OF THE ALLOCATION OF BUDGET FUNDS ON THE MAIN MACROECONOMIC INDICATORS IN ROMANIA</b>	
<b>Maria SPONTE (PIȘTALU).....</b>	<b>445</b>
<b>59. STUDY ON TAXES AND CHARGES APPLIED IN THE EUROPEAN UNION COUNTRIES AND IN ROMANIA IN THE FIELD OF AGRICULTURE</b>	
<b>Nicoleta STANCIU.....</b>	<b>449</b>
<b>60. THE EFFECTS OF V.A.T. SPLIT PAYMENTS MEASURE ON INSOLVENT AGRICULTURAL COMPANIES</b>	
<b>Paula STOICEA, Adina Magdalena IORGA.....</b>	<b>457</b>
<b>61. NEW APPROACHES ON THE DEVELOPMENT OF THE METHODOLOGY OF THE INTEGRAL INDICATOR FOR ESTIMATION OF THE RESOURCES POTENTIAL AND THEIR RANGE IN AGRICULTURAL ENTITIES</b>	
<b>Elena TIMOFTI, Petru TOMIȚA, Daniela POPA.....</b>	<b>463</b>
<b>62. MODELLING SMART ECONOMY AND EDUCATION-RELATED ENVIRONMENTS USING SYSTEM DYNAMICS PRINCIPLES</b>	
<b>Victor TIȚA, Nicolae BOLD, Doru Anastasiu POPESCU, Daniel NIJLOVEANU.....</b>	<b>471</b>
<b>63. A STUDY ON AGRITOURISM SERVICES IN ROMANIA</b>	
<b>Ioana-Alexandra TOADER, Dorina MOCUTA.....</b>	<b>475</b>
<b>64. AGRICULTURAL POLICY OPTIONS TO BOOST THE PRODUCER SURPLUS: THAILAND'S NATURAL RUBBER MARKET EQUILIBRIUM</b>	
<b>Özlem TURAN, Serkan GURLUK, Abdulhakim MADIYOH.....</b>	<b>483</b>
<b>65. COOPERATION AMONG INDIVIDUAL FARMERS IN ROMANIA: CONSTRAINTS AND OPTIONS</b>	
<b>Axel WOLZ, Judith MÖLLERS, Marius Mihai MICU.....</b>	<b>489</b>
<b>66. THE ORGANIC PRODUCTION OF CEREALS IN THE E.U. COUNTRIES AND THE PROFITABILITY OF WINTER WHEAT AND WINTER RYE IN ORGANIC FARMS IN POLAND</b>	
<b>Marcin ŻEKAŁO.....</b>	<b>493</b>



## THE ROLE OF DESTINATION MANAGEMENT ORGANIZATIONS (DMOs) FOR SUSTAINABLE RURAL TOURISM IN BULGARIA

Krasimir ALEKSANDROV, Ivan KILIMPEROV

Agricultural University – Plovdiv, Department of Tourism, Bulgaria, 4000 city of Plovdiv, 12, Mendeleev Blvd., Phone: +359 32 654 200, Emails: kasienit@gmail.com, i.kilimperov@gmail.com

*Corresponding author:* kasienit@gmail.com

### *Abstract*

*Bulgaria has all the necessary resources for the development of specialized types of tourism. There are also sea and mountain tourism, there are opportunities for development of rural, spa, cultural, culinary, wine tourism and others. In this connection, the country is divided into several tourist areas, each of which has a certain tourist specialization. The attention is directed to the tourist region of Rhodope, with specialization in rural tourism. The main purpose is to analyze the organization's management of the region as a destination and to explore the opportunities for developing sustainable rural tourism and its popularization at both national and international level.*

**Key words:** *tourist destination management organizations, rural tourism, sustainable development, sustainable rural tourism*

### INTRODUCTION

Bulgaria has all the necessary natural and anthropogenic tourist resources for the development of both seaside and mountain recreational tourism but also other specialized types of tourism such as cultural-historical, adventurous, rural and agrarian, wine, health and SPA tourism, etc.

A typical feature of tourism through is its rapid development, which produces adverse effects on the environment in general – the natural, the anthropogenic and the sociocultural environment. This strongly calls for the development of sustainable forms of tourism or such forms of destination management that will ensure the development of sustainable tourism.

Sustainable development involves the creation of opportunities to satisfy the needs of next generations, to ensure social tolerance, to protect the ecological integrity of environment and the growth of economy.

Eventually, tourism development can take into account the preservation of cultural heritage, the promotion of tourist attractions, investments, diversification of activities, service and staff quality [8].

This strongly calls for the introduction of changes into the organization and management of tourism at its different levels (site, destination, region, government), and also into the tooling set of tourist policy. A milestone in this respect would be the restructuring of tourist destination management organizations. From being regarded predominantly as marketing units, organizations should take up the strategic position of managers, and based on the regulatory requirements and the consumers' requirements, they should provide the necessary managing potential and tooling set that would be required to ensure the development of sustainable forms of tourism. Exactly for this purpose the National Strategy for Sustainable Development of Tourism was created, it includes adequate measures for developing sustainable forms of tourism [2]. It is clear that the so called "massification" of contemporary tourism causes significant problems of economic, social, cultural and environmental nature [6]. Having in mind the globalization and its effects on tourism, there is an urgent need to change completely the tourist product policy [7]. Looking from the perspective of specialized types of tourism, the rural, the cultural and the



ecological tourism are often viewed as sustainable forms of tourism. This fact is due to the philosophy of marketed product:

- preservation of nature and biological diversity;
- preservation, restoration and development of our cultural historical heritage;
- ensuring social tolerance and consideration for the needs of local inhabitants;
- economic growth and progress.

It is exactly this philosophy that formed the basis for the wording of the **purpose** of this article, which is **to specify the role of tourist destination management organizations for the development of sustainable rural tourism in Bulgaria.**

## MATERIALS AND METHODS

To define the role of tourist destination management organizations for the development of sustainable tourism we applied the method of observation, the method of comparative analysis (benchmarking), the normative method, plus a number of other management methods that have to do with the creation of a managerial structure for an organization.

We made an attempt to introduce the concept of developing the so called “slow tourism”. In general, slow tourism is defined as “a contemporary concept for creating alternative forms of tourism and harmonic development of destinations based on ethical values, full-valued tourist travels that were given one’s individual meaning, free from the stress and dynamicity that are typical of mass tourism, and taking place in natural, unique and authentic environment” [3]. It is exactly thanks to the above-mentioned specific features of slow tourism that it can be greatly associated with the services provided in the sphere of rural tourism.

## RESULTS AND DISCUSSIONS

The term “tourist destination” has a somewhat marketing connotation because “it reflects the interaction between the tourist needs and demands on the background of the target spatial direction of tourist streams toward a

particular host territory” [5]. The term tourist destination can also be defined as a territorial system having enough and diverse attractions and services available that are perceived as unique and capable of satisfying certain tourist needs, which has to be managed as a strategic business unit.

In this context and for the purpose of our study we can define **rural tourist destination** as a **territorial system, which is part of a rural region and possesses unique rural tourist resources to satisfy specific tourist needs in the sphere of rural and agrarian tourism, which should be managed, organized and planned as an autonomous business unit.**

The development of rural tourism is directly related to a series of other industries, which brings a number of challenges to the face of management. On the other hand, rural tourism interacts all the time with different elements of the two major areas of reality – the natural environment and the anthropogenic environment (including its sociocultural aspects). Therefore, the rural tourist destination management must ensure the proper functioning and harmonic interaction between the basic components of rural tourism, together with compliance with the requirements for ensuring the balance between the tourists’ needs and the local inhabitants’ needs. In this respect, the tourist destination management can be discussed in terms of its business, institutional and territorial aspects (Fig.1).

The business aspect is associated with the management of tourism as a business, which is carried out by companies specialized in the main tourist activities (such as the hospitality business – hotel and restaurant management, tour operation and travel agency) but also in various other activities that either directly or indirectly influence the development of tourism (transport, construction, advertising, agriculture, etc.).

A typical feature of a rural tourist business is the prevalence of small-scale companies with family-owned sites, which renders the management of a destination very difficult. On the other hand, such difficulties provide a very sound motivation to establish destination

management organizations, especially if the priority is to be put on sustainable tourism.

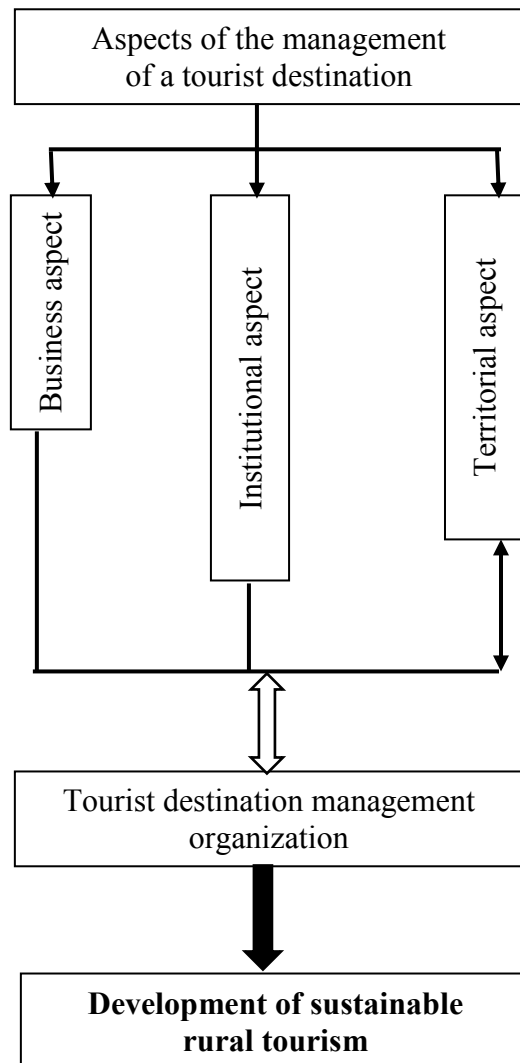


Fig. 1. Aspects of the management of tourist destinations in view of achieving sustainable rural tourism.  
 Source: Author's figure.

The institutional aspect is associated with the management delivered by government agencies and non-government organizations. A specific feature of rural tourism is also the function of certain informal institutions, which can be very much regarded as one of the basic organizational issues and factors that could help overcome the effects of subjectivity at the level of destination management.

The territorial aspect of management is mainly associated with the arrangement of recreational territories, the building of super and infrastructure for the needs of tourism, the preservation and the environment-friendly and

effective use of available tourist resources. The territorial aspect of management is influenced to a great extent by the business and institutional aspects because the subjects of management come from the institutional and business spheres.

An important issue in the territorial aspect of a rural tourist destination management is the management of agrarian lands because a large portion of those lands can serve as a resource for the development of sustainable forms of rural and agrarian tourism.

Based on the above aspects of management, we can summarize some key features of tourist destination management organizations, in particular concerning the rural tourist destinations.

Destination management comprises all the methods by which tourism can affect the destination, aimed at achieving the objectives set by the management. They include planning and control of tourism development, and of rural tourism in particular (including by applying the tooling set of tourism policy and the measures for rural development), provision of the required infrastructure, management of tourist streams, information services, business support, establishment and adherence to standards, monitoring.

Rural tourist destination management should be oriented towards the creation of conditions that will ensure the provision of unique experiences for the tourists in rural environment. Rural environment means rural lifestyle, ethical conduct, rural authenticity and culture. The effect that is sought after can only be achieved by combining the efforts of many organizations often very diverse in nature but always operating as one whole. In this regard, destination management requires that all interests and understandings no matter how different they may be are united for the purpose of achieving one common goal – to ensure the destination viability and integrity now and in the future.

This is very much the basis underlying the philosophy of rural tourism and the tourist products it offers. Preserving the culture and customs, taking care of the economic development while at the same time taking into consideration the needs of local

inhabitants, the condition of nature and providing for the needs of next generations. The problem has to do with the huge number of companies operating in this field, the missing proper coordination between them and the discrepancy between the needs of contemporary tourists (very much provoked by the modern-time development of tourist services) and the philosophy of life “conservation” which underlies the concept of rural tourism.

It is exactly here that one of the key roles of rural tourist destination management organizations is manifested. Quite often they become the principal advocates of tourist industry by guaranteeing mitigation of the negative effects from tourism on the environment in general and on the local communities in particular, by creating at the same time possibilities to “exchange” people, ideas, and opportunities. This can very much be the basis for overcoming the “rural backwardness”, the stereotypes and some behavioral patterns that are typical for quite many Bulgarian villages.

Actually, a rural tourist destination management organization can be most useful for facilitating the dialogue between the private sector, the public sector and the other parties concerned about the development of rural tourism. The purpose here is to set the required balance between modernization and conservation so as to guarantee the long-term sustainability of a destination.

The key strategic aims of every rural tourist destination management organization should be:

- (i) to improve the long-term prosperity of local inhabitants;
- (ii) to ensure maximum satisfaction of visitors by providing high-quality basic services, plus extra services that are specific and typical for the region and the village;
- (iii) to increase the liquidity and to ensure maximum profitability for local enterprises as well as the maximum multiplication effect for rural tourism;
- (iv) to bring to minimum the adverse effects of tourism by guaranteeing a stable balance between the economic benefits and the sociocultural and environmental costs;

(v) to make rural environment ready to host tourists with specific needs;

(vi) to attract major agricultural producers into the tourist business.

The last aim has become expedient because the rural tourist destination management requires that all processes and activities are organized in such a way as to guarantee the sustainable development of a destination. For rural tourist destinations this very much involves the performance of agricultural activities in the concerned region as a basic branch of industry, which is closely bound to the development of rural and agrarian tourism. To achieve sustainable development of destinations, the presence and completeness of the main components of sustainable development must be guaranteed:

(a) **ecological sustainability** – development must be compatible with the processes required to maintain the ecological balance, biological diversity and biological resources;

(b) **economic sustainability and succession of generations** – development must produce economic effectiveness and ensure equality and succession to the generations to come;

(c) **social sustainability** – development must create higher living standards for local inhabitants, maintain and develop the established ethical conduct and communication, and guarantee the harmony and understanding in society;

(d) **cultural sustainability** – development must be compatible with the culture and values of local inhabitants and guarantee the preservation, development and delivery of all tangible and intangible items bearing the national culture and spirit to the generations to come.

The problem, according to the business approach, is that sustainable development is mainly and most of all associated with such circumstances and factors that could guarantee maximum profit from related economic activities [1]. For the development of sustainable rural tourism this problem goes even deeper. The major part of companies offering tourist services lack the necessary theoretical knowledge about tourism, not to mention in the sphere of economics, therefore

they are basically not ready or able to provide sustainable rural tourism.

There follows the conclusion that in order to develop sustainable rural tourism all concerned institutions in the private and in the public sector and all the subjects of tourist destination management should strive to reach unanimity, coordination and single focus of their efforts. Therefore, **the main purpose of a rural tourist destination management organization can be defined as follows – to synchronize the efforts of all concerned parties as part of the process for achieving sustainable development.**

For this purpose, some of the basic processes related to the management and organization of rural tourist sites must be standardized. Considering the multitude and diversity of sites where rural tourist services are provided, there appears the need to create models (patterns) for organizing and managing the different activities performed at the tourist sites but also certain models (patterns) to be applied for shaping the design of tourist product. The idea is to introduce standards for certain organizational and managerial activities in order to make it easier for the rural tourist sites to adapt to ambient

environment, thus ensuring their economic stability. On the other hand, this will greatly facilitate and increase the efficiency of efforts made by the rural tourist destination management organizations to coordinate and achieve sustainable rural tourism.

The normative method and the designed normative models can be used as a starting point for the development of such patterns.

The main purpose of creating the normative model is to define the actual condition of a tourist site and to compare it to a given baseline model thus ensuring its economic X – effectiveness. When discrepancies between the normative model and the actual condition are found, measures should be taken to eliminate such discrepancies and to adapt the tourist site organization and management to the introduced norms and standards.

The design of normative models for tourist activities goes through several stages, the purpose of which is to assess and analyze the condition of processes that run in the rural tourist site and to restructure its management so as to eliminate as much and as best as possible the discrepancies between the actual condition and the design model (Fig.2).

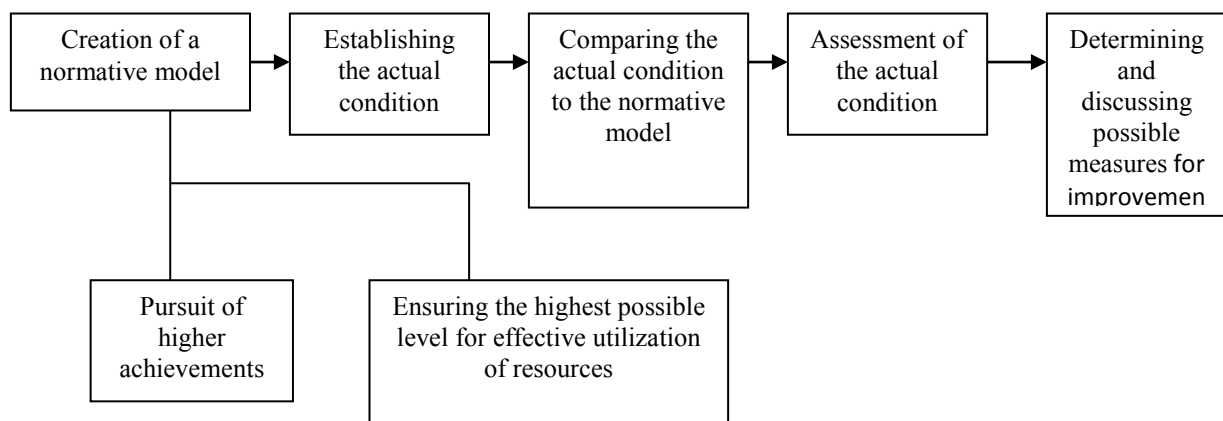


Fig. 2. Key stages in the creation of a normative model to be applied in the sphere of rural tourism

Source: Author's adaptation on Stankov, V. et al, 2007. Organization and Management of the Agricultural Enterprise (Agromanagement).

In summary, from the point of view of rural tourism, the territorial division of the country into regions can serve as a starting point for the creation of such organizations. Although the regions where rural tourism is developed are not strictly outlined, a suitable region for

this purpose can be the tourist region of Rhodope Mountains (Fig.3). This region offers its guests the unmatched opportunity to become engulfed into the typical Rhodopean atmosphere amidst its well-preserved nature, authentic culture and colorful history [4].

The region has the necessary infrastructure, the resources needed for the development of sustainable rural tourism and the favorable disposition of local inhabitants, in addition it is easily identifiable as a tourist destination. Another advantage is the existing tourist region management organization.

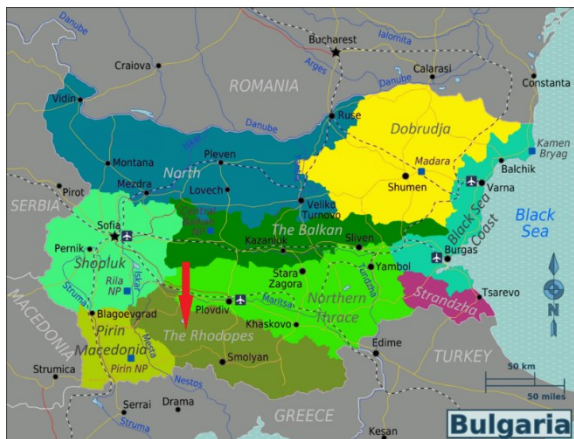


Fig. 3. Rhodopes tourist region

Source: <https://en.wikivoyage.org/wiki/Bulgaria>

## CONCLUSIONS

In conclusion, let us point out that control, being an essential function of the management of a tourist destination for sustainable tourism, is the key role factor to guarantee:

- the protection of economic interests of tourist product and service providers and traders;
- the creation of suitable conditions to improve the destination quality and competitive capacity;
- the defense of visitors' rights;
- the prevention of unsustainable practices, risk and crisis situations in the destination;
- the protection of interests of all concerned parties in the sustainable rural tourist destination.

## REFERENCES

- [1] Atanasova, V., Koprinarov, Br., 2015, Sustainable tourism – a global trend or a challenge. – B: „Ecological and rural tourism – challenges and prospects”, 6-18.
- [2] Draft of updated national strategy for sustainable development of tourism, 2014 – 2030, 2017. S.
- [3] Kazandzhieva, V., Lukanova, G., 2016, Advantages of the “slow tourism” concept in the context of the transformations in tourism. Specialized types of

tourism – challenges and prospects, Research papers of the Agricultural University, 60 (1), pp. 85-92.

[4] Lulcheva, I., Aleksandrov, K., 2017, Research on the supply and consumer demand for rural tourism in Eastern Rhodopes. Scientific Papers. Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 17(4): 179-186.

[5] Marinov, S. A tourist place, //Neshkov M et al, 2007, Introduction to tourism//. Science and economics, Varna, p. 147.

[6] Marinov, St., 2016, Marketing of Strandzha Natural Park as a destination for eco-tourism. Specialized types of tourism – challenges and prospects, Research papers of the Agricultural University, 60 (1), pp. 25 – 32.

[7] Neshkov, M., 2016, Conceptual problems in defining specialized tourism. Specialized types of tourism – challenges and prospects, Research papers of the Agricultural University, 60 (1), pp. 9 – 16.

[8] Popescu, A., Plesoianu, D, 2017, Trends of tourist arrivals and overnight stays in the Maramures County, Romania, 2007-2016 and forecast for 2017-2021. Scientific Papers. Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 17 (4) pp. 281-292.

## IMPACT OF E.U. FUNDING ON RURAL AND REGIONAL DEVELOPMENT MANAGEMENT

Berislav ANDRLIC<sup>1</sup>, Marko SOSTAR<sup>2</sup>, Tatjana BODEGRAJAC<sup>1</sup>

<sup>1</sup>Polytechnic in Pozega, 17 Vukovarska Str., Pozega, Croatia, Mobile: +385995226371, Emails: bandrlic@vup.hr, tbodegrajac@vup.hr

<sup>2</sup>Town of Pozega EU Fund Office, 1 Holy Trinity Square, Pozega, Croatia, Email: marko.sostar@pozega.hr

**Corresponding author:** bandrlic@vup.hr

### Abstract

*EU funds are all financial and operative programs funded by the European Union, either in the Member States (Union Programs and instruments of the Cohesion, Agriculture and Fisheries Policies), or outside of them (pre-accession funds, other country programmes). In order to develop the regions, cities and villages of Croatia, the programme of strategic investment is established by the regional policy which promotes economic and social growth and improves the living standard. It gives support for less developed areas and rural regions as an expression of solidarity. Purpose of this research paper is to identify level of knowledge about EU funds in rural area with survey method. There is a practical example of a survey of the respondents on the impact of EU funds on reducing rural regional inequalities as a result of this paper.*

**Key words:** rural development, management, EU funding

### INTRODUCTION

European funds are European Union funds, donated to various aid programs. EU funds and programs differ from sources of funds and types of grants, which are allocated to users. For most of them all money comes from the EU budget, while the rest comes from national budgets or funds from other organizations, such as the European Investment Bank.

Entrepreneurs, public bodies, and local authority units have European Union programs available, where applicants from one country compete with applicants from all other member states. Projects which are destined to have a positive impact on business and social change could be financed by EU funds.

EU funds are influenced by a number of factors, and they are the main source of EU investment, with the aim of assisting Member States, above all the less developed ones, in increasing their growth, securing jobs and ensuring rural development in line with the Europe 2020 goals. [4]

That EU regional policy and EU regional inequalities are becoming key areas of the EU funding development. In this context, the

paper present an analysis of the economic results in the area of knowledge about EU funding in rural region of eastern continental Croatia.

EU funding terminology

Since 2007, the Republic of Croatia is a beneficiary of the IPA program, which is Croatia's preparation for EU membership. By joining the Union, Croatia has been enabled to use EU Investment and Structural Funds, which have objectives to help Member States increase their growth and ensure more jobs, while ensuring sustainable development in line with EU cohesion policy.[4][8].

In the financial perspective 2014-2020, the term European Structural and Investment Funds (ESI Funds) was introduced, which includes the following funds: the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Fund for Maritime Affairs and Fisheries [1].

There is a visible structure of the EU funds, mostly made up of the Cohesion Policy (Regional Policy), for which in the period 2014-2020. EUR 351.8 billion, which is also the EU's main investment instrument. There

are also the European Fund for Regional Development (EFRR), the European Social Fund (ESF), the Cohesion Fund (KF), the European Agricultural Fund for Rural Development (EPFRR) and the European Fund for Maritime Affairs and Fisheries (EFPR). [5].

Regional and rural policy management considerations

To build the economic and social development and to improve the living standard in all the regions, cities and villages of Croatia it is needed a Programme of strategic investment established by regional policy, which is usually named "Cohesion Policy".

As an expression of the solidarity in the EU which sustains the less developed regions, the funding comes from the common EU budget.

In their visibility recent authors argue that the goal of Cohesion Policy is to reduce the main economic, industrial, social and territorial differences that exist in European regions [5] [6].

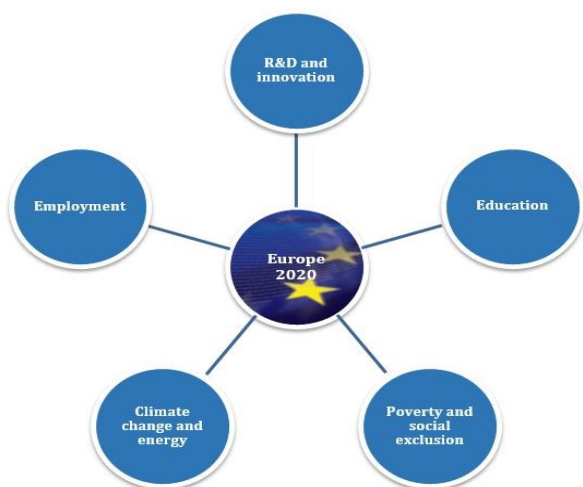


Fig. 1. Europe 2020 targets in rural development

Source: Eurostat portal  
[http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe\\_2020\\_indicators\\_-\\_background](http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_2020_indicators_-_background)

EU regional policy makes up the bulk of the EU budget for 2014-2020. and is the EU's key investment technique for achieving the goals of the Europe 2020 strategy (smart, viable and inclusive growth).

The financing of the EU's regional policy has aim on four key points: scientific research and innovation, communication technologies and media information, and increased competitiveness of small and medium-sized companies. [5]

Figure 1 shows data to the Europe 2020 targets. Indicators related to environmental objectives and education show progress towards the main goals. On the other hand, there is still a need to invest further efforts in the field of employment, research and development, and the fight against poverty or social exclusion.

Regional and rural development policy and all its activities should be based on the following 5 principles: [4]

(i)The Principle of Concentration - refers to the geographical concentration of the region according to unique criteria, and is defined by the creation of the so-called. NUTS 2 statistical regions,

(ii)The principle of program planning - regional policy resources are planned within the framework of the EU budget, whose revenue and expenditure plan brings in multi-annual financial frameworks, based on which the annual budget is adopted,

(iii)The Principle of Accession - The EU does not fund entirely one project, but requires the participation of national, regional and local sources,

(iv)The Principle of Partnerships – it is a negotiation between the European Commission and the member states about key regional policy programmes, and

(v)Principle of Efficiency - There is a process of monitoring and checking the spending of EU regional funds [7].

One of the characteristics of this policy is its solidarity with other EU countries, as a large part of its investment, aimed at the less economic key regions of the European Union [3].

With these resources, these regions allow them to realize their economic and rural development potential, in accordance with their capabilities, and the opportunities they have. [6]

Rural Development Programme: Case Study of Croatia

The Republic of Croatia's Rural Development Program for the period 2014-2020, worth about EUR 2.4 billion, started to be created in 2012 and was officially submitted for approval on 16 July 2014. The decision on approval is the crown of this long-term process involving local experts, most of whom are employees of the Ministry of Agriculture and Agricultural Payments Agency in agriculture, fisheries and rural development. The program has defined measures aimed at increasing the competitiveness of Croatian agriculture, forestry and processing industry, as well as improving the living and working conditions in rural areas at all. Measures are:

M1-Transfer of knowledge and information activities

M2-Advisory Services, Agrarian Management Services and Assistance to Farms

M3-Quality systems for agricultural products and food

M4-Investments in physical assets

M5-Renewal of agricultural production potential disturbed by elemental disasters and catastrophic events and the introduction of appropriate preventive activities

M6-Development of agricultural holdings and businesses

M7-Basic Services and Rural Reclamation in Rural Areas

M8-Investments in the development of forest areas and improvement of forest sustainability

M9-Establishment of producer groups and organizations

M10-Agriculture, Environment and Climate Change

M11-Ecological breeding

M13-Payments to areas with natural limitations

M16-Collaboration

M17-Risk Management M19 - LEADER (CLLD)

M20-Technical Assistance/Rural Development Network [2]

Eligible investments within the measures of the Republic of Croatia's rural development program for the period 2014-2020 are mostly financed by the European Union through the European Agricultural Fund for Rural Development (EPFRR), while the remainder

is co-financed by the State Budget of the Republic of Croatia [5] [6].

## MATERIALS AND METHODS

The data of the subject that was the object of this research was collected through an online method, which is today the most acceptable and the fastest method to implement. Respondents covered by this survey are young people, students, parents and retirees who have access to online media and live in rural area (Pozega Slavonia County in eastern Croatia). The survey was conducted in the period of September 5, 2017 - September 11, 2017. The sample size was 107 respondents.

## RESULTS AND DISCUSSIONS

In the first question, respondents should choose gender, where, as shown in the graph, most respondents were women 80.4%, while men only made 19.6% of the answers. The next question is how many years have respondents, where result shows that most of the respondents were 94.4% between 18 and 30 years of age, while subjects under the age of 18 and older 30 years were very little, only 2.8%.

The third issue of the survey was whether the respondents of Croatia's EU membership supported, where, as can be seen in Figure 8, most respondents support membership in the amount of 78.3%, while non-supporters account for only 22.6%.

The fourth question was the knowledge of EU and EU funds, where, as shown in Figure 2, there were a variety of responses. The majority of the respondents were poor knowledge in the percentage of 59.8%, sufficient knowledge 20.6%, no 16.8%, and the smallest percentage of excellent knowledge in the amount of 2.8%.

Table 1. Level of EU fund knowledge

Level	Percentage (%)
1.	59.8
2.	20.6
3.	16.8
4.	2.8

Source: Own research.



The next question of the survey is any of the areas of funding, where most of the answers seem to be the answer I do not know (42.9%), while there were still diverse responses from agriculture and the economy (30.3%), regional and rural development (19%) and others (7.6%).

Table 2 . Knowledge about EU funding sectors

Level	Percentage (%)
1.	42.9
2.	30.3
3.	19
4.	7.6

Source: Own research.

The next issue of the survey was that we have too few educated people from the EU area and so on EU funds, and as can be seen in the following graph, the results prove that we have very few educated people in this area where half of the respondents think we have too little educated people for the EU area at 53.8%, 42.5% think that perhaps, and only 3.8% of respondents think they do not.

Table 3 . Segment of EU funding experts

Level	Percentage (%)
1.	53.8
2.	42.5
3.	3.8

Source: Own research

The last question of the survey was about the use of EU funds, where most respondents said that the use of EU funds could improve the current situation in the Republic of Croatia by 72%, while 23.4% of respondents were out of the question and the other answers were 4.5 %.

## CONCLUSIONS

After the research carried out it can be concluded that there is a prospect for progress in today's young society, only a good incentive is needed. Today's young people feel helpless and unwilling to do whatever is going on, primarily because of state management, and the lack of interest of the authorities to invest. The survey was mostly women's approach, while a much smaller number of male

respondents proved that women are somehow more motivated to progress and are more willing to do something to improve the current situation not only in the Republic of Croatia but also in the world.

The devastating result was as far as the knowledge of the respondents about the EU in general as well as on EU funds is concerned, and there are so many places to improve. It is necessary to introduce courses, to encourage not only young people but also older people to education in this area, to overcome such a large gap in ignorance of the EU itself, as evidenced by, for example, the number of funds. Regarding the places where the areas of funding have been written, the answers were fairly divided, but it also proves that the respondents are poorly aware of the funds. Regarding the areas of funding, it is evident that most know where the "castors" could be launched, but just as it was stated before, the knowledge and the will to do something for development of rural area in eastern Croatia.

## REFERENCES

- [1]Bešlić, B. N., Bukovac, S., Copic, M., 2014, EU Project Management, Tim4Pin, Zagreb, p.16.
- [2]Devčić, A., Šostar, M., 2015, Regional Development and EU Funds, Opportunities and Challenges, Polytechnic of Požega, p.112.
- [3]European Union, Document „How are EU funds changing Croatia“, [https://europa.eu/european-union/topics/regional-policy\\_hr](https://europa.eu/european-union/topics/regional-policy_hr), Accessed 30.01.2018.
- [4]Hrcak scientific portal, Introduction of Nomenclature of Territorial Units for Statistics in Croatia, <https://bib.irb.hr/datoteka/205009.96.pdf>, Accessed 12.04.2018.
- [5]Rural Development Portal, Document Rural Development Programme of the Republic Of Croatia for the Period 2014-2020, : [https://ruralnirazvoj.hr/files/documents/Programme\\_2014HR06RDNP001\\_4\\_2\\_en.pdf](https://ruralnirazvoj.hr/files/documents/Programme_2014HR06RDNP001_4_2_en.pdf), Accessed 12.04.2018.
- [6] European Comission, Document Sustainable Rural Development in support of a sustained cohesion policy, [www.europa.eu/rapid/press-release\\_SPEECH-97-99\\_en.pdf](http://www.europa.eu/rapid/press-release_SPEECH-97-99_en.pdf), Accessed 13.04.2018.
- [7]Kersan-Škabić, I., 2015, European Union Economics, Juraj Dobrila University in Pula, Faculty of Economics and Tourism "Dr. Mijo Mirković ", p.183.
- [8]Knežević, I., 2016, Master thesis, Economic Faculty Split.

## ANALYSIS OF MARKETING STRUCTURE AND PROBLEMS IN GARLIC PRODUCTION: THE CASE OF KASTAMONU PROVINCE

Beyza BAYRAKLI, Mevlüt GÜL

University of Süleyman Demirel, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Phone: +902462118588, Fax: +902462118696, Emails: beyza3419@hotmail.com, mevlutgul@sdu.edu.tr

*Corresponding author:* mevlutgul@sdu.edu.tr

### *Abstract*

*In this study, the existing marketing system of garlic, which is an important product in terms of Kastamonu, was analysed. The problems of the farmer, the intermediaries and the handler were examined. In this frame, the data were obtained from the garlic farmers, intermediaries (agent, traders) and handler by questionnaire. The most important marketing channel for farmers in the region were traders. The price of garlic was usually determined by traders. The activities/number of members of the garlic producer association established in 2010 were not at the desired level. After the garlic produced by the farmers in the research area was classified according to their size and quality, they were offered for sale. Farmers were firstly tried to sell 3rd class small size and 2nd class medium-size garlic. First-grade garlic which can easily find buyers was kept in storage for more income. Problems in garlic farming; lack of technical knowledge of farmers, high garlic loss, the farmers tend to plant the Chinese garlic because of higher yield, lack of marketing opportunities, fluctuations in the price of garlic. With the development of storage facilities in the region, more income can be generated from the product. The development of organizational awareness at the level of producers in the region will increase the likelihood of the producer having a say in the market. Work should be done to protect the Taşköprü garlic. It is necessary to increase the awareness of this species, both within the country and abroad. Cooperative establishments for farmers to market in garlic will be a step towards ensuring price stability.*

*Key words:* consumption, organic products, Romania

### INTRODUCTION

There are 300 kinds of garlic in the world. It grows in all the climates and lands of the world. However, most plants prefer the abundant and sandy soil of selenium in temperate climates. From this point of view, Kastamonu is suitable for garlic agriculture by its land structure [10] [11].

Taşköprü Garlic is a product with "Geographical Recruitment" in the region [9]. Garlic is produced in almost all regions except the Northeast region of Turkey. Aegean region, Balıkesir, Aydın, Manisa, Mediterranean Region; Gaziantep, Antalya, Kahramanmaraş, Central Anatolia Region; Nevşehir, Kayseri, Karaman, Kastamonu, Samsun and Sinop in the Black Sea Region are among the important garlic production places. Turkey according to 2016 data dehydrated garlic planting area has 11,916 hectares (Fig. 1). The production amounted to 109,161 tons (Fig. 2).

Kastamonu province as of 2016 in terms of production and acreage of garlic is in first place in Turkey. The Kastamonu's garlic cultivated area share is 20.06% and production share is 22% of Turkey. Gaziantep is the second important garlic producers with 12.9% share of Turkey, Istanbul is third with 11.6%, Aksaray is fourth with 7.5%, Balıkesir ranks is fifth with 6.1%.

Kastamonu is Turkey's highest dry garlic producer. Kastamonu province in 1991, a total of 13,298 tons of garlic was produced by making 1,514 hectares of garlic in the field. The cultivation area continued to increase year by year. In 2011, the total dry garlic production reached 19,937 tons. In 2013-2014 it decreased by 2,055 hectares. There was a decrease due to drought in 2012, planting area and yield decreased in 2013. From 2014, the cultivated area of garlic has risen to over 2055 hectares, and thus production has increased to 24024 tonnes in 2016. As of 1991-2016 years of dry garlic production share's 13.9% to

32.7% in Turkey was carried out by Kastamonu (Fig. 3).

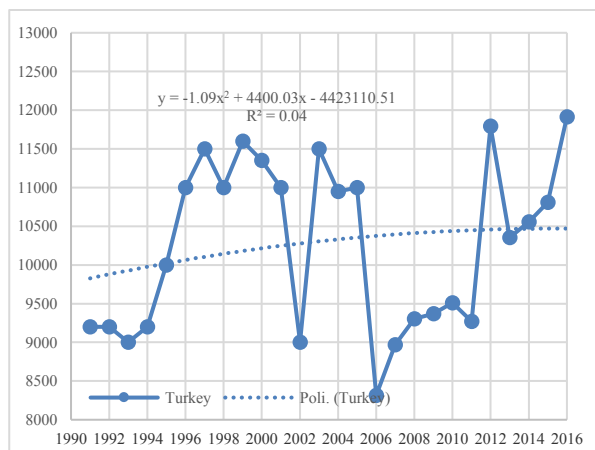


Fig. 1. Garlic cultivation areas (hectare) in Turkey  
 Source: TÜİK [13].

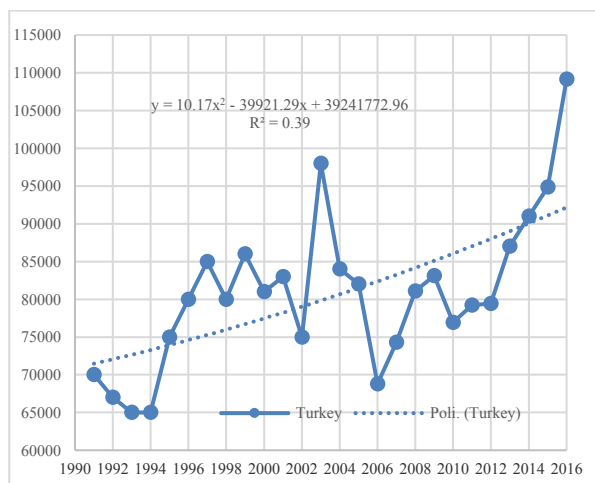


Fig. 2. Garlic production (tons) in Turkey  
 Source: TÜİK [13].

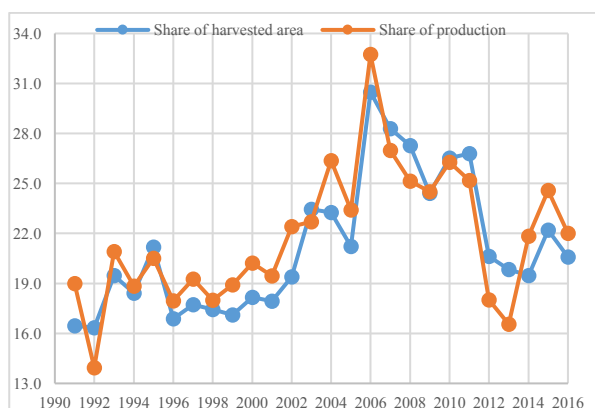


Fig. 3. Kastamonu's garlic production and harvested area share in Turkey  
 Source: TÜİK [13].

Dry garlic production area in Kastamonu province is got stronger in Taşköprü, Merkez and Hanönü districts.

Taşköprü district was selected as a research area. The reason for this, Taşköprü is constituted of 87.6% of the Kastamonu's garlic harvested area and 90.6% of the production.

Studies on marketing about garlic are very few (Some of them Erkal et al. [4]; and Güneş et al. [6]). For this reason, in this study, it was aimed to determine the marketing conditions in the stakeholders' level of garlic cultivation and to identify the problems and to improve the production.

## MATERIALS AND METHODS

The main material of the study was the data obtained by the face-to-face survey with farmers, intermediaries and processing companies in the villages of Kastamonu and Taşköprü. The data belong to the 2014 production period.

Method used to determine stakeholders numbers

In the study, data were obtained by face-to-face survey from farmers, intermediaries and processors dealing with garlic in the region. Taşköprü districts and villagers were identified as the study area. The questionnaires were prepared for stakeholders both for production and for marketing purposes. Questionnaires prepared according to the purpose of the research were filled by interviewing the stakeholders.

When the sample farmer's volume was determined, farmers' garlic harvested areas in the region were divided into three groups according to the width of the garlic field. Using layered sampling method [14], it was calculated that 105 of the number of farmers who grew garlic to be interviewed at a margin of error of 5% and a confidence interval of 99%. This sample volume was distributed to layers by the Neyman method [3]. First strata were identified farmers with 0.10-0.7499 hectare garlic cultivation area as I. group. Farmers with 0.750-1.50 hectare garlic cultivation area were II. group and farmers with 1.51 hectares and over garlic cultivation area were III. group (Table 1).

Table 1. The sample volume of garlic producers

Farm groups	Garlic harvested area (ha)	Population number (N)	Standard deviation	Variance	Average garlic harvested area	Sample number (n)
I	0.1-0.749	1,215	0.91	0.83	0.518	34
II	0.75-1.50	794	2.27	5.17	1.058	55
III	1.510+	111	4.60	21.15	1.886	16
Total		2,120	4.09	16.73	0.792	105

Source: Own calculation.

Twenty of the merchant-intermediaries who were active in the region were interviewed. There are 8 handlers as garlic processor in the region. Three of these companies were interviewed. The data were obtained by the face-to-face survey method. At this point, the marketing activities for each channel were included in the survey.

## RESULTS AND DISCUSSIONS

### *Farmers' level*

The 90.48% of the farmers was their parents where they learn about garlic farming channelled, while 7.62% of them from neighbouring farmers, and 1.90% of them from both neighbouring farmers and their own efforts.

At the beginning of the reasons why farmers prefer to cultivate garlic, the income was high (20.95%). The 13.33% of response prefer to cultivate garlic as a source of livelihood for themselves, 13.33% was because of high yields. 11.43% of the farms said that they preferred because of the easy and low cost of garlic cultivation.

About 64.76% of the farmers' garlic sale channel were merchants in the surveyed area. 28.57% of them were the district market, 4.76% of them were the company and 1.90% was the commission. Therefore, merchants are very influential in the garlic sale channel.

When the criteria for harvesting garlic in the area studied were examined that 8.57% of the farmers were colour of garlic; 75.24% of them were the maturity of garlic; 2.86% of them declared that they decided on the harvest date based on their hardness. 3.81% of the farmers interviewed were determined to consider market conditions in the garlic harvest.

The 2.86% of the farmers classified of garlic in the farmland, 7.62% of them in the farmhouses, 40.95% in the storage. According

to this, it was determined that the farmers interviewed did not have enough storage.

The classification of the products is an important marketing activity. Classification is divided the different products with their similar ones in terms of height, size, shape, colour, etc. Classification enables the consumers to select the products according to their tastes and income levels. It makes purchase and sale of the products easier. It prevents the purchase of undesired products. It facilitates assigning prices to the products [5].

There are three classes of garlic according to Turkish Standard Institute 1,131 and farms took this classification into consideration. These are extra, first class, second class. The minimum diameter for garlic entering the extra class should be 45 mm. Garlic entering Class I and Class II should have a diameter of 30 mm - 45 mm (excluded) [1].

The garlic was sold according to the market conditions. As the producer obtains more money, he attempts to produce the extra class product. Considering the average of the farms, the 1st class had the highest ratio of 51.82%. 2nd class products follow with 30.71% and the extra class products with 17.46% (Table 2).

Table 2. Categorization of the garlic production in the farms

Groups	Extra-Class	I. Class	II. Class	Total
	The average of farms (kg)			
I	819.12	1,941.18	1,230.88	3,991.18
II	1,554.55	4,401.82	2,716.36	8,672.73
III	3,531.25	12,250.00	6,718.75	22,500.00
Average	1,617.62	4,800.95	2,845.24	9,263.81
The share in the total production (%)				
I	20.52	48.64	30.84	100.00
II	17.92	50.75	31.32	100.00
III	15.69	54.44	29.86	100.00
Average	17.46	51.82	30.71	100.00

Source: Own calculation.

The majority (98.10%) of the farmers interviewed had lost crops. The garlic loss rates in the farmers were 5% at 17.14%; 2% in 16.19%; and 3% loss rate in 15.24% of farms. About 85.71% of the farmers are not members of any agricultural cooperatives. Therefore, the organization of farmers in the region as producer association-cooperative is low. Distribution of Gross Production Value (GPV)

Farms' Gross Production Value (GVP) was calculated as the sum of the revenues generated by the agricultural activities (such as crop production, supports, animal husbandry) for 2014 production season.

The mean GPV for farms was 101,713.53 TRY. In terms of farm size groups, the highest amount of GVP was in the third group farms at 171,488.73 TRY, followed by the second group with 100,459.40 TRY and first group with 70,919.22 TRY.

In the garlic size groups, the garlic production value was ranged from 17,061.76 TRY to 94,890.63 TRY, while the other crop production value was varied between 29,252.59 TRY and 35,554.34 TRY, and animal husbandry 24,604.87 TRY to 44,436.60 TRY (Table 3).

Garlic production values were the most important activities and the highest income in farms average and third groups. Indeed, garlic production value amounted to be 37.83% in average farms and ranged 24.06% to 55.33% of the total GPV in farm groups in the region. In the first group, other crop production value was the first with 41.25% of total GPV. This activity's share was changed 18.75% to 41.25% in the groups. Animal husbandry production value's share was 25.91% to 34.69% in the groups. In other words, farms derived more than one in four ratios of their annual GPV from animal husbandry production activities. Therefore, garlic production appears to be an important economic activity for the farms examined in the study (Table 3).

About 16.79% of the farmers interviewed had problems with garlic cultivation, 84.77% had disease and harmful problems, 16.19% had fertilizer and fertilization problem, 19.05% had irrigation problem, 8.57% had problems with machine use, 7.62% 11.43% of the problem was in the input structure, 3.81% in the equipment problem, 40.00% in the input prices, 19.04% in the control of the input vendors and 35.23% in the product prices. Of the 105 farmers interviewed, 56.19% said the market was inadequate for chickpeas and that in some periods the buyers' numbers were inadequate for the product.

59.05% of the farmers interviewed from the research findings stated that there is a lack of producers' organising in garlic production.

Table 3. Distribution of GPV in the farms

Production branches	I	II	III	Average
	Value (TRY/farms)			
Garlic production activities	17,061.76	35,314.55	94,890.63	38,482.38
Other crop production activities	29,252.59	35,554.34	32,161.50	32,996.77
Animal husbandry	24,604.87	29,590.52	44,436.60	30,238.38
<b>Total</b>	<b>70,919.22</b>	<b>100,459.40</b>	<b>171,488.73</b>	<b>101,717.53</b>
Rate (%)				
Garlic production activities	24.06	35.15	55.33	37.83
Other crop production activities	41.25	35.39	18.75	32.44
Animal husbandry	34.69	29.46	25.91	29.73
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source: Own calculation.

#### *Stakeholders' level*

It was discussed with 20 traders and 3 processors in the marketing channel.

85% of the traders purchased garlic on their behalf, 10% of them purchased garlic on firm behalf, and 5% of them purchased garlic on behalf of another merchant.

The period of purchasing garlic from farmers in the region was the most (50%) in July.

The traders declared that decisive of the garlic purchase price was garlic quality (30%), market supply and demand (20%), bargaining (20%), garlic classification (10%) and garlic size.

The majority of merchants (80%) did not have a garlic processing facility. 20% were in the garlic processing plant. A large majority (85%) of merchants had storage. 80% of them did market research.

A significant portion of merchants sold the product (80%) in advance while 5% sold futures.

Merchants reported that the development of market opportunities in the region, improvement of garlic yield, dissemination of conscious production, compliance with crop rotation, regulation of price uncertainty, control of Chinese garlic and improvement of garlic production in the region could be achieved.

All of the processing companies were Limited Liability Corporation.



Firm A has been in garlic purchase activity about 15 years, B 10 years and C about 1 year. The level of education of the workers employed by firms in their organizations was generally at primary and secondary level. The managers' education level was generally university degree (66.67%). It was determined that the companies interviewed did not have an infrastructure for exporting. All of the companies sell garlic in the national market. The marketing channels that companies use in purchasing garlic were usually "producer-commissioners" and "producer-collector-commissioners". Firms usually sold garlic to big chain stores in the national market. All of the companies interviewed conduct market research with their own team. Firms used domestic packaging material. Firms were using string bags and reported that their sizes varied between 100-250 g and 3 kg. Standardization procedure for garlic was applied (classification of garlic to head diameter). They divided garlic into large, medium and small.

It was determined that 67.57% of the cost of 1 kg of garlic was raw material cost, 15.06% was processing cost, 9.65% was transportation cost and 7.22% was packaging cost.

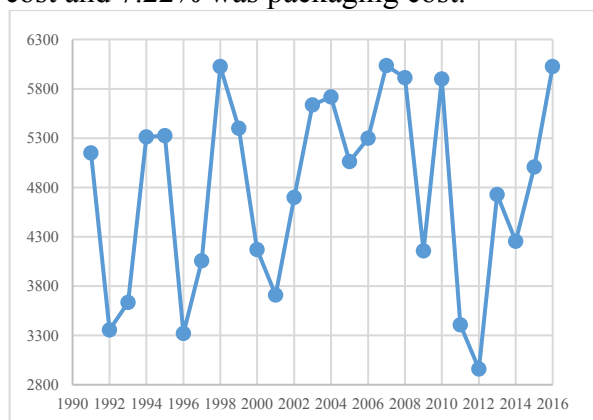


Fig. 4. Real prices of garlic (TRY/tons) in Turkey  
 Source: TÜİK [13].

Over the years, the real prices of the garlic producers have fluctuated based on supply-demand balance (Figure 4). This result corroborates with Özkan and Aydın's [12] findings. Therefore, the effect of this had been felt more in garlic producers. It had been a reflection of net profit fluctuations of the farmers. Reducing the production costs to the minimum level or increasing the yield

potential in this situation are the ways of the farmer. However, this is hardly achieved due to the nature of agricultural products.

Yurdakul [16] defined marketing channels that they are routes through which agricultural products move from producers to consumers. These channels' length varies from commodity to commodity.

Yurdakul [16] declared the marketing channels of the fruit and vegetable in Turkey below:

Producer – Agriculture Cooperative – Retailer – Consumer

Producer – Wholesaler – Commissioner – Retailer – Consumer

Producer – Commissioner – Wholesaler – Retailer – Consumer

Producer – Middleman – Commissioner (at the production place) – Wholesaler – Commissioner (at the consumption place) – Retailer – Consumer

In investigated areas, there were local wholesale, merchants, commissioners, processing firms. Farmers can directly sell their garlic to the local wholesalers or processing firms. Some of the common marketing channels for garlic are farmers, local wholesalers, merchant, retailers, and consumers. The wholesale markets play an important role in the entire marketing channel for garlic.

#### SWOT Analysis of Garlic Sector

In this study, the SWOT analysis [2] [7] [8] [15] [17] for garlic production was based on the opinions of stakeholders related to garlic. Within this framework, the strengths, weaknesses, opportunities and threats of garlic production are presented in the framework of information obtained from producers, intermediaries and processors.

The strong aspects of garlic in the region are appropriate to the ecological conditions; product quality; Turkey is the center of the garlic production; the substances in the soil structure are effective in the production of high-quality garlic; taste and smell are different according to other garlic; the storage life varies from approximately 12-14 months; high yield; little use of inputs; income is high.

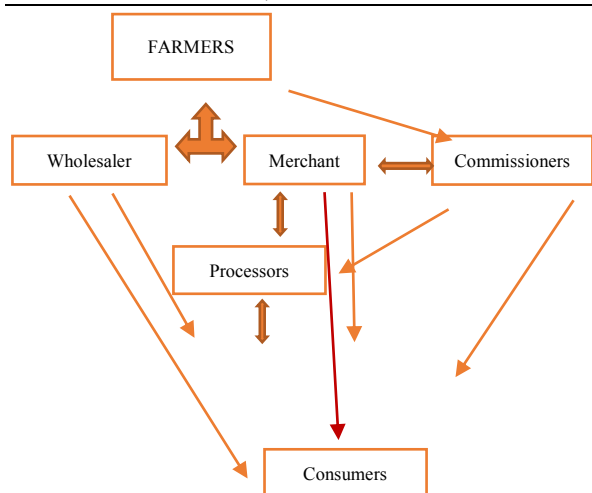


Figure 5. Marketing channels of garlic  
Source: Own calculation.

The weaknesses of the sector in the field of research are the failure of producers to carry out soil analyses and the inadequacy of organization in production and marketing of the region in which the research is conducted. As a matter of fact, some producers in the region were found to have fewer organizations. The price of garlic is not established by certain committees and organizations. According to the number of merchants coming to the bazaar according to supply-demand in the local market, the price formation takes place. It can be said that with the increase of the organizations, the producers will have an advantage in terms of input and sales price. Inadequate/unconscious input by farmers in the region surveyed may lead to lower productivity and quality in production. The development of the garlic industry is also due to the inadequate processing, sorting and packaging facilities. Opportunities in the region's garlic sector are that the use of technology is increased, the harvest season of the garlic grown in the region is different from other regions, the usage areas are widespread, and the regional varieties are preferred by consumers. The threats in the garlic sector of the region covered in the survey are: climate change, increased disease and pests, which in turn affects the quality and price of the garlic; the difficulty of finding workers in the region; lack of production planning; price instabilities; some farmers turn to Chinese garlic cultivation due to the high yield.

## CONCLUSIONS

In this study, the marketing structure and problems of the garlic sector in Kastamonu province were examined. It was tried to bring solutions for the sector.

Kastamonu province for 21.8% of garlic production to meet in Turkey, was selected as the research area. The most important district of Kastamonu where garlic production is concentrated is Taşköprü. Garlic farm made in Taşköprü district constitutes one of the important income resources of the families.

An important part of the garlic produced in Taşköprü is evaluated in internal markets. The main fields used in the internal market are meat products (especially sausage and bacon) industry, pickle industry, head and fresh spices. Industries that will use garlic in the region by processing canned, puree, dried tablets, etc., have begun to develop.

Farmers in the region sell garlic usually in neighbourhood markets. Merchants are the most buyer of garlic in the neighbourhood markets. The price of the garlic is formed by the supply-demand and the number of merchants coming from the bazaar. According to this situation, farmers can turn marketing margins into their own interests by setting up cooperatives for garlic marketing. With the activities of the garlic producer association established in 2010, the number of members is not at the desired level. It could not be worked effectively. It needs to be supported and developed.

After the garlic produced by the farmers in the research area are classified according to their size and quality, they are offered for sale. The farmers were selling predominantly middle-class third-class small-sized and second-class medium-sized garlic on the market, which is more difficult to sell. First class garlic, which always finds recipient easily, is kept in storage to get more income and is driven to the market according to its price.

Garlic hiding warehouse was usually a simple warehouse. Long-term storage in Kastamonu is made by merchants other than a few farmers. Merchants are able to sell their garlic for a certain period of time, drive into the market during winter, and sell high prices.

With the development of storage facilities in the region, more income can be generated from the product. Contractual production for farmers in the region may also be an alternative.

The problems experienced in garlic farming in the region were the fluctuations in the price of the garlic, the problems of the marketing opportunities, the farmers' tendency to plant Chinese garlic because the higher yield, inadequate technical knowledge of farms and losses in harvesting.

For the development of the sector with the movement from the obtained findings:

-At the farmer level, agricultural extension activities should be increased and this should be aimed at solving the right problem.

-Knowledge of organisation at the level of farmers in the region should be improved, which will increase the likelihood of farmers being active in the market.

-In particular, the so-called Taşköprü garlic is one of Turkey's most important species in terms of quality, flavour and durability. Therefore, studies should be done to protect their characteristics.

-It is necessary to increase awareness of Taşköprü garlic in domestic and international markets.

-There is no organised structure in production and marketing of the region in which the research is conducted. In the years when production is low, while the product price is rising, the product price can decrease considerably due to the production excess due to high price expectation next year. This can lead to significant price instability over the years.

Therefore, it can be stated that farmers may have taken a step towards price stability by establishing cooperatives to market in garlic.

## ACKNOWLEDGEMENTS

We would like to thank to TÜBİTAK (2209-A) and Suleyman Demirel University, Faculty of Agriculture for their financial support.

## REFERENCES

- [1]Anonymous, 2008, Official Gazette. 30 May 2008 No.26891, TS 1131 Garlic (in Turkish), Ankara.
- [2]Aslan, O., Gul, M., 2017, Economic structure and the problems of thyme producer farms in Denizli. International Journal of Social and Economic Sciences, Vol.7(1): 64-69.
- [3]Çiçek, A., Erkan, O., 1996, Research and sampling methods in agricultural economics (in Turkish). Gaziosmanpaşa Üniversitesi, Ziraat Fakültesi Yayınları No 12, 118p, Tokat.
- [4]Erkal, S., Osmanlıoğlu, E., Şafak, A., Türkeş, T., Ergun, M.E., Yücel, A., 1989, Research on the economic aspects of garlic production and market in Turkey (Türkiye'de sarımsak üretimi ve pazarlamasının ekonomik yönden değerlendirilmesi üzerinde bir araştırma). Atatürk Bahçe Kùltürleri Merkez Araştırma Enstitüsü Müdürlüğü Yayınları, 31p, Yalova.
- [5]Güneş, T., 1996, Agricultural marketing (in Turkish). Ankara University Publication, Ankara, 297 P.
- [6]Güneş, T., Erkuş, A., Kırıl, T., Turan, A., Tanrıvermiş, H., 1994, Production cost of sparring in Kastamonu province and marketing cost projection (Kastamonu ilinde sarımsağın üretim maliyeti ve pazarlama masrafları alt projesi ). Ankara Üniversitesi Ziraat Fakültesi, Ankara.
- [7]Hay, G.J., Castilla, G., 2006, Object-based image analysis: Strengths, weaknesses, opportunities and threats (SWOT). The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences Proceedings Book, In: Proc. 1st Int. Conf. OBIA, pp. 4-5.
- [8]Houben, G.K., Lenie, K., Vanhoof, K., 1999, A knowledge-based SWOT analysis as an instrument for strategic planning in small and medium sized farms. Decision Support System, Vol.26:125-135.
- [9]İbret, B.Ü., 2005, a geographical study on garlic agriculture and Taşköprü Garlic in Turkey (in Turkish). Marmara Coğrafya Dergisi, Vol.12:17-50.
- [10]Kuzka, 2012, Notices on Taşköprü Garlic Panel (Sarımsak Paneli Bildiri Notları) T.C. Kuzey Anadolu Kalkınma Ajansı (KUZKA) Paneli, 6 February 2012, Kastamonu, 138p.
- [11]Ötleş, S., 2006, Importance of garlic for nutrition and food consumption (Sarımsağın Beslenme ve Gıda Yönünden Önemi ve Tüketilme Şekilleri). Ege Üni. Gıda Müh., Bornova, İzmir.
- [12]Özkan, E., Aydın, B., 2016, comparatively examination of the changes in cost and income indicators in onion and garlic production in Thrace Region (in Turkish). Bahçe Dergisi, Vol.2(Özel Sayı): 95-101.
- [13]TUİK, 2017, TUİK (Turkish Statistical Institute) Statistical Data. (web page: <http://www.tuik.org.tr>, accessed on (20.12.2017).
- [14]Yamane, T., 2001, Basic sampling methods (in Turkish). (First edition). Translators: Alptekin ESİN, M. Akif BAKIR, Celal AYDIN and Esen GÜRBÜZSEL, Literatür Yayıncılık, İstanbul.



[15]Yumuk, G., İnan, İ.H., 2005, an evaluation of quality costs of manufacturing industry firms in Trakya Region by SWOT analysis (in Turkish). Journal of Tekirdag Agricultural Faculty, Vol.2 (2):177-188.

[16]Yurdakul, O., 1998, marketing of agricultural products (in Turkish). Cukurova University, Faculty of Agriculture Publication No 127, Adana, 240p.

[17]Zoller, C., Bruynis, C., 2007, conducting a SWOT analysis of your agricultural business. Ohio State University Extension Fact Sheet Series, pp. 1-3. <https://www.agweb.com/assets/import/files/3611.pdf>, Accessed on December 5, 2017.

## STRUCTURE OF BULGARIAN AGRICULTURE 10 YEARS AFTER THE ACCESSION TO THE EU

Rositsa BELUHOVA-UZUNOVA, Krum HRISTOV, Mariyana SHISHKOVA

Agricultural University – Plovdiv, 12 Mendeleev Blvd, Plovdiv, Bulgaria, Phone: +35932654381, Mobile: +359883326543, Emails: rosicab\_uzunova@abv.bg, krumhristov@abv.bg, mariyana.shishkova@gmail.com

**Corresponding author:** rosicab\_uzunova@abv.bg

### Abstract

*After the Accession to the European Union the Common agricultural policy become an important factor for the development of Bulgarian agriculture. Despite the positive changes in the sector, the agrarian production in the country is characterized by low competitiveness and efficiency. The aim of the study is based on the analyses of the structural changes in Bulgarian agriculture to formulate conclusions for the effect of the ten years membership on the sector. The paper outlines the transformations in agricultural production, farm structure and trends in trade with agricultural products. The study indicates that there are significant problems related to productivity and value added over the past 10 years. The main challenges are associated with structural and sectorial imbalances, uneven distribution of financial support, polarization and overconcentration in the sector.*

**Key words:** Common Agricultural Policy, patterns of specialization, structural changes, transformation

### INTRODUCTION

Bulgarian agriculture is an important sector in national economy. After the accession to the EU, agricultural sector changed significantly. The implementation of Common Agricultural Policy (CAP) caused serious transformations in patterns of specialization and concentration. Bulgarian farms are modernized, the average size of holdings increased but there are substantial problems associated with polarization and production imbalances. Through the new opportunities that the EU fund granted, the share of the non-cultivated area is reduced and there is positive trade balance in Bulgarian agriculture. Despite the positive trends there are a lot of issues and challenges that have to be considered.

The 10 years EU membership gives good opportunity to analyse and highlight the main changes, trends and challenges for Bulgarian agriculture. This topic is widely discussed [2,8] and extends to debate about the impact of CAP on the development of agricultural sector.

The aim of the study is based on the analyses of the structural changes in Bulgarian agriculture to formulate conclusions for the impact of the ten years membership on the

sector. For this purpose, the structural changes in Bulgarian agricultural sector are represented in three main dimensions:

- Changes in the importance of agriculture for national economy
- Changes in patterns of agricultural specialization
- Changes in concentration and economic size of farms.

### MATERIALS AND METHODS

The survey covers the period 2007- 2016 that marks important stage of Bulgarian economic development – the accession to the EU.

Methodological approach includes various methods of research. Analysis, synthesis, deduction and induction are used in the study. Comparative, monographic, logical, tabular and graphical methods of analysis are applied. The data is provided by Eurostat, National Statistical Institute, Farm Structure Survey 2003-2013 in order to present information for structural transformation of Bulgarian agricultural sector. The changes in economic size and concentration are conducted by using the Eurostat classification of farms. “By economic size based on standard output in EUR they form five groups: Very small

farms: < EUR 2,000; Small farms: EUR 2,000 – < EUR 8,000; Medium-sized farms; EUR 8,000 – < EUR 25,000; Large farms: EUR 25,000 – < EUR 100,000; Very large farms: ≥ EUR 100,000” [4].

## RESULTS AND DISCUSSIONS

### Role of agriculture for Bulgarian economy

Number of significant variation and structural changes in all sectors of economics occurred during the transition period [3]. The transformations in agriculture led to a lot of issues and negative trends. The measures that government applied to support the sector were

not consistent. Therefore, after the accession of Bulgaria to the EU in the agriculture sector remain serious unresolved issues. Some of the disadvantageous processes and restructuring are leading to decrease of the role and importance of the agriculture for the national economy. Figure 1 illustrates the share of Bulgarian agriculture in the gross value added, in the number of employees and in the export of products for the period 2007 – 2016. The share of agriculture in the gross value added is gradually declining after the accession to the EU.

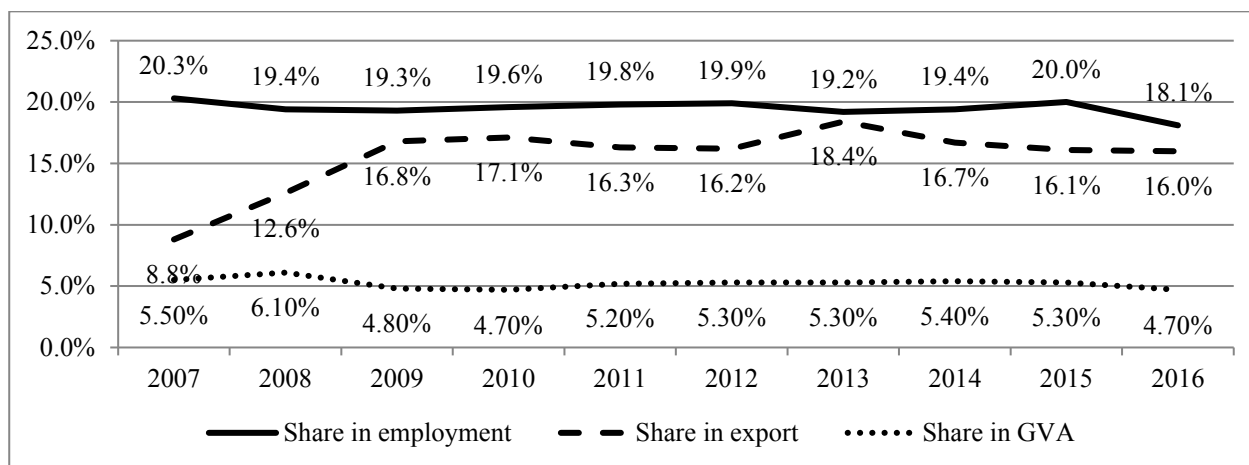


Fig. 1. Role of agriculture in national economy (%)

Source: National statistical institute, FAO, Ministry of Agriculture, food and forestry [7,11,12,13,14,15].

These trends in Bulgaria are similar to the ongoing processes in all other Member States of the Union. The negligible share of agriculture in the economy is a positive phenomenon only when is accompanied with increasing quantity and quality of the agricultural production. This does not apply to Bulgaria and the decreased importance of the sector is the result of negative trends in its development. In the country, there is a reduction in production and a number of issues related to the competitiveness and efficiency. Therefore, the trends in the share of gross value added are signal for structural problems in the sector.

The share of agriculture in employment does not show significant variation. However, the modernization of Bulgarian agriculture associated with new technologies and innovation lead to reduction of number of

employees. There is a downward trend in the number of labor force in agriculture after the accession to the EU.

According to Eurostat, in EU-27 between 2000 and 2010 the share of EU agriculture workers is declined by 25%. In the EU-15, the decrease is 17%, while in the EU-12 the reduction is 31%. The lowest decline is registered in Greece (only 3%); while in Estonia the decrease is nearly 55%. With the decline by 48% for the period 2000 – 2010 Bulgaria ranks second [5]. However, the issues in Bulgarian agriculture are related not only to the number employees, but also with highly degraded educational and age structure. The lack of young and skilled workers in agriculture has negative impact on the sector, leads to low motivation and limits the opportunities for development and innovation in agriculture [16].

The share of agriculture in Bulgarian export shows more substantial changes and dynamics than the other two indicators. After the accession to the EU, Bulgarian domestic market became part of the Common market. Therefore 2007 is critical for Bulgarian export. This is the first year with negative trade balance in agriculture. The share of agricultural exports is less than 9%. In the next few years there are positive changes. The share of agricultural export is raising and the data indicates stabilization of Bulgarian agriculture in the international trade. However, significant changes in structure of export are observed. There is substantial growth in export of cereals and oilseed. By contrast, in the sector of vegetables and fruits, where Bulgaria was traditional exporter in the recent past, the country became net importer [9]. There is a decline in export of milk and crisis in meat sector. Bulgarian agricultural sector has an export-oriented strategy. This strategy, however, is related to increased export of extensive production, which leads to serious structural problems and a reduction of livestock production. A considerable part of domestic consumption of basic livestock products is ensured by imports [1].

### Structural changes in Bulgarian agriculture

After the Accession to the EU there is major transformation in the structure of Bulgarian agriculture presented in Table 1.

Based on the indicated data, some important conclusion could be drawn:

First, the role of cereals is arising after EU Membership. The main reasons are related to the direct payments that benefits mainly extensive crop producers. Structural transformations are observed in the sector of industrial crops as well. Their share in gross production is increased by nearly 16%. The main factor for this trend is the substantial change in the direction of specialization. Leading crops are sunflower and rapeseed. There are favorable trade conditions for these oilseeds and they are intended mainly for export. The relative share of forage crops is very low and is decreasing in the last few years. The main reasons are related to the problems in livestock production.

Second, there is serious negative trend in the sectors of fruits and vegetables. Despite the favorable natural conditions, the relative share of fruit and vegetables is substantially reduced. In the sector of vegetables, the decline is more noticeable. In 2016 the share of vegetables is 4 times lower compare to 2007.

Table 1. Structure of Bulgarian agriculture 2007-2016 (%)

Sectors	2007	2010	2013	2016
Cereals	15.9	26.0	32.7	32.7
Industrial crops	11.2	23.1	22.6	26.9
Forage plants	3.2	6.0	4.9	2.2
Vegetables	15.5	5.7	3.6	4.8
Potatoes	1.8	1.9	1.6	0.7
Fruit	7.7	3.8	4.1	5.0
Cattles and bulls	5.8	3.7	3.4	4.4
Pigs	5.8	3.7	4.2	4.1
Sheep and goats	5.6	3.8	3.0	2.9
Poultry	6.3	5.8	4.7	4.0
Other animals	0.7	0.7	0.1	0.1
Milk	15.6	11.6	11.5	9.1
Eggs	3.9	3.7	2.7	2.1
Other animal products	1.1	0.8	0.9	0.9

Source: Own calculation based on National statistical institute [17].

The decrease in fruits is also significant and marks the serious structural imbalances in Bulgarian agriculture. The sectors with high value added are experiencing severe problems after the accession to the EU. The payments under Pillar 1 cover only 4-5% of their costs therefore do not contribute for the increase of efficiency and competitiveness in these sectors. The land owned by small farmers is highly fragmented therefore producers have some difficulties applying for support.

Third, the share of all livestock sectors and products in gross agricultural production decreases. The sheep and goats' production is very low and is in crisis. The comparative advantages of the mountainous and semi-mountainous areas related to pastures failed to compensate for the degraded material and technical infrastructure. The financial support in these sectors is limited because of size of farms. In the sectors of cattle, poultry and pigs the relative share in gross production remains stable but is much lower comparing to the

extensive sectors. The most substantial decline is observed in the milk production.

The negative trends in livestock that started during period of transition are continuing after the accession to the EU. Despite the opportunities of CAP funds in several directions, these sectors face significant challenges in meeting EU requirements for production quality. The unfavorable changes and transformations in all livestock sectors have negative impact on Bulgarian agriculture and are limiting the opportunities for rational production structure and optimal concentration. The share of the main agricultural subsectors in gross production is illustrated on Figure 2.

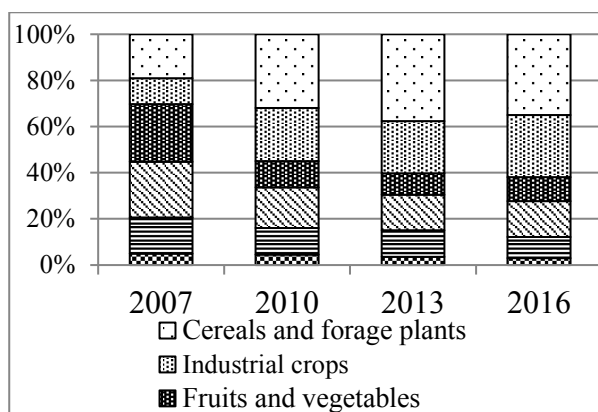


Fig. 2. Share of the main agricultural subsectors in gross production (2007-2016)

Source: National statistical institute [17]

The predominant development of crop specialization after the accession to the Community could be explained by the opportunities for these holdings provided by the direct payments support. Furthermore, the major share of funds under the Rural Development Program (RDP) is going to big grain producers and increasing significantly their competitiveness. On the other hand, livestock farms have weak access to the financial support. Therefore they could not compete with the others highly subsidized EU breeders. The problems in livestock are more serious than in crops sectors. As a result, these structural changes caused imbalance in agriculture and there is overconcentration and arising role of extensive sectors.

#### Concentration and economic size

The changes in structure of agricultural holdings are presented in table 2. The main

trends are outlined by analyzing two important indicators- number of farms and standard output. Farms are divided into five groups according to the EUROSTAT methodology [4]. Based on the analysis of the Farm structure survey (FSS) some important conclusions could be drawn.

First, the data indicate that after the accession to the EU in Bulgaria is established highly dualistic agricultural structure - 75% of the holdings are very small and generated less than 9% of the standard output. By contrast, only 3% of the farms (the biggest grain producers in the country) accumulated nearly 75% of the standard output. The polarization and overconcentration in Bulgarian farm structure that began in the accession period is increasing significantly after 2007.

According to the latest FSS in 2013, almost 4.5 million holdings in the Community are with economic size less than 2,000 EUR and around 3 million farms have standard output between 2,000-8,000 EUR. These two major groups represent more than 69 % of all agricultural holdings in the EU. In Bulgaria the relative share of these very small farms is nearly 75%, which is higher than EU-average. By contrast, 680,000 farms in the Community are with economic size more than EUR 100,000. These agricultural structures represent more than 6% of holdings in 2013. In Bulgaria the share of these farms is considerably lower (around 3%). The comparison with EU-28 shows that Bulgarian agricultural structure is more concentrated and misbalanced than EU-average.

In the EU there are serious differences among Member-States associated with the economic size of the agricultural households in 2013. In Belgium, Luxemburg and Netherlands around 50% of the agricultural holdings accumulate standard output more than EUR 100,000. On the other side, in 9 Member-States farms with economic size less than 2,000 EUR are the most common structures. The highest share of these households is located in Romania (68.7%) and Hungary (67.6%). In Bulgaria the data shows that this group presents more than half of all farms.

Second, the average size of farms in Bulgaria increases after the accession to EU. While the

share of holdings with standard output in a range less than 2,000 and 8,000 EUR is decreasing, the economic size of very large farms increases substantially. Medium-sized farms are more than 5% of all holdings, but the growth in their economic size is not significant. For the period 2005-2013 the economic size of the holding in the Community expanded by almost 56%. The biggest farms are registered in the Netherlands (EUR 303,800), followed by Denmark,

Belgium, the Czech Republic, Germany and Luxembourg. On the other side, in 10 Member-States the average standard output is below EUR 15,000. Bulgaria is in this group of Member-states with average economic size -EUR 13,112. The lowest average farm size is registered in Romania (standard output of EUR 3,300). Another interesting comparison between Bulgaria and other Member states shows the misbalanced structure of Bulgarian agriculture.

Table 2. Concentration of agricultural holdings in Bulgaria

Type of holdings	Share in number of holdings (%)				Share in standard output (%)			
	2003	2007	2010	2013	2003	2007	2010	2013
Very small	92.45	89.10	84.90	75.40	33.82	18.70	15.60	8.41
Small	6.24	8.62	9.40	16.29	12.49	11.10	11.30	9.25
Medium-sized farms	0.86	1.60	2.78	5.15	8.84	9.73	12.80	10.59
Large farms	0.42	0.58	2.48	2.21	26.22	20.66	18.25	18.36
Very large	0.06	0.11	0.44	0.96	18.64	39.81	42.05	53.38

Source: Own calculations based on EUROSTAT and Ministry of Agriculture, food and forestry [6, 10, 11,12,13,14].

According to EUROSTAT, in Luxembourg, Belgium and France one fifth of standard output is produced by approximately the smallest two thirds of all farms [4]. By contrast in Slovakia 96% of all holdings are with economic size between less than 2,000 – 8,000 EUR and accumulated only 20% standard output in the country. Similar trends are registered in Hungary, Estonia, Bulgaria, the Czech Republic, Cyprus and Latvia.

A comparison between small and large farms shows that some of the biggest differences in farms distribution by economic size are registered in Hungary (2,360:1), Romania (1,286:1) and Latvia (1,007:1). In Bulgaria the ratio is 780:1.

The data and the comparison with other Member-States and EU average reveal the main structural problems in Bulgarian agriculture. The small farms in the country are the most common structures. They form higher than average for EU percentage of all agricultural households, while medium-sized farms are far from the average levels for the Community. Only the share of large farms is close to EU-28. Positive changes are observed in the average economic size, which is arising, but this trend is mainly caused by reduction in

the number of small agricultural holdings. The data shows that after EU membership the imbalances in the level of concentration are increasing. The main reasons are associated not only with the significant share of small households and increasing role of big farms, but also with the fact that medium-sized holdings are not important structures in Bulgarian agricultural sector.

## CONCLUSIONS

Based on the analysis of the data the following conclusions could be drawn:

- (i) The importance of Bulgarian agriculture is decreasing after the accession to the EU
- (ii) There are two major groups of holdings, which play important role in Bulgarian agriculture – big profit optimizers (only 3% of all farms) that concentrate more than half of the standard output and small “survivors” that accumulated less than 9% of standard output, but represent more than 75% of all farms.
- (iii) Substantial differences are observed among Member-States. The survey indicates that Bulgarian agricultural sector has to overcome number of issues related to its competitiveness and efficiency.

(iv) The concept of Multi-speed Europe is very popular idea across EU, but in Bulgaria there is multi-speed agricultural structure and serious disparities among different subsectors on one side and among different farms and structures on the other side.

(v) The most important instrument of the CAP – Pillar I, which accounts for over 70% of CAP funds is ineffective not only in Bulgaria, but also in many other Member-States.

(vi) Measures under the RDP program in Bulgaria are not accessible for small farmers and causes decrease in their competitiveness. Also, some policy recommendations have been issued as presented below.

The research indicates that current CAP does not make best use of the resources and do not ensure the integration and convergences nor among Member-states, nor among agricultural holdings. In the context of the new programming period and the future of CAP after 2020 some recommendation could be made:

(1)The CAP in the new programming period needs serious revision and reforms. After 2020 direct payments should be systematically reduced. Funds should have better orientation and targeting.

(2)The CAP funds should be directed to the specific challenges as improving productivity, resource efficiency and to support farmers of providing specific environmental and other public goods.

(3)The financial support in Pillar I should have better and clear targeting.

(4) Serious increase in the redistributive effect of the payments is needed.

(5)It is highly inequitable major financial support to go to farms and farm businesses with substantial incomes and sizeable assets. The EU funds should be directed to small and medium-sized farms that need support, guidance and protection.

## REFERENCES

[1]Atanasov, D., Popova, B., 2010, Sustainable development characteristics of different dairy farms in Bulgaria. *Trakia Journal of Science*, Volume 8, Supplement 1, pp. 245-253.  
 [2]Buckwell, A. et al., 2017. CAP: Thinking Out of the Box Further modernisation of the CAP – why, what

and how? RISE Foundation, Brussels, [http://www.risefoundation.eu/images/files/2017/2017\\_RISE\\_CAP\\_Full\\_Report.pdf](http://www.risefoundation.eu/images/files/2017/2017_RISE_CAP_Full_Report.pdf), Accessed January 10, 2018.

[3]Di Falco, S., Penov, I., Aleksiev, A., van Rensburg, T.M., 2010, Agrobiodiversity, farm profits and land fragmentation: Evidence from Bulgaria. *Land Use Policy* Volume 27, Issue 3, July 2010, pp. 763-771.

[4]European Commission, Small and large farms in the EU - statistics from the farm structure survey, 2016, [http://ec.europa.eu/eurostat/statistics-explained/index.php/Small\\_and\\_large\\_farms\\_in\\_the\\_EU\\_statistics\\_from\\_the\\_farm\\_structure\\_survey](http://ec.europa.eu/eurostat/statistics-explained/index.php/Small_and_large_farms_in_the_EU_statistics_from_the_farm_structure_survey), Accessed March 4th, 2018.

[5]European Commission, How many people work in agriculture in the European Union? An answer based on Eurostat data sources, EU Agricultural Economics Briefs, No 8 | July 2013, [https://ec.europa.eu/agriculture/sites/agriculture/files/rural-area-economics/briefs/pdf/08\\_en.pdf](https://ec.europa.eu/agriculture/sites/agriculture/files/rural-area-economics/briefs/pdf/08_en.pdf), Accessed March 4th, 2018.

[6]EUROSTAT Statistics explained, Farm structure statistics, 2015, [http://ec.europa.eu/eurostat/statistics-explained/index.php/Farm\\_structure\\_statistics](http://ec.europa.eu/eurostat/statistics-explained/index.php/Farm_structure_statistics), Accessed March 4th, 2018.

[7]FAO statistic division 2007-2013, <http://www.fao.org/faostat/en/#data/TP>, Accessed March 4th, 2018.

[8]Georgiev, M., Roycheva, A., 2017, New institutional economics and methods for measuring the adaptation of Bulgarian agriculture. *Trakia Journal of Sciences*, Vol. 15, Suppl. 1, pp. 199-205.

[9]Manolova, V., 2009, Bulgarian and Romanian fruit growing: comparative analysis. *Acta horticulturae*, 825.55, <https://doi.org/10.17660/ActaHortic.2009.825.55>, Accessed March 4th, 2018.

[10]Ministry of agriculture, food and forestry, Agrostatistics, Agricultural Census 2003

[11]Ministry of agriculture, food and forestry, Agrostatistics, Agricultural Census 2010

[12]Ministry of agriculture, food and forestry, Agrostatistics, Farm Structure Survey 2007

[13]Ministry of agriculture, food and forestry, Agrostatistics, Farm Structure Survey 2013

[14]Ministry of Agriculture, food and forestry, Agricultural reports, 2007-2017 <http://www.mzh.government.bg/MZH/bg/Documents/AgrarenDoklad.aspx>, Accessed March 4th, 2018.

[15]National Statistical Institute, Main macroeconomics indicators, 2007-2016 [https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x\\_2=1169](https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=1169), Accessed March 4th, 2018.

[16]National Statistical Institute, Labour market 2007-2016, [https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x\\_2=181](https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=181), Accessed March 4th, 2018.

[17]National Statistical Institute, Economic Accounts in agriculture 2007-2016, [https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x\\_2=228](https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=228), Accessed March 4th, 2018.

## SYMBIOTIC FIXATION OF NITROGEN IN BELMONDO PEA VARIETY IN A SUGGESTED CROP ROTATION SYSTEM - TECHNICAL, ECOLOGICAL AND ECONOMIC EFFICIENCY

Mihai BERCA<sup>1</sup>, Valentina-Ofelia ROBESCU<sup>2</sup>, Gabriel CROITORU<sup>2</sup>, Roxana HOROIAS<sup>3</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd., District 1, Bucharest, Romania, prof.mihai.berca@gmail.com, unibercaimihai@yahoo.com

<sup>2</sup>Valahia University of Targoviste, 2 Regele Carol I Blvd., 130024, Targoviste City, Romania, Emails: robescu\_ofelia@yahoo.com, valentina.ofelia.robescu@gmail.com

<sup>3</sup>AGROVET SA, 20 Siriului Street, 014354, District 1, Bucharest, Romania, Email: roxana.horoias@gmail.com

**Corresponding author:** roxana.horoias@gmail.com

### Abstract

*In 2016 and 2017, in southern Romania, field experiences with Belmondo pea variety have been carried out. It has been found that, at about 35 days after emergence, the number of fresh nodules per plant ranged from 20 to 46 in the nitrogen-free version, with an average of about 33 nodules/plant. Since nodules were found at 80 plants/m<sup>2</sup>, it results a number of 2,640 nodules/m<sup>2</sup>. By weighing after oven drying, it was measured 38.24 mg/plant, which is 3.06 g/m<sup>2</sup> and 30.6 kg/ha. Using the balance (difference) method, the calculated amount of nitrogen extracted from peas was 262.5 kg/ha, as follows:  $N_{\text{biologically fixed}} = 262.5 - 135$  (control wheat) = 127.5 kg N/ha (2-year average for Belmondo peas). It results that for each kg of dry nodules a quantity of 4.17 kg N has been synthesized – a nitrogen calculation coefficient. In a crop rotation with 25% peas and a surface of 1,600 ha, an amount of 51 t N/ha is fixed, which represents 24.5% or 29.4 €/ha. Research is part of a program meant to reduce conventional inputs and increase farm profitability.*

**Key words:** crop rotation, efficiency, nitrogen, nodules, pea

### INTRODUCTION

Monitoring the relation management between soils and crops, many authors found that, despite the application of a large quantity of nitrogen nutrients of chemical synthesis, soil fertility is continuously reduced because the organic matter degrades itself in fast paces [2, 5]. It can be said that the Haber-Bosch synthesis models have reached their limits and for a long time are wanted natural solutions, in order to replace the bag (chemical) nitrogen with the one already having it in the air. In this respect, biosynthesis patterns are known through fixing nitrogen from air by various microorganisms (bacteria, actinomycetes). The most common and effective system is that of symbiotic fixation, which is carried out by symbiosis between legumes and bacteria. Most common are bacteria of the *Rhizobium* genus. Peas is a very important crop, which fits well in rotation with wheat, but also with

rape and corn in the arid areas, including those in southern Romania.

Martins et al. (2003), studying this system on the semi-dry soils from Brazil, observed that, in addition to the nitrogen needed for the development and production of peas, the plant offers 50 kg N/ha to the following wheat crop, which corresponds to a normal nutrition in this region [10]

Studies performed in Europe by Riou (2016) [12] determined the nitrogen amount fixed by different legumes, giving the following figures: soy 60-115 kg N/ha; peas 50-100 kg N/ha; alfalfa 130-250 kg N/ha; white clover  $\cong$  200 kg N/ha [13].

Depending on the environmental conditions, the variation range of the fixed quantity is much higher. Pietsch et al., 2006 (from Boku University in Vienna) have been indicated the intervals and averages for the nitrogen fixed by different species [11]. On larger agricultural sites, such as those in India as mentioned by Marquard, (2000) and Quispel,



(1982) [9, 12] there are both wider nitrogen fixation intervals, as well as higher averages ranges for different leguminous species (as seen in Table 1).

The amount of fixed nitrogen is imposed by soil conditions, moisture, soil biology, specific technologies, and soil's nitrogenous activity. From the found literature it is worth noting that this model of the symbiosis between legumes and various bacteria brings, worldwide, over 100 million tons of nitrogen, which is a quantity comparable to that produced by chemical synthesis [13].

Table 1. The amount of nitrogen fixed by the various annual and perennial legume crops in Austria and India

Crt.	Species	Austria		India	
		Variation (kg N/ha)	Average (kg N/ha)	Variation (kg N/ha)	Average (kg N/ha)
1.	Fava bean	100 – 450	170	100 – 300	200
2.	Peas	50 – 300	100	50 – 500	150
3.	Lentil	30 – 150	80	50 – 150	80
4.	Lupinus	50 – 400	100	140 – 200	150
5.	Soya	60 – 300	100	60 – 300	100
6.	Vetch	30 – 180	100	50 – 150	100
7.	Clover	50 – 350	250	45 – 670	250
8.	Alfalfa	100 – 400	250	90 – 340	250

Source: data from the mentioned authors.

In the agricultural area from southern Romania, in recent years, a market for protein products has been formed, among which peas (*Pisum sativum*) gain new surfaces each year. In these circumstances, the nitrogen fertilization system suffers significant changes in both the economic, but especially in the bioeconomic (ecological) field of agricultural systems sustainability.

This research deals with the behaviour of the nitrogen biosynthesis model by symbiotic fixation on peas in a 4 year crop rotation system, in two localities in southern Romania (Alexandria and Calarasi).

## MATERIALS AND METHODS

The research aim is to provide information on the amount of nitrogen fixed by Belmondo pea variety in southern Romania and the extent to which it is used by the crop rotation system. Substitution problems of industrial synthesis nitrogen with the atmospheric, symbiotically fixed one.

The proposed objectives were:

- (i) determining the number, dynamics and quantity of nodules formed on the peas in the years 2016-2017;
- (ii) calculating the amount of nitrogen fixed by symbiosis and its distribution in plants consumption;
- (iii) establishing economic and ecological effects.

Work was carried out in two locations – Burnas Platform (Alexandria) and South Plain (Calarasi). Belmondo variety with erect port (approved in Romania and the European Union) has been used. A crop rotation system was selected, in which the peas came before wheat, the wheat before rape, the rape before corn and the corn before peas.

The soil was chernozem type, with about:

- 3.4% humus and 34% clay in Alexandria;
- 3.2% humus and 26% clay in Calarasi.

In terms of climate indicators:

- Alexandria – temperate continental climate, semiarid, with a multiannual average temperature of 10.8°C and a little over 500 mm precipitation/year;
- Calarasi – temperate continental climate, semiarid, with a multiannual average temperature of 11°C and about 500 mm precipitation/year.

In both areas, during the vegetation period, 70-72% of rainfall occurred. Research years 2016 and 2017 were favourable to pea crop, during the vegetation period falling over 300 mm precipitation/m<sup>2</sup>.

Investigations were conducted in the field, according to the subdivision parcel method, where, alongside the location factor, phosphorus (P<sub>0</sub>, P<sub>30</sub>, P<sub>60</sub>, P<sub>90</sub>) and nitrogen (N<sub>0</sub>, N<sub>40</sub>, N<sub>80</sub>, N<sub>120</sub>) fertilizers were used.

The crop was carried out according to the technology in the area. 110 seeds/m<sup>2</sup> were sown, resulting in about 85 plants/m<sup>2</sup>, out of which about 78-80 plants formed nodules and fixed nitrogen. Plants were monitored in the field, taking samples weekly to observe the formation of nodules. No inoculation was performed, the soil being rich in bacteria (*Rhizobium leguminosarum*).

It has been found that both as number and as weight, the plants completed their biosynthesis equipment at about 30-35 days

after emergence. At this point, most of the samples for measurement were collected.

They were determined:

-Number of nodules/10 plants/repetition; it has been used the rehearsals average.

-Weight of nodules/m<sup>2</sup> by drying them in drying stove at 105°C for 3 hours, in special capsules.

-The amount of fixed nitrogen, by the Nitrogen Balance Difference method [8], using wheat as a reference plant:

$$N_{\text{fixed remaining}} = N_{\text{fixed by legume (harvestable)}} - N_{\text{reference plant (harvestable)}}$$

Fixed nitrogen relative to the dry nodules weight led to the calculation of a local efficiency index in nitrogen fixation of the mass of nodules. Data was statistically processed by dispersion analysis and correlations in 2D and 3D.

## RESULTS AND DISCUSSIONS

Formed nodules, depending on the locality, are shown in Table 2.

Table 2. Number of nodules/plant and amount of dry nodules (g/m<sup>2</sup>) according to research locations – average for 4 preceding plants

Crt	Location	Nodules number				Nodules weight			
		No./plant	% from M	Diff.	Sign	g/m <sup>2</sup>	% from M	Diff.	Sign
1.	Alexandria	25.22	97.32	-0.69	-	3.06	101.26	+0.04	-
2.	Calarasi	26.61	102.68	+0.70	-	2.98	98.74	-0.03	-
Mean (M)		25.91 = 100% Interval 1 – 70		Control		3.02	100	1.49	
DL <sub>5%</sub> = 1.57									

Source: results of the own experiments.

The determinations show that there are no statistically significant differences between the two locations, on average over the two analysed years (2016 and 2017). We can consider as representative and statistically assured in this area from southern Romania the number of 30 nodules/plant. We can also consider the amount of 3.02 g of dried nodules/m<sup>2</sup> as representative and statistically assured for the Alexandria – Calarasi region. The confidence interval is  $30 \pm 1.6 = 28.4 - 31.6$  for the number of nodules and  $3.02 \pm 0.21 = 2.81 - 3.23$  for weights nodules/m<sup>2</sup>.

Please note that we found an average number of 78 plants/m<sup>2</sup> in order to count the nodules. On average,  $78 \times 25.91 = 2,020$  nodules/m<sup>2</sup> there were harvested. We can say that 1 g of

dried nodules is actually collected from 2,020:  $3.02 = 669$  nodules, with small average variations from one location to another.

At the same time, remark that no inoculations have been done. Work was done in a natural inoculation system, both areas being well supplied with *Rhizobium*.

To highlight the influence of the preceding plant on nodules formation, the data are shown in Table 3, on average for the two research locations.

Table 3. Atmospheric nitrogen fixation, expressed in number and weight of nodules (g/m<sup>2</sup>) in peas, Belmondo variety, in Southern Romania, 2016-2017

Preced . crop	Nodules number				Nodules weight			
	No/pl.	% from M	Diff.	Sign	g/m <sup>2</sup>	% from M	Diff.	Sign
Peas	3.32	10.09	-29.53	ooo	0.29	9.65	-2.72	ooo
Wheat	55.41	168.65	+22.56	***	5.07	168.04	+2.05	***
Rape	43.19	131.46	+10.34	***	3.96	131.36	+0.95	***
Corn	29.50	89.90	-3.35	oo	2.74	90.95	-0.27	-
Mean (M)	32.55 = 100%		DL <sub>5%</sub> = 2.30 DL <sub>1%</sub> = 3.05 DL <sub>0.1%</sub> = 3.94		3.02 = 100%		DL <sub>5%</sub> = 0.33 DL <sub>1%</sub> = 0.44 DL <sub>0.1%</sub> = 0.56	

Source: results of the own experiments.

The number of nodules per plant is very variable in relation to the preceding plant in the crop rotation system. In the field work in which the peas comes for 4 years in a row, the natural inoculation and the number of nodules is of only 3.32 (close to 0), the loss being very significantly negative. The same thing happens with the weight of the nodules/m<sup>2</sup> – 0.29 g/m<sup>2</sup> or 290 mg/m<sup>2</sup>, significantly negative.

This phenomenon is known from literature, but also from practice. Amel (2015) finds 9 nodules/plant in a 2 years monoculture, compared to 18 nodules in a simple crop rotation system with wheat. Researches were conducted on an Indian pea. Similar results were obtained at the University of Manouba (Tunisia). In most of the studied papers, especially in warmer areas, the number of nodules/plants has hardly exceeded 30-50 pieces [6].

In our experiments, the best natural inoculation occurs in peas after wheat (55 nodules/plant and 5.07 g dry nodules/m<sup>2</sup>) – values significantly positive compared with the average.

Another good preceding crop for peas also was the rape crop, but less good was the corn.

It is to be said that after corn there was not enough time for a proper preparation of the germinative bed, as observed and confirmed by dos Santos et al. (2011) [5].

A complete picture of the natural inoculation behaviour of peas is also presented in Figure 1. In the same time, it is important to note that a single variety (Belmondo variety) has been tested, genetically adapted to good inoculation with *Rhizobium*.

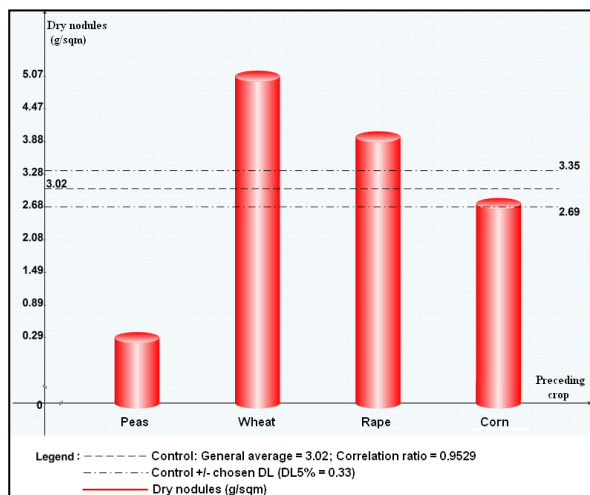


Fig. 1. Nitrogen fixation, measured in g of nodules/m<sup>2</sup> depending on the preceding crop— average for Alexandria and Calarasi, 2016-2017  
 Source: Own results.

Numerous studies and researches synthesized by Pietsch G. (Boku University, Vienna) [11] demonstrate that there are a lot of restriction factors in the natural realization of inoculation and, thus, in the reduction of fixed nitrogen. Among others, the alkalinity or the higher acidity of the soil, the lack of phosphorus, of sulphur or, on the contrary, the excess of nitrogen, too much clay content or the defective physical properties are mentioned. Regarding the phosphorus relation with the nitrogen fixation on peas in the experiments in Alexandria and Calarasi, a small amount of phosphorus in the soil (about 6-8 mg/g soil) led to a small quantity of dry nodules, relative to the average of the two locations (2.49 g/m<sup>2</sup>) – Figure 2. Statistically, the value is positioned very significantly negative below the average.

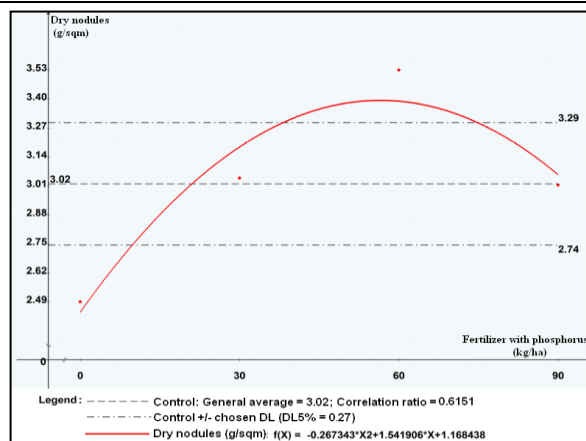


Fig. 2. The role of phosphorus in improving the symbiotic fixation of nitrogen on Belmondo peas – average for Alexandria and Calarasi, 2016-2017  
 Source: Own results.

Nodule formation increases significantly with doses of phosphorus, it became significant at just 10 kg P<sub>2</sub>O<sub>5</sub>/ha applied, but it's limited to 62 kg P<sub>2</sub>O<sub>5</sub>/ha, where the 1st order derivative of the function in Figure 2 indicates the maximum. The maximum production of nodules obtained in 62 kg P<sub>2</sub>O<sub>5</sub>/ha is about 3.55 g/m<sup>2</sup>, i.e. 35.5 kg/ha.

Our own calculations made by using the difference method in the nitrogen balance show that every 1 kg of dry nodules are fixing 4.6 kg N ⇒ 35.5 × 4.6 = 163.3 kg N fixed in the version with P<sub>62</sub>. In the phosphate-free version the following situation has been observed: 2.55 g/m<sup>2</sup> = 25.5 kg/ha = 114.75 kg fixed N.

It results that phosphorus, in its relation with *Rhizobium* in Belmondo peas, has raised an increase of 163.3 – 114.75 = 48.55 kg N/ha. This aspect improves the biological value of phosphorus applied in the autumn.

There are a lot of materials and books that inform us that, by increasing the nitrogen in the soil, the nodulation and nitrogen fixation are reduced. We quote, in this regard, Bourion et al. (2007) [3], but also the work of L'Taief et al. (2009) [7], which claims that even at low doses of nitrogen applied to Indian pea, nitrogen fixation suffers greatly.

The results obtained are shown in Figure 3, for the average of localities, and Figure 4 separately for the two localities, for comparison.

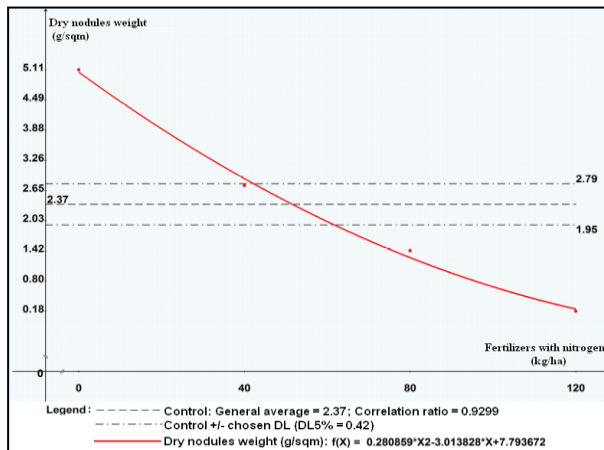


Fig. 3. Dynamics of nitrogen fixation (g of nodules/m<sup>2</sup>) according to the applied nitrogen doses – the average for Alexandria and Calarasi, 2016-2017  
 Source: Own results.

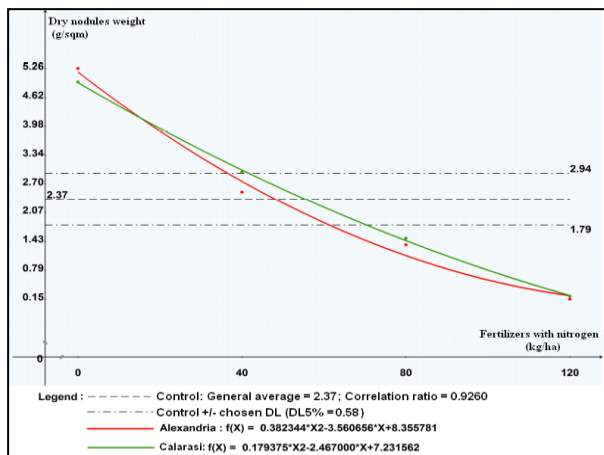


Fig. 4. Dynamics of nitrogen fixation (g of nodules/m<sup>2</sup>) according to the applied nitrogen doses – Alexandria and Calarasi, 2016-2017  
 Source: Own results.

The following findings are made: cultivation of peas in poor nitrogen conditions can lead to a large amount of nitrogen fixed – 5.11 g/m<sup>2</sup> assumes 5.11 x 4.6 = 235 kg fixed N/ha.

This parameter is statistically assured for 92.6% of the crops that are conducted under the same soil and climate conditions. The parameter for the transformation of dry nodules into fixed nitrogen also varies depending on other agrochemical intervention factors, between 4.1 → 4.7 kg N/1 kg of nodules.

Under the research conditions, the increase with only 40 kg/ha of available nitrogen in the soil reduces by about 46% the fixed nitrogen. This means 23.6 x 4.6 = 108 kg. By applying 40 kg N/ha to the pea crop, it is lost up to 2.7 times more nitrogen by the nitrogen fixation

deficit. The losses are enormous at 80 and 120 kg N/ha. At high dose, symbiotic fixation is practically cancelled. The situation is similar in the two locations, the differences between the two functions being by no means significant.

A first observation is that, under the given conditions (soil, climate, agro-technical), pea crop doesn't need nitrogen fertilizers at all and that, on the contrary, their application brings twice damages to the agricultural crop rotation system. Taking into account the negative impact of synthetic fertilizers (Haber-Bosch), the use of biological fixation models is using the symbiosis between legumes (in our case, peas) and *Rhizobium leguminosarum* species. Considering that the application of phosphorus in a dose of about 60 kg/ha leads to an increase of about 50 kg/ha of fixed nitrogen, it follows that the optimal nutritional variant with NP is N<sub>0</sub>P<sub>60-70</sub>. In our experiments, this version obtained 5.97 g dry nodules/m<sup>2</sup>, i.e. 59.7 kg/ha x 4,6 = 275 kg fixed N/ha. That means 275 – 235 = +40 kg N/ha brought by the N<sub>0</sub>P<sub>60</sub> version compared to the N<sub>0</sub>P<sub>0</sub>.

The coefficient 4.6 may vary between 4.1-4.7 kg N/1 kg dried nodules for conditions such as those investigated. It depends on the fixation intensity (I), which correlates with many optimization factors

According to the calculations made by the nitrogen balance method in crop and soil, a pea crop consumption of about 127.5 kg N/ha has resulted. The difference between what is left between the self-consumption and the fixed nitrogen and which is very variable, even in small spaces in culture, can be and is going to be used by the following crops. By doing so, peas become an excellent preceding plant, primarily for wheat, but also for rape and other crops. After Chaillet and Bousquet (2009) [4] and other authors, the nitrogen supply to the soil by peas crop can be used up to 60% of wheat, by these benefit taking advantage even the third crop in rotation system.

The increase in the percentage of legumes from the crop rotation system and in the intensity of the symbiotic fixation process solves, on the one hand, the problem of the



proteins of plant origin, which are increasingly wanted in Europe, and on the other hand it raises the ecological and economic sustainability of the agricultural agroecosystems.

## CONCLUSIONS

On the southern Romania soils, under semiarid conditions, but with a good agrotechnics, the Belmondo pea variety obtained yields of 3.5-4.0 t/ha and symbiotically fixed between 115 and 275 kg N/ha from air.

On the analysed area, between Alexandria and Calarasi, the amount of N symbiotically fixed didn't significantly detach from one area to another.

Phosphorus fertilizers raise pea's ability to fix nitrogen with up to 40-50 kg/ha over the P<sub>2</sub>O<sub>5</sub>-free version.

Application of nitrogen fertilizers greatly reduces inoculation and fixation, starting with the dose of 40 kg N/ha. At 120 kg N/ha, fixation ceases. The presence of nitrogen in soil prevents the communication between bacteria and plants.

The plants with more vigorous roots form a larger number of nodules and fix more nitrogen.

Fattening option recommended to pea's crop is N<sub>0</sub>P<sub>60-70</sub>.

## REFERENCES

[1]Amel Benselama, 2015. Réhabilitation de la culture du *Lablab purpureus* et études de son partenaire symbiotique. Ph.D. Thesis. Oran University, Algeria, <http://theses.univ-oran1.dz/document/14201511t.pdf>, Accessed on 11 of January 2018

[2]Berca M. *et al.*, 2015, Modelul HumProd pentru evitarea colapsului agriculturii românești, generat de distrugerea humusului, ca resursă naturală. Buletinul Institutului Politehnic din Iași, Tomul LXI, Fasc. 3-4, pag. 47-63

[3]Bourion Virginie *et al.*, 2007, Genetic Variability in Nodulation and Root Growth Affects Nitrogen Fixation and Accumulation in Pea. *Annals of Botany*, Vol. 100, NO. 3, 589-598, <https://www.ncbi.nlm.nih.gov/>, Accessed on 12nd of January 2018 <https://pubmed.ncbi.nlm.nih.gov/2533614/>, Accessed on 11 of January 2018

[4]Chaillet, I., Bousquet, N., 2009, La fixation de l'azote de l'air par les plantes. Une

symbiose bactérie/plante. *Perspectives Agricoles*, NO. 358, pp. 34-35, [https://www.perspectives-agricoles.com/file/galleryelement/pj/11/78/da/2e/358\\_8939196083206480358.pdf](https://www.perspectives-agricoles.com/file/galleryelement/pj/11/78/da/2e/358_8939196083206480358.pdf), Accessed on 11 of January 2018

[5]dos Santos, J.G.D. *et al.*, 2011, Soil Management and Efficiency of Rhizobia Strains of Cowpea *Vigna unguiculata* (L.) Walp. in the Tropics. *Chilean Journal of Agricultural Research*, Vol. 71(4):594-600, <https://scielo.conicyt.cl/pdf/chiljar/v71n4/at15.pdf>, Accessed on 11th of January 2018

[6]Hmida, C., Saoudi A., 2010, Etude de la variabilité des souches de Rhizobium efficaces pour l'haricot issues par radiomutagenèse. License applied in Biotechnology, <http://www.iaea.org/inis/collection/NCLCollectionStore/Public/42/056/42056536.pdf>, Accessed on 12 of January 2018

[7]L'Taief, B. *et al.*, 2009, Effets de la fertilisation azotée, de l'inoculation par *Rhizobium* sp. et du régime des pluies sur la production de la biomasse et la teneur en azote du pois chiche. *BASE – Biotechnologie, Agronomie, Société et Environnement*, Vol. 14(4), 537-544, <http://www.pressesagro.be/base/text/v13n4/537.pdf>, Accessed on 12 of January 2018

[8]Loges, R. *et al.*, 2001, Methodische Aspekte zur Bestimmung der symbiontischen N<sub>2</sub>-Fixierungsleistung von Leguminosen. *Arbeitsgemeinschaft für Grünland und Futterbau in der Gesellschaft für Pflanzenbauwissenschaften, Wissenschaftlicher Fachverlag: Giessen*, pp. 29-32, <http://orgrprints.org/2147/1/loges-2001-methode-stickstoff-fixierung-leguminose.pdf>, Accessed on 12 of January 2018

[9]Marquard, R., 2000, Stickstoff assimilation und die Symbiose mit Knöllchen bakterien. <https://geb.uni-giessen.de/geb/volltexte/2000/320/original/sticksto.html>, Accessed on 12 of January 2018

[10]Martins, L.M.V. *et al.*, 2003, Contribution of biological nitrogen fixation to cowpea: a strategy for improving grain yield in the semi-arid region of Brazil. *Biology and Fertility of Soils*, Vol. 38(6): 333-339

[11]Pietsch Gabriele *et al.*, 2006, Biological Nitrogen Fixation of Different Legume Species under Water Stress – BIOfix Project. [http://www.academia.edu/13923676/BIOLOGICAL\\_NITROGEN\\_FIXATION\\_OF\\_DIFFERENT\\_LEGUME\\_SPECIES\\_UNDER\\_WATER\\_STRESS](http://www.academia.edu/13923676/BIOLOGICAL_NITROGEN_FIXATION_OF_DIFFERENT_LEGUME_SPECIES_UNDER_WATER_STRESS), Accessed on 11 of January 2018

[12]Quispel, A., 1982. *Frontiers of Research in symbiotic Nitrogen Fixation*. *Frontiers of Research in Agriculture*, Indian Statistical Institute, Calcutta, pag. 206-223

[13]Riou Virginie, 2016, Legumineuses et azote: comment ça marche? SOLAG – Bulletin Sol et Agronomie des Chambres d'agriculture des Pays de la Loire, no. 6, [http://www.pays-de-la-loire.chambres-agriculture.fr/fileadmin/user\\_upload/Pays\\_de\\_la\\_Loire/022\\_Inst-Pays-de-la-loire/Listes-affichage-FE/RetD/Vegetal/Bul-SOLAG/2016/20160905\\_SOLAG\\_legumineuses\\_et\\_azote.pdf](http://www.pays-de-la-loire.chambres-agriculture.fr/fileadmin/user_upload/Pays_de_la_Loire/022_Inst-Pays-de-la-loire/Listes-affichage-FE/RetD/Vegetal/Bul-SOLAG/2016/20160905_SOLAG_legumineuses_et_azote.pdf), Accessed on 12 of January 2018.

## FACTORS AFFECTING COTTON PRODUCTION DECISIONS OF FARMERS: EASTERN MEDITERRANEAN REGION, TURKEY

M. Emin BİLGİLİ<sup>1</sup>, Hilal YILMAZ<sup>1</sup>, Selcan AKKOYUN<sup>1</sup>, Yasemin VURARAK<sup>1</sup>,  
Mevlüt GÜL<sup>2</sup>

<sup>1</sup>Eastern Mediterranean Agricultural Research Institute, Karatas Yolu 17.km. P.K: 45, Dogankent, Yuregir, Adana, Turkey, Emails: eminbilgili@gmail.com, htarim01@gmail.com, selcanakkoyun@gmail.com, yvurarak@hotmail.com

<sup>2</sup>University of Süleyman Demirel, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Emails: mevlutgul@sdu.edu.tr

**Corresponding author:** mevlutgul@sdu.edu.tr

### Abstract

*This study aimed to determine the factors affecting cotton production decisions of producers in the Eastern Mediterranean Region of Turkey. The main research material was the data obtained from the questionnaires conducted with farmers in this region. We identified six factors influencing the decision-making in cotton production, which included economic, technical, political, environmental, personal, and product-related factors. The logistic regression model attempted to explain the factors convincing farmers to cultivate cotton. The variable related to the cotton experience of farmers was found significant. Besides, the variables of the number of individuals per household, total agricultural area, cotton plantation area in 2013, 2011, 2000, and 1990 were statistically significant. Cotton cultivation areas in the Eastern Mediterranean region tended to shrink rapidly after 2000s. In addition to increasing the cost of cotton production, factors like competitor product costs, productivity, changes in technology and price fluctuations also played a role in such a decline. Therefore, the decision to cultivate cotton is affected by not only the price of cotton but also the government supports in place, changes in foreign trade practices, technology, human resources, competitor product prices, and yield.*

**Key words:** cotton, Eastern Mediterranean Region, production decision, factors

### INTRODUCTION

Cotton has a profound economic importance for the producer countries, as it is an indispensable product in many sectors that brings a substantial added value and employment opportunities. It is a raw material for many industries, including cotton-ginning industry, textile industry using its fiber, oil and feed industry using its seeds, and paper industry using cotton linter. An alternative to petroleum, the oil obtained from cottonseeds has been increasingly used as a raw material in biodiesel production. In addition, the recent rise in the population and standard of living increase the demand for cotton plants [3]. As in the world, Turkey also has limited area suitable for cotton cultivation. Cotton production in Turkey is confined to certain irrigable areas in the Aegean and Mediterranean regions, as well as South-eastern Anatolia. In this context, the decisions of cotton producers to choose, discontinue, or

continue cotton cultivation become crucial for the future of cotton production in our country. In general, the decision to determine product design is analysed by considering economic, technical, sociocultural, and environmental criteria. The economic criteria in determining what agricultural product to cultivate might include income prospects, income stability during the period, production costs, risks, institutional supports, dependency on foreign agricultural inputs and marketing opportunities. The technical criteria are productivity, production techniques, product quality, and healthy working conditions. The sociocultural criteria consist of family labour and employment, social justice in the rural area, availability of cultivation in problematic and disadvantaged areas, and adaptation to local sociocultural values. The environmental criteria usually include soil erosion, soil fertility, regional water use, water pollution, air pollution, and biodiversity [16].

Accurate insight into the structure and nature of the farmer's production objectives should precede any analysis of resource distribution and production behaviour [4]. In this context, determining farmer goals could prove extremely beneficial. Determining the long or short-term goals of farmers can be quite useful in predicting economic behaviour. Goals are included in business models, thus helping farmers in decision-making. The identification of farmer's goals and targets contributes to the development of agricultural extension and relevant policies.

The cotton production in the research area was 462,678 tons in 1991, but this figure declined to 421,971 tons in 2016. The total area used for cotton cultivation accounted for 183,772 hectares in 1991, but this area decreased to 77,054 hectares in 2016. The region's share in Turkey's overall cotton production showed a significant drop from 30-35% in the 1990s to 18-27% in the 2000s. The region's share in cotton cultivation area in Turkey also declined from 17-34% in the 1990s to 16-24% in the 2000s (Fig. 1). Indeed, the region suffered considerable downturn in cotton production and cultivation area. However, while the cotton yield was 2,518 kg per hectare in early 1990s, this figure more than doubled (2.38 times), rising to 6,005 kg in 2016. This increase in cotton yield appears to have compensated the deficit in overall production activity.

The analysis of the changes in cotton production in the region reveals that cotton production in the region fluctuated between -18% and +64% in the 1990s. In the 2000s, the change in cotton production in the region ranged between 19% and 27%, which means that 1990s showed much more fluctuation. The change in cotton plantations in the region ranged from -34.5% to +38.3% in 1990s, but 2000s witnessed a sharper fluctuation between 17.9% and 51.2%. The change in cotton production showed even more variation. However, in the 2000s cotton cultivation areas remained below the numbers in 1991. Cotton yield in the region was always above the yield achieved in 1991, except for 1992, 1995, and 1996 (Figure 2).

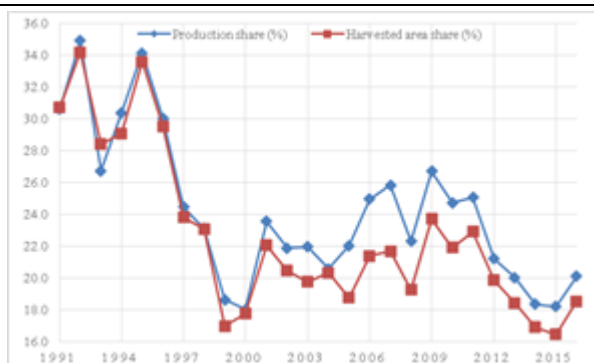


Fig. 1. Changes in cotton production, planting area and yield in the study area as compared to 1991  
 Source: TUIK [19]

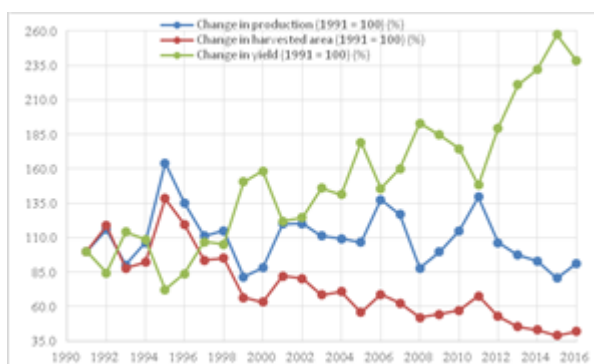


Fig. 2. Changes in cotton production, planting area and yield in the study area as compared to 1991  
 Source: TUIK, [19]

Policy decisions for agricultural production are assessed taking into account social, environmental, and economic objectives. The protection of family businesses, improving the quality of life in rural areas and the protection of traditional agricultural products are among the social objectives. For environmental purposes, it is possible to consider promoting agricultural practices for environmental protection, contributing to the maintenance and conservation of natural areas. Criteria such as the provision of reasonable prices to consumers, the production of safe and healthy products, the promotion of competition between enterprises, the provision of adequate income for farmers, the guarantee of self-sufficiency at the national level can be given as examples of economic objectives of policies [7], [18].

Economists assume that limited resources are distributed to maximize profits. In addition to making the most profit, other goals can also be important. Moreover, it is no longer possible to run operations easily based on the assumption that profit maximization can

adequately account for all observed operation behaviours. Although many farmers desire to achieve the highest profit, they may also want to carry out the least risky production. Determination of purpose structure provides ease of distribution of resources [20], [5]. A sufficient understanding of the structure and nature of the farmers' production objectives should precede the analysis of any resource allocation and production behaviour [4]. In this context, there are many benefits to determining farmer goals. Determining the goals of farmers can be useful in predicting economic behaviour. Goals are included in business models, helping farmers in decision-making. The introduction of farmer goals and objectives contributes to the development of agriculture policy and publishing programs [20].

Over the past 20 years, cotton cultivation areas have tended to show a steady decline across Turkey and in the Eastern Mediterranean region. In recent years, shrinking of cotton cultivation lands has been more pronounced. It is of vital importance in this context that we analyse the mechanisms of farmer's decision about what to cultivate, which is one of the fundamental issues to address. There has been no research looking into the reasons why the farmers in the Eastern Mediterranean region have been abandoning cotton production and looking to grow other crops. This study therefore seeks answers to this problem in the region.

This study aimed to determine the factors affecting cotton production decisions among the farmers in the Eastern Mediterranean Region of Turkey.

## MATERIALS AND METHODS

The main research material was the data from the surveys conducted with cotton producers in the Eastern Mediterranean Region. There are five provinces in the region: Adana, Mersin, Kahramanmaraş, Osmaniye and Hatay. The questionnaires were administered in the cities of Adana, Mersin, and Hatay. We used the proportionate stratified random sampling in determining the number of samples to represent the main population in

studying the factors influencing the farmer's decision to cultivate cotton in the Eastern Mediterranean Region. Using the proportional sampling formula, the sample volume was determined as 194 farmers with 95% confidence interval and 5% error margin. In the region, the cotton cultivation areas showed declines and expansions over the years. Determining the measures that could be taken to prevent the increase or decrease of cotton production in the region was another goal of the study. For this purpose, taking into consideration the year 1995, when the cotton cultivation areas reached the highest level in the Eastern Mediterranean Region, the number of the survey was determined according to the cultivation areas in the provinces and districts. Accordingly, data obtained at face-to-face interviews with a total 194 farmers, including 100 farmers from Adana, 60 from Hatay, and 34 from Mersin. Factor analysis was used to determine the factors influencing the decision to cultivate cotton among farmers. Factor analysis refers to a class of multivariate statistical methods aiming for data reduction and summarization. In general, it mainly analyses the relationships between large numbers of variables and then explains these variables by main dimensions (factors). In addition, in this method, each factor can be seen as a dependent variable, which is a function of the original observation values [10].

The general factor model has many forms. The most commonly used are "common factor analysis" and "component factor analysis". The choice of factor model depends on the purpose of the study. The mathematical model of factor analysis is similar to multiple regression equations. Each variable is expressed as a linear combination of actually unobservable factors.

The Logistic Regression model was used to explain the influence of various factors on farmer's decision to cultivate cotton. Logistic regression is a nonlinear regression model specially designed for binary dependent variables. If the dependent variable in the model is expressed by two categories, the model is called "Binary Logistic Regression Model", and if it is expressed in more than



two categories of the dependent variable, it is called "Multinomial Logistic Regression Model" [13]. In the binary logistic regression model, the observed dependent variable can take only two values: "0" and "1". If the event occurs, it will take the value 1 and if it does not it takes the value 0 [24].

## RESULTS AND DISCUSSIONS

The individual and household characteristics of the farmers were found to be important factors in decision-making in agricultural activities. The mean age of the farmers interviewed was 57 years, ranging from 38 to 68 years. The education level of the farmers was 6 years on average. Although they were predominantly elementary school graduates, there was a wide range of educational differentiation from primary school to university. Agricultural experience was 27 years on average, showing a variation between 5-45 years.

The household size of the farmers ranged from 2 to 38 persons, with an average of 4 people per household. Two persons from every household were involved in agricultural activities. Membership to agricultural cooperatives was an important factor influencing their decision-making. About 79% of the producers in the study were members of an agricultural cooperative, with 83% of them actively participating in cooperative activities. The farmer's land assets, ownership status and characteristics of land were important elements in agricultural activities. The land assets of interviewed producers accounted for 56 decares on average, ranging from 1 to 392 decares. The mean land owned by the farmers was 45 decares, and the average rented and sharecropping land was 24 decares. There was a wide variation in the size of the owned, rented and sharecropping land.

Cotton cultivation areas in the Eastern Mediterranean region began to shrink rapidly after 2000s. Cotton cultivation histories of the farmers in the region were examined to determine the reasons why they gave up cotton production.

Cotton cultivation areas covered by the study were 18 decares on average in 1990. In 2013,

the average cotton plantation area increased to 26 decares, which was associated with the incentive policies and cotton prices.

The change in the cotton cultivation areas in the Eastern Mediterranean region was largely attributed to the changes in the cost and price of competitive products. The producers turned to alternative products. The alternative product's growing conditions, profitability, prevalence in the region were important factors in decision-making. It was found that 77% of the farmers who gave up cotton production began to cultivate corn and 23% began to produce soybean. The main reason for preferring corn over cotton was lower cost, lower labour force and its ease of cultivation as compared to cotton.

The cotton plantation area of the farmers interviewed in the Eastern Mediterranean region was 172 decares on average. In 2013, farmers who produced cotton were found to have cultivated cotton in minimum 20 decares and maximum 400 decares of land. Average yield of cotton in the region was 541 kg. It was determined that the minimum cotton yield was 450 kg and the maximum yield was 600 kg. In the research area, the average income from cotton was TRY794 per decare, ranging from TRY428 to TRY1020. The average cost of cotton production was TRY596, and the lowest production cost for farmers was TRY551 and the highest was TRY637.

The average absolute profit from the cotton production in the region was calculated as TRY197. The lowest absolute profit of the farmers was -TRY160, while the highest profit was TRY445. Absolute profits differed widely in the region. The main reasons for this variation could be factors such as yield, price and different production techniques. In particular, the producers with a yield above the regional average had higher absolute profit values. The relative profit in cotton production was calculated as 1.33. Previous studies performed in different regions also found a low relative profit value in the production of cotton. For example, Yılmaz and Gül [22] calculated the relative profit in cotton production in Antalya as 1.02. Similarly, Kuzgun et al. [12] found that

relative profits in cotton production varied between 0.93 and 1.36 in 1992 and 1998. Yılmaz [21] reported that the absolute profit in all farmer groups was negative and the relative profit was 0.85 in Antalya. Sağlam [17] found that the relative profit in cotton production was 0.83 in Adana. Karlı et al. [11] estimated that the relative profit in cotton production in Şanlıurfa varied from 0.52 to 2.10, reporting significant variation in relative profit over the years.

The average land allocated to corn cultivation was 102 decares in the research area, which ranged from a minimum of 106 decares to a maximum of 700 decares. In the research area, the average corn yield per decare was 1,252 kg, ranging from 1,057 kg to 1,400 kg. The average revenue from the corn cultivation was calculated as TRY761 per decare (range: TRY764-896). Average production cost per decare was TRY364, with the lowest being TRY365 TL and the highest TRY403.

The absolute profit from the corn production in the region was TRY397 per decare. The lowest absolute profit was TRY399, and the highest absolute profit in corn production was TRY525. The absolute profit values in corn production also showed a significant variation.

The average area for soybean cultivation in the research area was 74 decares on average (range: 81-230 decares). The mean soybean yield was 350 kg per decare (range: 355-425 kg). The average gross production value obtained from the soybean cultivation was TRY 543 per decare, ranging between TRY562 to TRY806. The average production cost for soybean was TRY241 per decare. The lowest production cost was calculated as TRY244, while the highest production cost for soybean production was TRY354.

The average absolute profit from the soybean production in the region was TRY302 per decare (range: TRY318-451). Variations in yield, price, and cultivation techniques seem to cause a significant variation in absolute profit values.

Absolute profit and relative profit values obtained from cotton production were lower than profits derived from corn and soybean production. Yurdakul and Ören [23]

investigated the relationship between cotton production cost, selling price and plantation area in Çukurova Region between 1971-1988, and they reported that the correlation coefficient between the changes in the net profit and the plantation area in the following year was 0.645. Özkan [14] reported that the greatest uncertainty in cotton production in Antalya between 1981 and 1995 was in absolute profit. Özkan [15] determined that cropping decisions of farmers were mainly based on net returns of cotton production and farmers in the past were influenced by a wide variety of factors in choosing farm enterprises. Akpınar and Gül [1] found that there was seasonal fluctuation in cotton prices in Cukurova region between 1981-1996 and also there were severe fluctuations in real prices.

Table 1. Income, Cost and Profitability of Cotton, Corn and Soybean Production

Indicators	Cotton	Corn	Soybean	Corn/ Cotton	Soybean/ Cotton
Plantation Area (decare)	172	102	74	0.59	0.43
Yield (kg/decare)	541	1,252	350	2.31	0.65
Gross Production Value per decare (TRY)	794	761	543	0.96	0.68
Production Costs per decare (TRY)	596	364	241	0.61	0.40
Absolute profit per decare (TRY)	198	397	302	2.02	1.53
Relative Profit	1.33	2.09	2.25		

Source: Own calculation.

In their technical efficiency study in cotton production, Günden [9] calculated the technical efficiency in cotton production in Menemen as 0.677, suggesting that the current yield could be increased by 32.3% under the same conditions. Aktürk [2] calculated the technical efficiency of cotton production in Söke as 0.839.

Binici et al. [6] reported that 72% of the enterprises in the Harran Plain were running inefficient operations. Gül et al. [8] reported that cotton-growing enterprises in the

Çukurova region could reduce their current input by 20% and still get the same output.

**Results of Factor Analysis**

A factor analysis was performed to reveal the factors that influenced the decision to cultivate cotton among the producers in the Eastern Mediterranean region. A total of 37 variables thought to be effective in farmer's decision-making were included in the analysis. The data on these variables were collected through a questionnaire using 5-

point Likert scale and the responses given by the participants were analysed.

The hypothesis that the correlation matrix obtained from the factors evaluated in the study is the identity matrix was rejected (Bartlett's Test of Sphericity 6574.294). In addition, the value of Kaiser-Meyer-Olkin (KMO) statistics was greater than 0.5 (KMO 0.670). Therefore, it is safe to say that a factor analysis was appropriate for these data.

Table 2. Logistic Regression Model (Y = Cotton Production Dummy)

Variables	1	2	3	4	5	6
Production cost is high						0.557
The profitability of alternative products is higher than the cotton						0.520
It sells for a low price						0.466
Harvesting cotton is easy						0.422
In a short time I can convert cotton into cash	0.856					
It is a traditional product	0.843					
Alternative product's marketing is easier than cotton	-0.840					
There is storage possibilities	0.823					
There are marketing issues	-0.821					
Irrigation facilities are suitable for cotton farming	0.818					
I cultivate cotton out of habit	0.655					
I get the opinion of other farmers when I decide to cultivate cotton		0.730				
I get the opinion of other family members in deciding to cultivate cotton		0.715				
Cotton production gives me free time		0.593				
This product is easy to grow		0.491				
It needs little hoeing and care		0.665				
Pesticide costs are low		0.615				
Production cost of alternative product is lower than cotton		-0.570				
Climate conditions are suitable for cotton farming			0.858			
The structure of our land is suitable for cotton farming			0.856			
Cotton cultivation involves many risks			0.627			
I produce cotton as it is eligible for insurance			-0.565			
It requires a lot of manual labour			0.492			
It is widely cultivated in the region			0.452			
It is suitable for machine use				0.721		
I do not have the necessary tools-equipment				0.667		
I produce cotton as there are reliable buyers				-0.581		
I am a member/officer of a cooperative or union related to the product				0.573		
It is suitable for the use of family labour				0.555		
There is availability of unionization (cooperative etc.)				0.530		
I enjoy cultivating this product				0.472		
I produce cotton due to the government subsidies					-0.550	
I suffer financial troubles for production inputs					-0.696	
I have experience in cotton cultivation					-0.493	
It is difficult to find workers					-0.411	
Alternative product requires less labour					0.384	
Soil conditions are not suitable for any crops other than cotton					0.370	

Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.670  
 Bartlett's Test of Sphericity: 6574.294 (sig: 0.000).  
 Source: Own calculation.

An appropriate method should be selected after the factor analysis has been found to be suitable in the analysis of the available data. In the factor analysis, there are two basic approaches: principal component analysis and common factor analysis.

The principal components analysis was used in this study and eigenvalues were used to determine the number of factors.

A rotation can be applied in order to assign the data to more appropriate factor groups. In cases where the number of factors is high, more commonly used orthogonal rotation applications include "varimax, equamax and quartimax" and nonorthogonal ones include "direct oblimin, and promax" rotations. Various rotations were tried and the most favourable results were obtained from the varimax method. The results of the factor analysis performed are presented in Table 2.

As a result of factor analysis, 37 variables were reduced to 6 factor groups. Accordingly, Factor 1 was the product, Factor 2 personal, Factor 3 environmental, Factor 4 technical, Factor 5 politic, and Factor 6 economic factor.

### **Logistic Regression Model**

The dependent variable of the Logistic Regression model was the values 0 and 1, representing the events of cotton production and absence of production. The value 0 represents 98 farmers who cultivated an alternative product and the value 1 represents 96 farmers who cultivated cotton. In other words, 51% of the farmers produced a product alternative to cotton in 2013, while the remaining 49% produced cotton. Using this model, we attempted to explain the factors influencing the farmer's decision-making in the agricultural product to cultivate. The explanatory variables included the age of the producers (years), the education level (years), farming experience (years), the number of individuals in the household (persons), the number of individuals working in the agricultural activities in the household (persons), membership to an agricultural organization (member: 1, not member:0), cotton plantation area (hectares) in 1990, 2000, 2011, 2012 and 2013, and the factors identified in the factor analysis were used in the model designation.

Table 3. Logistic Regression Model (Y = Cotton Production Dummy)

Variable	Coefficient		Standard Error	Wald Statistics	Probability ratio
Constant	-9.989		9.908	1.017	0.000
Education	-0.044		0.092	0.228	0.957
Experience	0.039	*	0.023	2.737	1.040
Number of family members	0.320	*	0.176	3.319	1.378
Number of families engaged in agricultural activities	-0.011		0.268	0.002	0.989
Membership to a cooperative	-0.480		0.419	1.310	0.619
Cultivation Area	0.006	***	0.002	7.101	1.006
Personal factors	-0.191		0.188	1.036	0.826
Environmental factors	1.717		1.880	0.834	5.566
Political factors	-0.243		0.178	1.861	0.785
Cotton 2013	0.091	*	0.049	3.411	1.095
Cotton 2011	0.177	***	0.058	9.327	1.194
Cotton 2000	0.011	**	0.005	4.284	1.011
Cotton 1990	-0.009	*	0.005	2.760	0.991
R Square	0.57				
-2 Log likelihood	205.57				
Model Accuracy of Prediction %	87.70				

Significance levels: \* represents 0.10, \*\* 0.05 and \*\*\* 0.01.

Source: Own calculation.

The model was generally meaningful and independent variables had a high explanatory power over the dependent variable in terms of

horizontal cross-sectional data ( $R^2 = 0.57$ ). The model function's ability to produce

predictions close to the real values was calculated as 88%.

The analysis showed that the independent variables including the farming experience, number of family members, total cultivation area, and cotton plantation areas in 2013, 2011, 2000, 1990 were statistically significant. On the other hand, factor variables obtained from factor analysis were not statistically significant.

The variable of the farming experience was found significant. Its positive coefficient indicates the existence of a synergistic relationship between experience and the probability of producing cotton. The increase in farming experience by one year increases the probability of producing cotton by about 4%. As the farming experience was a variable related to the farmer's age, the age variable was excluded from the model in order to avoid multicollinearity problems. It was found that the number of individuals per household positively correlated with the farmer's probability of producing cotton – when the household population increases, the probability of the farmer producing cotton increases by about 38%.

There was also a positive and statistically significant relationship between the total agricultural area, which was another independent variable, and the cotton cultivation. According to the model results, the increase of the total cultivation area by 10% would increase the farmer's probability of producing cotton by 6%.

The analysis of intermittent cotton production from 1990 to 2013 and the dependent variable of cotton production revealed a significant relationship between the probability of farmers producing cotton and cultivation areas in 2013, 2011, 2000 and 1990. A 1% increase in the number of farmers producing cotton in 2013, would increase the probability of cotton production by about 9%. In 1990, it was estimated that 1% increase in cotton plantation area would reduce the likelihood of producing cotton by about 9%.

## CONCLUSIONS

The study revealed that the main factors influencing cotton production decisions in the Eastern Mediterranean Region included the product factor, personal, environmental, technical, political, and economic factors. The logistic regression model estimated that the individual and household characteristics of the farmers were also important determinants of agricultural activities. The most important factors were variables of experience and family population. The independent variables of the total cultivated area and cotton plantation areas in 2013, 2011, 2000 and 1990 were also statistically significant.

The cotton plantation areas in the Eastern Mediterranean region began to shrink in size rapidly after 2000s. This decline could be attributed to the rise in the cost of cotton production, alternative product costs, yield, changes in technical applications, and changes in prices. Indeed, the corn production was 2 times more profitable and soybean production was 1.5 times more profitable than cotton production in the year studied. Therefore, the decision to cultivate cotton was not only affected by the price of cotton but the incentive policies, foreign trade practices and the changes in alternative product prices and yields.

## ACKNOWLEDGEMENTS

This study was funded by the Republic of Turkey Ministry of Food, Agriculture and Livestock TAGEM/GDARP (General Directorate of Agricultural Research and Policies) (Project No: TAGEM/TEAD/13/A15/P01/003-003). We would like to thank TAGEM/GDARP.

## REFERENCES

- [1] Akpınar, M.G., Gül, M., 1998, Developments and seasonal fluctuations in unginced cotton prices in Adana province (in Turkish). *KSU Journal of Science and Engineering*, 2(1), 100-107.
- [2] Aktürk, D., 2000, Measurement of production efficiency: A case study of cotton production, Söke (in Turkish). Ankara University, Graduate School of Natural and Applied Sciences, Department of Agricultural Economics, PhD Thesis, 127 p., Ankara.

- [3]Anonymous, 2014, 2013 Year cotton report (in Turkish). Republic of Turkey Ministry of Customs and Trade, General Directorate of Cooperatives.
- [4]Aromolaran, A.B., Olayemi, J.K., 2000, Analysis of factor affecting the preference intensity of farmers for selected farm production objectives. *African Development Review*, 12(1): 114-127.
- [5]Basarir, A., Gillespie, J.M., 2003, Goals of beef cattle and dairy producers: a comparison of the fuzzy pair-wise method and simple ranking procedure. *Southern Agricultural Economics Association Annual Meeting*.
- [6]Binici, T., Zoulaf, C., Kacira, O.O., Karlı, B., 2006, Assessing the efficiency of cotton production on the Harran plain, Turkey. *Outlook on Agriculture*, 35(3), 227-232.
- [7]Gómez-Limón, J., Atance, I., 2004, Identification of public objectives related to agricultural sector support. *Journal of Policy Modeling*, 26, 1045–1071.
- [8]Gül, M., Koç, B., Dağıstan, E., Akpınar, M.G., Parlakay, O., 2009, Determination of technical efficiency in cotton growing farms in Turkey: A case study of Cukurova region. *African Journal of Agricultural Research*, 4(10):944-949.
- [9]Günden, C., 1999, Determination of technical efficiency in cotton production by data envelopment analysis: The case of Menemen (in Turkish). *Ege University Graduate School of Natural and Applied Sciences, Department of Agricultural Economics, MSc. Thesis*, 140p, İzmir.
- [10]Joseph, F., Hair, JR., Rolph, E.A., Ronald, L.T. William, C.B., 1992, *Multivariate Data Analysis*. Macmillan Publishing Company. A division of Macmillan, Inc. Third Edition. New York, U.S.A. pp.239.
- [11]Karlı, B., Kart, F.M., Gul, M., Akpınar, M.G., 2017, Cost and Profit Analysis in Cotton Production in Şanlıurfa Province, Turkey. *Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development"*, 17 (2): 207-220.
- [12]Kuzgun, M., Özkan, B., Yılmaz, İ., 1999, Antalya ilinde üretimin yoğun olduğu yörelerde pamuk üretim maliyetinin saptanması (in Turkish). *T.C. Tarım ve Köy İşleri Bakanlığı Tarımsal Araştırmalar Genel Müdürlüğü Akdeniz Tarımsal Araştırma Enstitüsü Müdürlüğü 1999 Yılı Gelişme Raporu*, 213-218p, Antalya.
- [13]Leech, N. L., Barrett, K. C., Morgan, G. A., 2004, *Spss for intermediate statistics: Use and interpretation*. Lawrance Erlbaum Associates Publishers, Manwah New Jersey.
- [14]Özkan, B., 1996, Income, price, cost and yield variability for seed cotton production in Antalya province (in Turkish). *Tarla Bitkileri Merkez Araştırma Enstitüsü Dergisi*, 5(2), 53-60.
- [15]Özkan, B., 1996, The effects of net returns on cotton area in Antalya (in Turkish). *Anadolu Ege Tarımsal Araştırma Enstitüsü Dergisi*, 6(2), 149-158.
- [16]Parra-López, C., Calatrava-Requena, J., 2006, A multifunctional comparison of conventional versus alternative olive systems in Spain by using AHP. *International Association of Agricultural Economists Conference, Gold Coast, August 12-18, Australia*.
- [17]Sağlam, C., 2000, Effective factors on the cotton production cost and success of farm enterprisers on the irrigated areas of Yüreğir district of Adana province (in Turkish). *Çukurova University, Graduate School of Natural and Applied Sciences, Department of Agricultural Economics, MSc. Thesis*, 56 p, Adana.
- [18]Simona, M., Romana, B., 2006, Multifunctional agriculture: values and preferences of society. *International Scientific Days, Faculty of Economic and Management, "Competitiveness in the EU – Challenge for the V4 countries"*, May 17-18, Nitra.
- [19]TUIK, 2017, *Turkish Statistical Institute, Statistical Data*. (<http://www.tuik.gov.tr>)
- [20]Van Kooten, G. C., Schoney, R. A., Hayward., K. A., 1986, An alternative approach to the evaluation of goal hierarchies among farmers. *Western Journal of Agricultural Economics*, 11(1): 40-49.
- [21]Yılmaz, İ., 2001, Antalya ili Merkez ve Serik ilçeleri ova işletmelerinde buğday ve pamuk üretiminde girdi kullanımı ve üretimin fonksiyonel analizi (in Turkish). *Türkiye Ziraat Odaları Birliği Yayınları No: 207, 78 p.*, Ankara.
- [22]Yılmaz, Ş.G., Gül, M., 2015, Evaluation of Cotton Production Costs and Profitability Level in Agricultural Farms: The Case of Antalya Province (in Turkish). *Mustafa Kemal Üniversitesi Ziraat Fakültesi Dergisi*, 20(2), 27-41.
- [23]Yurdakul, O., Ören, N., 1991, Çukurova bölgesinde pamuk üretim maliyeti, satış fiyatı ve ekim alanı ilişkisi (in Turkish). *Çukurova I.Tarım Kongresi*, 9-11 Ocak, 32-41p, Adana.
- [24]Walker, S. H., Duncan, D.B., 1967, Estimation of the probability of an event as a function of several independent variables. *Biometrika*, 54: 167–179.



## ALLOCATIVE EFFICIENCY OF GROUNDNUT (*Arachis hypogea* L.) PRODUCTION IN BAUCHI STATE, NIGERIA

Salihu Umaru BIYE<sup>1</sup>, Haruna LAWAL<sup>2</sup>, Abubakar Umaru JONGUR<sup>2</sup>

<sup>1</sup>Federal University, Kashere, Faculty of Agriculture, Department of Agricultural Economics & Extension, P.M.B. 0182, Gombe, Gombe State, Nigeria, GSM Nos: +2348060516813, +2348024321262, Email: salihubnumarbiye@yahoo.com

<sup>2</sup>Modibbo Adama University of Technology, Department of Agricultural Economics & Extension, School of Agriculture and Agricultural Technology, P.M.B. 2076, Yola, Adamawa State, Nigeria

**Corresponding author:** salihubnumarbiye@yahoo.com

### Abstract

The study examines allocative (cost) efficiency of sole groundnut production in Bauchi State. It focuses on identifying the determinants of groundnut output growth, by measuring how efficient farmers are with respect to the allocation of their inputs. Data from 251 farmers were elicited using structured questionnaires via: cluster, multi-stage, purposive and simple random sampling techniques were analyzed using: descriptive statistics, and Stochastic Frontier Cost Function (SFCF). The result revealed that 61.32 % were 31-50 years, 70.12% were male, 82.87% were married and 84.06% were literate. Cost of seed used ( $P_2$ ), family labour ( $P_3$ ) and agrochemicals ( $P_5$ ) were highly significant at 1% level, while hired labour ( $P_4$ ) and cost of fertilizer was also significant but at 5% and 10% respectively. ( $\sigma^2$ ) was significant at 10% level, LR was 36.99, ( $\gamma$ ) was 0.80. Mean AE was 58%. Farmers were advised to be more rational in resource allocation; loans should be accessible and affordable to farmers.

**Key words:** allocative efficiency, Bauchi State, groundnut production

### INTRODUCTION

Groundnut (*Arachis hypogea* L.) originated from South America, but is now widely cultivated throughout the tropical, sub-tropical and temperate countries, and in Africa, Asia, North and South America. Groundnut does well on sandy – loam soil, with pH range of 5-7 and soil should be rich in calcium and phosphorus which are essential for pod formation. It has the bunch, erect and creeping type. The popular varieties in Nigeria are kano local, kano 50, Castle cary, Samnut 21, 22, and 23 (rosette resistant varieties). Groundnut can be a sole crop or intercropped. It performs better as sole crop (Idoko and Elizabeth, 2014) [13].

Allocative (or price) efficiency refers to the ability of the firm to choose its inputs in a cost-minimizing manner (Murillo-Zamorano, 2004) [15]. Allocative efficiency reflects the ability of a farmer to use the inputs in optimal proportions given their respective prices (Asogwa *et al.*, 2011) [3]. The allocative efficiency (AE) of resource was determined

by checking whether or not the ratio of the marginal value product to input price was equal to 1 (Kapopo and Assa, 2012) [14].

Amos (2013) [2] asserted that allocative efficiency of resource use is critical to enhancing productivity and incomes. The major goal of any production system is the attainment of an optimally high level of output with a given amount of effort or input. For allocative efficiency to hold, farmers must equalize their marginal returns with true factor market prices. Thus, technical inefficiency is related to deviations from the frontier isoquant, while allocative inefficiency reflects deviations from the minimum cost input ratios (Bravo-Ureta and Pinheiro, 1997) [6]. According to Farrell (1957) [8] a farm is allocatively efficient when production occurs at a point where the marginal value product is equal to the marginal factor cost.

In recent time, the world continues to witness increase in groundnut output. For instance the global groundnut output in 2006 was estimated at 33, 376, 717 metric tons; in 2009 the figure was put at 37, 166, 758 metric tons;



in 2011 rises to 40, 470, 923 metric tons and further witnessed an increase to 45, 654, 289 metric tons. While the world groundnut output continues to witness sharp increase, the story seem to be different in Nigeria as the output fell from 3, 825, 000 metric tons in 2006 to 2, 977,620 metric tons in 2009, and further declined to 2, 962, 627 metric tons in 2011 (FAOSTAT, 2013) [9]. It is against this backdrop that the paper seeks; to identify and describe their socioeconomic characteristics, determine their allocative efficiency (AE) and proffer recommendations.

## MATERIALS AND METHODS

Data were collected by administering well-structured questionnaires to sole groundnut farmers via scheduled interview with the farmers. A total of two hundred and fiftyone (251) sole groundnut farmers were successfully interviewed.

### Sample Size and Sampling Technique

Multi-stage, cluster, purposive and simple random sampling techniques were employed in the selection of the respondents in the following order; In the first stage, Bauchi State was clustered into three zones namely, Bauchi North, Bauchi West and Bauchi Central using the Bauchi State Agricultural Development Classification. In the second stage, Cluster sampling was used to cluster each zone into Local Government Areas. In the third stage, purposive sampling was used to select villages from each local government area. In the fourth stage, random sampling was used to select the registered sole groundnut farmers as follows. The sample size from each village was determined in form of proportion of the registered farmers.

### Analytical Techniques

Data collected from the sole groundnut farmers were subjected to analysis using both descriptive and inferential statistics. The descriptive statistics was used to describe the socioeconomic characteristics of the groundnut farmer. Stochastic Frontier Cost function was used in estimating the allocative efficiencies. The allocative (cost) efficiency function was derived analytically and defined as follows:

$$\ln C_{ij} = \beta_0 + \beta_1 P_{ij} + \beta_2 \ln P_{ij} + \beta_3 \ln P_{ij} + \beta_4 \ln P_{ij} + \beta_5 \ln P_{ij} + V_{ij} - U_{ij} \quad (1)$$

Subscript ij refers to the j<sup>th</sup> observation of the i<sup>th</sup> farmer.

where: Ln = Logarithm to base e, C<sub>ij</sub> = cost of production of groundnut (₦/ha), P<sub>2</sub> = cost of seed (₦/kg), P<sub>3</sub> = cost of labour (₦/ha), P<sub>4</sub> = cost of herbicide (litres/ha), P<sub>5</sub> = cost of pesticide (₦/kg), P<sub>6</sub> = cost of fertilizer (₦/kg), Allocative inefficiency frontier model is given as:

$$U_{it} = \delta_0 + \delta_1 Z_{1it} + \delta_2 Z_{2i} + \delta_3 Z_{3it} + \delta_4 Z_{4it} + \delta_5 Z_{5it} + \delta_6 Z_{6it} + \delta_7 Z_{7i} \quad (2)$$

where:

U<sub>it</sub> = non-negative random variables associated with technical inefficiency of production, Z<sub>1</sub> = age of farmers, Z<sub>2</sub> = formal education (formal education=1, no formal education =2), Z<sub>3</sub> = years of farming experience, Z<sub>4</sub> = annual farm income of farmers (₦), Z<sub>5</sub> = extension contact (number of time or if there is no contact), Z<sub>6</sub> = household size (number of persons in a household), Z<sub>7</sub> = variety of groundnut used (improved variety = 1, local variety = 0).

## RESULTS AND DISCUSSIONS

### Socioeconomic Characteristics of the Respondents

**Age.** The age distribution of the respondent is presented in Table 1. The result shows that most of the respondents (61.32 %) were within the age ranges of 31-50 years, while only 5.18% of them were 20 years and below. The maximum age was 65 years and the minimum age is 22 years while their mean age was 42.42 years. This has a direct effect on the ability of the respondents to seek and comprehend improved production practices relative to older respondents, consequently influencing their tendency of recording higher efficiency among farmers. This is in line with Battese and Coelli (1995) [4] and Otitoju and Arene, 2010) [18] who found a positive relationship between farmer's age and inefficiency.

Table 1. Age distribution of the respondents

Age	Frequency	Percentage
≤ 20	13	5.18
21 – 30	37	14.74
31-40	72	28.69
41-50	82	32.67
51 – 60	41	16.33
≥ 61	6	2.39
<b>Total</b>	<b>251</b>	<b>100</b>
Mean=42.42	Min. = 22	
Max. = 65		

Source: field survey: 2015

**Gender.** The gender distribution of the respondents is presented in Table 2. Male farmers constitute the majority (70.12%) while only few (29.88%) of them were female, which implies that there are more male farmers than female farmers engaged in groundnut farming in the area. Otitoju and Arene (2010) [18] also found that male significantly aid in security and wellbeing of the family; planning agriculture and many other aspects of rural life.

Table 2. Gender distribution of the respondents

Gender	Frequency	Percentage
Male	176	70.12
Female	75	29.88
<b>Total</b>	<b>251</b>	<b>100</b>

Source: field survey: 2015

**Marital status of the respondents.** Marital status of the respondents is presented in Table 3.

Table 3. Marital status distribution of the respondents

Status	Frequency	Percentage
Single	27	10.76
Married	207	82.87
Widower	14	5.58
Divorcee	2	0.79
<b>Total</b>	<b>251</b>	<b>100</b>

Source: field survey: 2015

Most (82.87%) of the groundnut farmers in the study area were married, while 10.76% and 5.58% of the respondents were single and widowed/widowers respectively.

**Educational levels of the respondents.** Table 4 presents distribution of educational levels of the respondents. Analysis of the level of education of the respondents in the study area

revealed that 37% of them had attended secondary schools, 31.08% had attained tertiary institutions and 15.05 % attended primary schools, while 12.35% had Quranic education. This implies that given a functional and effective extension service at their disposal, there exist a high tendency of assimilation of extension package among them, consequently leading to high rate of efficiency Sichoongwe *et al.* (2014) [21], Ghimire *et al.* (2014) [10]. According to Musa *et al.* (2016) [16], Ojo *et al.* (2013) [17], Wainaina *et al.* (2014) [22] educated farmers have the ability to understand profits associated with use of improved varieties Ghimire *et al.* (2015) [10].

Table 4. Educational level distribution of the respondents

Education	Frequency	Percentage
Uneducated	9	3.59
Quranic	31	12.35
Primary	40	15.94
Secondary	93	37.05
Tertiary	78	31.08
<b>Total</b>	<b>251</b>	<b>100</b>

Source: field survey: 2015

Table 5. Farming experience (years)

Farming experience	Frequency	Percentage
1-5	98	39.04
6-10	79	31.47
11-15	24	9.56
16-20	32	12.7
>20	18	7.17
<b>Total</b>	<b>251</b>	<b>100</b>

Source: field survey: 2015.

**Farming experience of the respondents.** The farming experience of the respondents is presented in Table 5. The result revealed that majority (39.04%) of them had farming experience of 1-5 years, 31.47% had between 6-10 years, 9.56% had 11-15 years, while 12.75% and 7.17% were within the ranges of 16-20 and >20 years respectively. This implies that sole groundnut farmers have wealth of farming experience capable of boosting their efficiency level and productivity as well. This conforms to the findings by; Otitoju and Arene (2010 [17], Adeyemo *et al.* (2010) [1], Idiong *et al.*

(2009) [12] and Ekunwe *et al.* (2008) [7], Rahji (2005) [18], who reported that age and years of farming experience improve efficiency as a result of “practice makes perfect”.

**Sources of Capital of the respondents.** The distribution of the sources of capital of the respondents is presented in Table 6. The analysis on the respondents’ sources of capital for sole groundnut farming activities revealed that bulk (71.31%) of their capital came from their personal savings, 13.55% through borrowing from friends and relatives, and 10.76% from Bank of Agriculture, while only 3.58% obtained loan from commercial banks. The implication is that farmers in the area had poor access to formal farm credit. This is in agreement with findings of Idachaba (2006) [11], who asserted that poor access to formal farm credit constitute a major constraint militating against the rural farmers’ agricultural productivity.

Table 6. Sources of capital of the farmers

Source	Freq.	Percentage
Personal savings	179	71.31
Borrowing	34	13.55
Comm. Bank Loan	9	3.58
Bank of Agric.	27	10.76
Money lenders	2	0.79
<b>Total</b>	<b>251</b>	<b>100</b>

Source: field survey: 2015

**Allocative Efficiency Estimation.** The maximum likelihood estimate of the stochastic frontier cost function is presented in Table 7. The maximum likelihood estimates of the stochastic frontier cost function shows that the entire coefficient were positive and thus conform to the apriori expectations. All the coefficients were significant except for farm size ( $P_1$ ) which was not significant. Costs of seed used ( $P_2$ ), family ( $P_3$ ) and agrochemicals ( $P_5$ ) were highly significant at 1% level, while hired ( $P_4$ ) and chemical fertilizers ( $P_6$ ) were also significant but at 5% and 10% respectively.

*Cost of seed ( $P_2$ )* was significant at 1% implying that it is an important variable in the estimation of the total cost of groundnut in the study area. The coefficient of seed was 0.1487

means that unit increase in the cost of seed would result into 1.487% increases in the total cost of production in the area and vice versa.

*Cost of family labour ( $P_3$ )* was also highly significant at 1% and the cost coefficient of family labour was 1.8895. This implies that a unit increase in the estimated cost of family labour would result in the total cost of groundnut production increasing by 1.89% in the area. Cost of hired labour ( $P_4$ ) was also significant but at 5% level. The coefficient of hired labour was 2.7412, signifying that a unit increase hired labour would account for 2.74% increase in the estimated total cost of production of sole groundnut in the area.

*Cost of agrochemicals ( $P_5$ )* was also significant at 1% with a coefficient of 3.4630, means that a unit increase in the cost of agrochemicals would account for 3.46% increase in extra total cost of production. Cost of fertilizer ( $P_6$ ) was significant but at 10%, with a coefficient of 1.2435, implying that 1.24% increasing in total cost of production was accounted by a unit increase in the cost of fertilizer in the production of groundnut.

Similarly, the inefficiency effects revealed that all the coefficients were negative and thus carry the expected sign except for extension contacts ( $z_5$ ) and variety of seed ( $z_7$ ) which were found to be positive. A negative coefficient implies positive effect on cost efficiency and vice-versa. This signifies that with the exception of the contact with extension agent ( $z_5$ ) and variety of seed ( $z_7$ ), all other variables had influence on the sole groundnut farmers’ efficiency in cost allocation. Age of the farmers and their farm income seem to have a very high influence on their cost efficiencies, as they were statistically significant at 1%. This means that any change in the two mentioned variables would affect their efficiencies accordingly. This is also in agreement with findings of Biye (2016) [5] and Idachaba (2006) [11], who affirmed a positive relationship between farm income and efficiency.

*The estimated coefficient of age of the farmers* was negative and statistically significant at 1% indicating that increase in ages of the farmers tend to decrease cost inefficiency in sole groundnut production. Farming

experience ( $z_3$ ) and variety of groundnut seeds ( $z_7$ ) used were also found to be insignificant. This implies that farming experiences and the variety of seed used does not influence their allocative efficiencies. However, years of formal education ( $z_2$ ) and extension contact were statistically significant at 10%, while household size was statistically significant at 5%. Extension contact and formal education can positively influence their ability on rational resource allocation.

This is in line with; Adeyemo *et al.* (2010) [1], and Shehu *et al.* (2010) [20], who asserted

that educated farmers, are more likely to adopt progressive farming practices and new technologies and thus increase their overall efficiency.

*Sigma squared* ( $\sigma^2$ ) was also significant at 10% level, implying the presence of good fit and the correctness of the distributional form assumed for the composite error term in the model. Gamma ( $\gamma$ ) was found to be 0.80 and is statistically significant at 10%. This means that 80% variation in output was accounted by variation in their efficiency in cost allocations.

Table 7. Maximum Likelihood Estimates of the Stochastic Frontier Cost Function

Variable	Parameter	Coefficient	Stand. error	t-ratio
<b>Cost factors</b>				
Constant	$\beta_0$	3.4305	0.2910	11.7878***
farm size ( $P_1$ )	$\beta_1$	0.0552	0.1059	0.5208
seed ( $P_2$ )	$\beta_2$	0.1487	0.0420	3.5407***
family labour ( $P_3$ )	$\beta_3$	0.0189	0.0039	4.8878***
hired labour ( $P_4$ )	$\beta_4$	0.0274	0.1119	2.4497**
agrochemicals ( $P_5$ )	$\beta_5$	0.0346	0.0062	5.5770***
fertilizers ( $P_6$ )	$\beta_6$	0.0124	0.0042	2.9512*
<b>Inefficiency Effects</b>				
Age ( $z_1$ )	$\delta_1$	-0.1143	0.0199	-5.7325***
Formal education ( $z_2$ )	$\delta_2$	-0.0319	0.0177	-1.8111*
Farming experience ( $z_3$ )	$\delta_3$	-0.0230	0.0425	-0.4788
Farm income ( $z_4$ )	$\delta_4$	-0.1435	0.0342	-4.2031***
Extension contact ( $z_5$ )	$\delta_5$	0.0153	0.0104	1.4797*
Household size ( $z_6$ )	$\delta_6$	-0.2491	0.1124	-2.2173**
Variety of seed ( $z_7$ )	$\delta_7$	0.0724	0.1351	0.5362
<b>Diagnostic statistics</b>				
Sigma squared	$\sigma^2$	0.2822	0.0187	15.1041*
Gamma	( $\gamma$ )	0.7953	0.2664	2.9853*
Log Likelihood Ratio	L LR	36.99		

Source: Computer output from Frontier 4.1

\*\*\*Significant at 1% level; \*\*Significant at 5% level; \*Significant at 10% level

### Allocative Efficiency of the Sole Groundnut Farmers

Table 8. Allocative Efficiency of the Sole Groundnut Farmers

Range of Allocative Eff.	Freq.	Percentage
0.30 – 0.39	7	2.79
0.40 – 0.49	56	22.31
0.50 – 0.59	88	35.06
0.60 – 0.69	70	27.89
0.70 – 0.79	25	9.96
0.80 – 0.89	4	1.59
0.90 – 0.99	1	0.40
<b>Total</b>	<b>251</b>	<b>100</b>

The allocative efficiencies of the sole groundnut farmers deduced from the stochastic frontier cost function are presented in Table 8.

The result revealed that a wide variation in allocative efficiency exist among them, as the minimum allocative efficiency recorded was between 0.30 and 0.39, whereas the maximum was between 0.90 – 0.99. The mean AE was 0.58 (58%) which is almost halfway to the attainment of the optimal level (efficiency frontier). The highest allocative efficiency

recorded was 0.97 (97%), while the lowest was 0.35 (35%). This shows that there exists a very wide variation in allocative efficiency among the sampled population.

## CONCLUSIONS

Majority (61.32%) of the sole groundnut farmers were adult male (70.12%) and were married (82.87%). Also most of them are literates as only (3.59%) of them can neither read nor write. They had a mean farming experience of 19 years. They have poor access to farm credit as only 10.76% and 3.58% of them were privileged to get loan from Bank of Agriculture and Commercial banks respectively.

Although the sole groundnut farmers were slightly efficient in resource allocation, there exists a wide variation in AE, with a mean AE of 0.58 (58%). However, there is still room for improvement by 42% through more rational allocation of inputs, diversifying their sources of quality inputs at affordable price. Farm size was insignificant. A unit increase in costs of; agrochemicals and hired labour will result to increase in the total cost of sole groundnut in the area by 3.46% and 2.74% respectively. 80% variation in output can be explained by their efficiency in cost allocations

From the foregoing analysis, it is recommend that:

(i) Farmers should improve their cost efficiency through rational resources allocation in such a way that inputs such as hybrid seeds, fertilizers and herbicides are procured at the least cost possible without compromising quality and also from certified sources.

(ii) Government and stakeholders in agriculture, notably groundnut production should increase farmers' access to farm loans so as to boost productivity in the area.

(iii) Farmers are advised to expand production by putting more land under cultivation and also form cooperative in order to drastically cut cost of hired.

## REFERENCES

- [1] Adeyemo, R., Oke, J. T. O., Akinola, J. T. O., 2010, Economic Efficiency of Small Scale Farmers in Ogun State, Nigeria. *Tropicultura* 28 (2).
- [2] Amos, A. P., 2013, Allocative Efficiency of Resource Use by Cassava Farmers in Wamba Local Government Area, Nasarawa State, Nigeria. *International Journal of Economic Development Research and Investment*, Volume 4, Number 3, December 2013.
- [3] Asogwa, B. C., IHEMEJE, J. C., Ezihe, J. A. C., 2011, Technical and Allocative Efficiency Analysis of Nigerian Rural Farmers: Implication for Poverty Reduction. *Agricultural Journal* Vol. 6 (5) pp. 243-251.
- [4] Battese, G. E., Coelli, T. J., 1995, A Model for Technical Inefficiency Effects in Stochastic Frontier Production Function for Panel Data. *Empirical Economics* 20: 325 - 332.
- [5] Biye, S. U., 2016, Analysis of Production Efficiency and Profitability among Groundnut (*Arachis hypogea l.*) Farmers in Bauchi state, Nigeria. Unpublished PhD Thesis, Department of Agricultural Economics & Extension, School of Agriculture and Agricultural Technology, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria
- [6] Bravo-Ureta, B., Pinheiro, E., 1997, Technical, Economic, and Allocative Efficiency In Peasant Farming: Evidence From The Dominican Republic. *The Developing Economies*.
- [7] Ekunwe, P. A., Orewa, S. I., Emokaro, C.A., 2008, Resource Use Efficiency in Yam Production in Delta and Kogi States of Nigeria. *Asian Journal of Agricultural Research* 2(2): 187-201.
- [8] Farrell, M. J., 1957, The Measurement of Productivity Efficiency. *Journal of the Royal Statistical Society, Series A*, Vol. 120, Part 3, pp.253- 90.
- [9] FAOSTAT (2013). Factfish Peanuts, production Quantity for World. [www.factfish.com/statistic/country/world/peanuts,production](http://www.factfish.com/statistic/country/world/peanuts,production).
- [10] Ghimire, R. G., Wen-Chi, H. U., Hrestha, R. B. S., 2015, Factors Affecting Adoption of Improved Rice Varieties among Rural Farm Households in Central Nepal. *Rice Science* 22(1):35-43.
- [11] Idachaba, F. S., 2006, Rural Development in Nigeria: Foundations of Sustainable Economic Development. *Ife Journal of Agriculture*, 8: 111 – 118.
- [12] Idiong, I. C., Agom, D. I., Effiong, E. O., Ohen, S. B., 2009, Analysis of Technical and Economic Efficiencies in Rice Production Systems in the Niger Delta Region of Nigeria. In *Sustaining Agricultural Growth to Meet National Economic Development Goal*. Proceedings of the 23rd Annual Conference of Farm Management Association of Nigeria (FAMAN).
- [13] Idoko, M. D., Elizabeth, S., 2014, Challenges in Groundnut Production and Adoption of Groundnut Production Technology Information Packages among Women Farmers. *Agriculture and Biology Journal of North America*, <http://Www.Scihub.Org/Abjna>. Vol. 5 (6) pp.252-258

- [14] Murillo-Zamorano, L., 2004, Economic Efficiency and Frontier Techniques. *Journal of Economic Surveys* 18(1): 33–77.
- [15] Musa H. A., Mesfin, H. M., Abady, S., W. Mesfin, Kebede, A., 2016, Adoption of Improved Groundnut Seed and its Impact on Rural Households' Welfare in Eastern Ethiopia. *Cogent Economics & Finance*, Vol.4(1): 1-13.
- [16] Ojo, C. O., Ghide, A., Phaniel, A., 2013, Gender Resource Accessibility and Profitability among Groundnut Producers in Hong Local Government Area of Adamawa State, Nigeria. *Asian Journal of Agriculture and Rural Development* 3(9):650-656.
- [17] Otitoju, M., Arene, C. J., 2010, Constraints and Determinants of Technical Efficiency in Medium-Scale Soybean Production in Benue State, Nigeria. *Africa Journal of Agricultural Research* 5(17): 2276–2280.
- [18] Rahji, M. A. Y., 2005, Determinants of Efficiency Differentials in Lowland Rice Production Systems in Niger State, Nigeria. *Ibadan Journal of Agricultural Research* 1(1): 7-17.
- [19] Shehu, J. F., Iyortyer, J. T., Mshelia, S. I., Jongur, A. A. U., 2010, Determinants of Yam Productivity and Technical Efficiency among Yam Farmers in Benue State, Nigeria. *Journal of Social Science* (2) pp 24.
- [20] Sichoongwe, K., Mapemba, L., Tembo, G., 2014, The Determinants and Extent of Crop Diversification among Smallholder Farmers: A Case Study of Southern Province, Zambia. *International Food Policy Research Institute Working Paper* 5:1-14.
- [21] Vincent, K., Assa, M., 2012, Economic Analysis of Groundnut Production in Kasungu District, Malawi: A Production Economics Approach. University of Malawi. Online at <http://mprap.uni-muenchen.de/41593/MPRAP>
- [22] Wainaina, P., Songporne, T., Matin, Q., 2014, Improved Seeds, Fertilizer or Natural Resource Management? Evidence from Kenya's Smallholder Maize Farmers. Paper Prepared for Presentation at the EAAE 2014 Congress Ljubljana, Slovenia.



## STRUCTURAL CHANGE IN THE ROMANIAN AGRICULTURE: IMPLICATIONS FOR THE FARMING SECTOR

Elena BULARCA (OLARU), Elena TOMA

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 762 2733 53; Email: bularca\_elena@yahoo.com, elenatoma2001@yahoo.com

*Corresponding author:* bularca\_elena@yahoo.com

### *Abstract*

*The paper describes changes observed in Romanian agriculture from 2002 until 2016, against the background of the situation in previous years. Romania's membership in the European Union has substantially changed the farming conditions in Romanian agriculture. Thus, the question arises: what has changed in that sector in recent years? The present article contains an attempt to answer this question. Therefore, the main of this article is to describe the agricultural holdings situation and evolution in 2002-2016 period using data from the Agricultural Census (2002, 2010 years) and Farm Structure Survey (2005, 2007, 2013, 2016 years). During the 2002- 2016 period, the number of agricultural holdings has been declining. It shows that the large agricultural holdings which represent 0, 5% of total agricultural holdings manage more than 50% of utilised agricultural area. The situation of Romanian agriculture has improved substantially and it is characterised by a traditional farming which is the most dominant in terms of numbers of people involved and the geographical coverage. In Romania agriculture is an important contributor towards national economic performance.*

*Key words:* agricultural holdings, evolution, number, size, distribution, implications

### INTRODUCTION

Agriculture is a large and important sector in most developing countries, being connected to other sectors. This results from the fact that agriculture is a source of supply for a unique consumption good, a source of demand for non- agricultural products and a potential source of labor, land and capital [4].

The role of agriculture sector has suffered significant transformation in the past years [2]. The World Bank (2008) said that agriculture has features which make it a unique instrument for development [14].

An important role in a global economy has the evolution of farms structure which is a part of an elaborate evolution of the farm sector [1]. In the world are more than 570 million agricultural holdings, more than 500 million of these are family farms and about 84% of farms are smaller than 2 ha. The world agricultural production is produced in family farms with a high share across almost all countries, using 75% of the world's agricultural land. Farms that have less than 2

ha, named small farms, operate 12% of the world's land and produce a consistent share of the world's food [6]. The same holds true for EU where farming is primarily a family activity, more than 75% of agricultural labour force was provided by family members. Predominantly, in EU-28, "the most common size of farm is with 2-20 hectares of utilised agricultural area" [3].

In 2013, Romania had 3.63 million farms (on the first place in EU) [11], but until 2016 their number was declining with almost 6% (with 11% compared to 2010). The utilised agricultural area of an agricultural holding in 2016 was 3.65 ha, compared to 3.60 ha in 2013 [9].

In this context, the paper aimed to analyse the evolution of the number holdings by legal structure, average holdings size, farm distribution, type of land tenure, land use, crops structure and animals statistical analysis. These aspects were discussed and analyzed in 2002- 2016 period in Romania



## MATERIALS AND METHODS

In order to set up this article, it has been calculated a system of statistical, analytical and synthetic indicators which, after the way of calculation and expression, can be structured in the following way: absolute indicators, relative indicators and average indicators [13]. It has been calculated and interpreted, largely, the succeeding indicators: the number of agricultural holdings (number), the utilised agricultural area (hectare), the average physical size of the agricultural holdings (hectare/farm), the livestock number (number), the employed persons in agriculture sector (number) and the number of worked days in agricultural holdings (number).

For processing and interpretation of the data have been use two methods: the index method and the comparison method. The index method is the most important method in the dynamic of phenomena evolution and uses two types of index: fixed base index and chain base index. It also has been use the growth/decay rate which refers to the percentage change of a specific variable within a specific time period, given a certain context [5].

The period analysed in this study was 2002-2016.

The data for the period 2002-2016 were collected from National Institute of Statistics and have been statistically processed and interpreted.

## RESULTS AND DISCUSSIONS

The number of agricultural holdings has continuously decreased from 4,485 million in the year 2002 to 3,422 million in the year 2016, as a result of land concentration, meaning a decrease of 24% (Figure 1).

After the calculation of chain base index of agricultural holdings, it observes that this value is between 92 and 98%, the higher decrease was about 8% in 2007 compared to 2005, with the accession of Romania to the European Union.

Analysing the number of agricultural holdings by legal status, it is remarked that the agricultural holdings without legal personality

constitute most of Romanian farms, more than 99% (Figure 2).

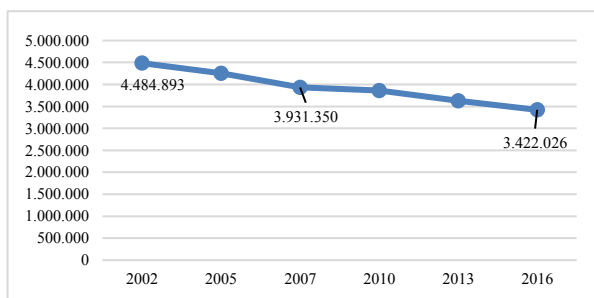


Fig. 1. Evolution of Agricultural Holdings during the period 2002-2016

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS[7, 8]

Analysing the number of agricultural holdings by legal status, it is remarked that the agricultural holdings without legal personality constitute most of Romanian farms, more than 99% (Figure 2). These farms are mainly family farms with extensive semi-natural grassland pastoral systems and mixed farming systems [10].

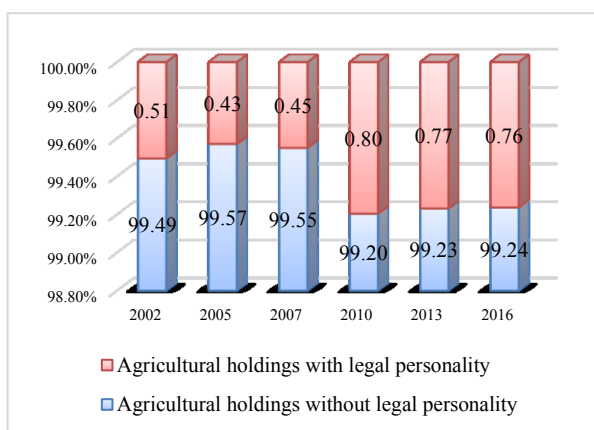


Fig. 2. Share of Total Number of Agricultural Holdings by legal status during the period 2002-2016 (%)

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

In Romania, the units with legal status are represented by agricultural companies or associations, commercial companies, units of public institutions, co-operative units and others categories. The number of agricultural units with legal status increased with 15% in 2016 compared to 2002. The principal reason of this increase is the duplication of the commercial companies number (Figure 3).

After the fall of communism, in Romania faced broke up the collective farms and appeared uncertainty of ownership. These individual parcels which are very small became dedicated to the subsistence crops and are habitually cultivated by peasants.

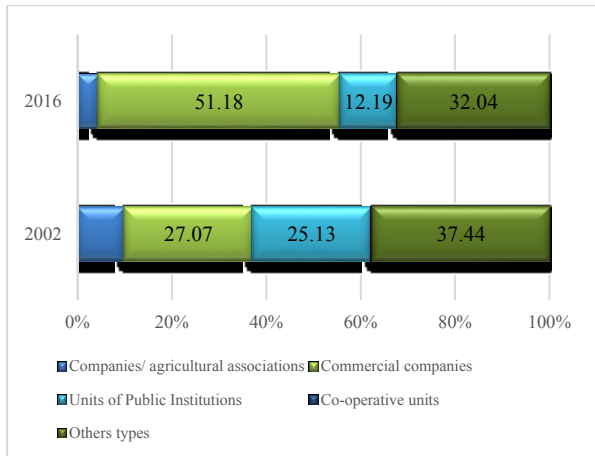


Fig. 3. Share of number of Agricultural Holdings with legal personality during the period 2002-2016 (%)  
 Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

The largest share of agricultural holdings under 2 ha is representative for the distribution of the agricultural holdings by physical size classes.

The very small farms constitute more than 65% of total of farms. In the evolution of the distribution of agricultural holdings by physical size classes, a decreasing trend can be observed in the number of very small holdings with less than 2 ha.

This was a consequence of concentration land which produced the growth of the medium sized farms with 95%, large farms with 56% and very large farms with 20% in 2016 compared with 2002 (Table 1).

The distribution of Romanian agricultural holdings by size classes must be investigated in affinity with the utilized agricultural area distribution: the agricultural holdings under 2 ha utilized 12% of the agricultural area (decreasing with 2pp compared to 2002); the farms with 50 and over 50 ha used more than 50% of agricultural area (Figure 4).

Table 1. The distribution of agricultural holdings by different size classes in Romania

Size class (ha)	Number						% of total					
	2002	2005	2007	2010	2013	2016	2002	2005	2007	2010	2013	2016
Very small: less than 2 ha	3,067,148	2,721,713	2,485,566	2,725,676	2,589,924	2,400,930	71.34	66.04	64.53	70.88	72.67	71.84
Small: 2-20 ha	1,208,683	1,369,585	1,335,718	1,077,167	934,776	904,409	28.11	33.23	34.68	28.01	26.23	27.06
Medium sized: 20-50 ha	9,477	16,119	16,107	20,158	18,727	18,523	0.22	0.39	0.42	0.52	0.53	0.55
Large: 50-100 ha	3,850	4,939	4,791	7,796	7,263	6,013	0.09	0.12	0.12	0.20	0.20	0.18
Very Large: more than 100 ha	10,203	8,891	9,608	14,448	13,075	12,310	0.24	0.22	0.25	0.38	0.37	0.37
<b>Total</b>	<b>4,299,361</b>	<b>4,121,247</b>	<b>3,851,790</b>	<b>3,845,245</b>	<b>3,563,765</b>	<b>3,342,185</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Own calculation on the basis of data from Farm Structure Survey and Agricultural Census data base 2002-2016, NIS

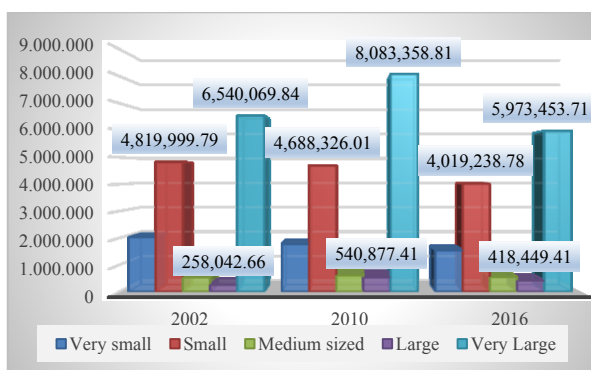


Fig. 4. The distribution of utilized agricultural area by different size classes of the agricultural holdings  
 Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7]

The total utilised agricultural area of Romania was around 12,5 million ha in 2016, it has been decreased (-10.25%) from 2002 to 2016 (Figure 5).

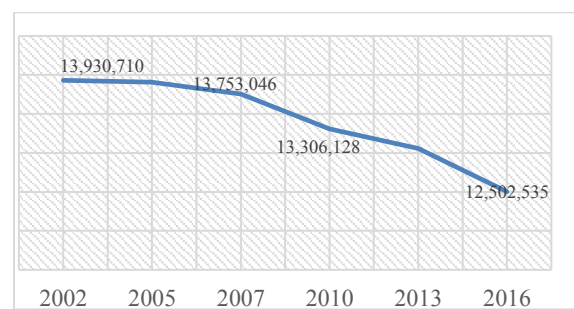


Fig. 5. Utilized agricultural area (UAA) in Romania in 2002-2016 period

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

The biggest decreasing was observed after the accession of Romania to the European Union and this trend has been caused by privatization and redistribution of agricultural land because Romania encounters a profound

restructuring process regarding their agricultural sectors.

Table 2. The average physical size of the Romanian agricultural holdings

Specification	2002	2005	2007	2010	2013	2016
Agricultural holdings (numbers)	4,484,893	4,256,152	3,931,350	3,859,043	3,629,656	3,422,026
Utilized agricultural area (hectares)	13,930,710.10	13,906,701.28	13,753,046.49	13,306,128.33	13,055,849.80	12,502,535.49
Average of UAA (ha)	3.11	3.27	3.50	3.45	3.60	3.65

Source: Own calculation on the basis of data from Farm Structure Survey and Agricultural Census data base 2002-2016, NIS [7,8]

In Romania, the average area of the agricultural holdings was growing from 3.11 hectares in 2002 to 3.65 hectares in 2016 (Table 2). The above- mentioned size together with the unreasonable parcelling of the land area, are causing great difficulties in practicing a performant and competitive agriculture, in crop rotation, in the use of technical means and modern technologies, etc [12].

A special importance in the increase or decrease of the physical size of farms is hold by the progress of the land market with its primary components: in property, concession, land leasing, etc [12].

From 2002 to 2016 the distribution of UAA has dramatically changed (Figure 6). In the whole period the UAA into ownership had the biggest share which was down by 14pp in 2016 compared to 2002. This decrease of UAA in property resulted in an increase of UAA on lease (+23 pp).

The other categories consist of land concession, share cropping, land concession, land utilized on free of charge basis, etc. and it has a relatively decreasing share.

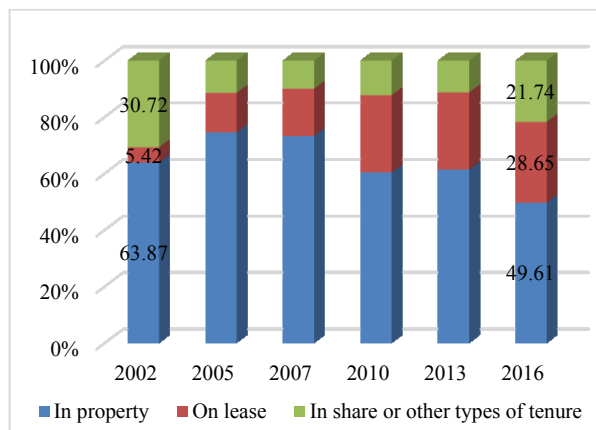


Fig. 6. Utilized agricultural area (UAA) by land modality in 2002-2016 period (%)

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

In 2002-2016 period, the utilised agricultural area was relatively decreasing for all categories of use (Table 3). The share of the UAA by categories of use is entirely important for the present and the future of Romanian agriculture. We mention that the arable land owns the largest share of UAA (63-64%) followed by pastures and meadows (32-34%) and the less share held by kitchen gardens and permanent crops (under 5%).

Table 3. The distribution of UAA by categories of use in 2002-2016 period

Specification	2002		2005		2007		2010		2013		2016	
	Hectares	% of UAA	Hectares	% of UAA	Hectares	% of UAA	Hectares	% of UAA	Hectares	% of UAA	Hectares	% of UAA
Arable land	8,773,749	62.98	8,866,592	63.76	8,691,343	63.20	8,306,416	62.43	8,197,590	62.79	7,813,433	62.49
Kitchen gardens	168,865	1.21	170,612	1.23	177,945	1.29	182,025	1.37	157,439	1.21	142,333	1.14%
Pastures and meadows	4,644,005	33.34	4,530,298	32.58	4,540,135	33.01	4,506,253	33.87	4,398,346	33.69	4,245,421	33.96
Permanent crops	344,092	2.47	339,199	2.44	343,623	2.50	311,433	2.34	302,474	2.32	301,348	2.41%
Total of UAA	13,930,710	100.0	13,906,701	100.0	13,753,046	100.0	13,306,128	100.0	13,055,850	100.0	12,502,535	100.0

Source: Own calculation on the basis of data from Farm Structure Survey and Agricultural Census data base 2002-2016, NIS [7,8]

In evolution of the agricultural holdings by categories of use of UAA, it observed a continuous decrease (Figure 7). From 2002 to 2016, the number of farms with arable land has down by 30%, with kitchen garden by

17.5%, with pastures and meadows by 24% and with permanent crops by 24.5%.

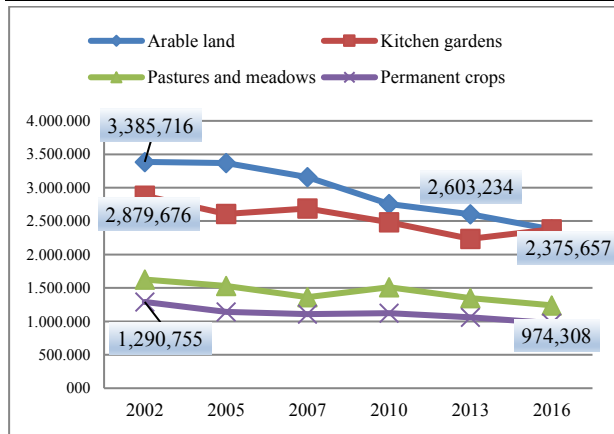


Fig. 7. The evolution of agricultural holding by categories of use of UAA, in 2002-2016

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

We noticed that in the all analysed period, the share of categories use of arable use was keeping the same (Figure 8). The largest share of UAA is owned by cereals grains (more than 60% of arable land), followed by industrial plans (19%) and green fodder (10%).

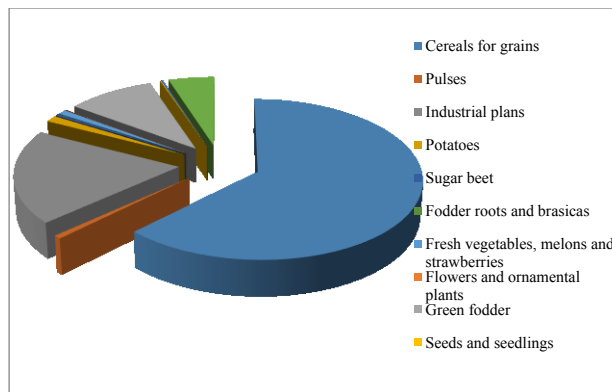


Fig. 8. The share of UAA by categories of arable land 2016 (%)

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

Analysing the evolution of arable land in 2016 compared to 2002 (Figure 9), we observed significantly changes, the highest growth has occurred in the flowers and ornaments category (by +150%) and the biggest fall has occurred in fodder roots and brassicas category (-72%).

We observed that, excepting macroregion one, all the macroregions have a large share of UAA in arable land (more than 50%). Macroregion one has 58% of UAA utilised by

pastures and meadows due to climatic conditions (Figure 10).

The livestock number from 2002 to 2016 is significantly decreasing in bovine (- 36%), pigs (50%) and poultry (- 6%). The number of goats, sheep and bee families has increased by 85%, 26% and 73% (Figure 11).

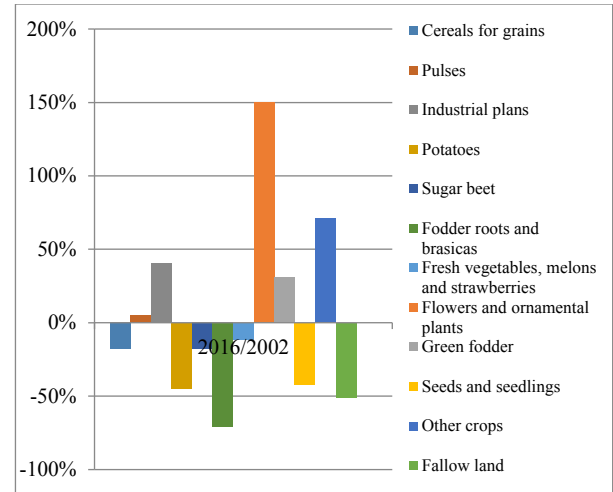


Fig. 9. The evolution of arable land in 2016 compared to 2002

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7]

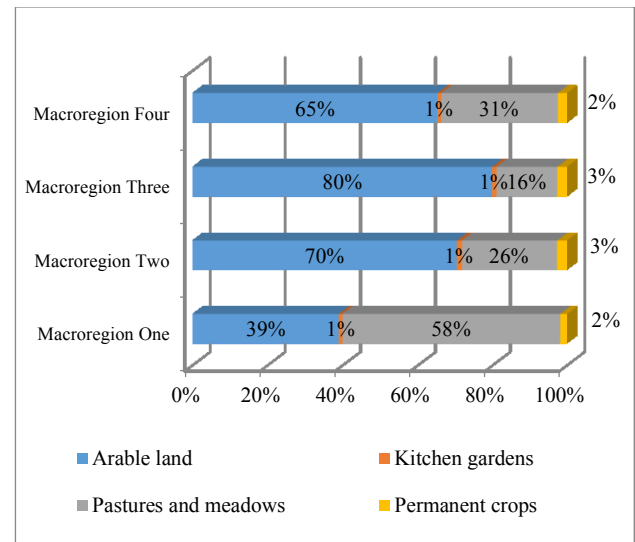


Fig. 10. The share of utilised agricultural area by macroregions in 2016

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

Analysing the agricultural holdings with livestock by the most important species, we observed that the share of pigs farms has been decreasing (by - 20 pp) opposite to the share

of poultry farms which has been increasing by 40 pp from 2002 to 2016 (Figure 12).

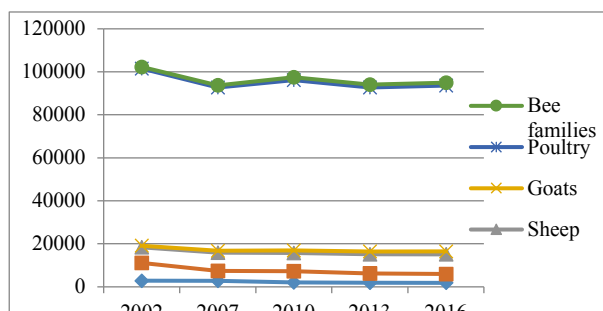


Fig. 11. The evolution of livestock numbers by species in Romania in 2002- 2016 (thousands)

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

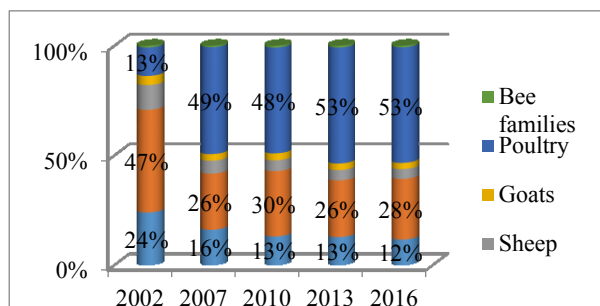


Fig. 12. The distribution of agricultural holdings with livestock by species

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

From 2002 to 2007, the number of men employment in agriculture has decreased

more rapidly (-33%), then from 2007 to 2010 it has increased (+12%) and in the last period, 2010- 2016, it decreased slightly (-14%).

The number of women employed in agriculture registered substantial increases and decreases in the same manner as the number of men employed in agriculture, from 4,437 million in 2002 to 2,904 million in 2016 (Figure 13).

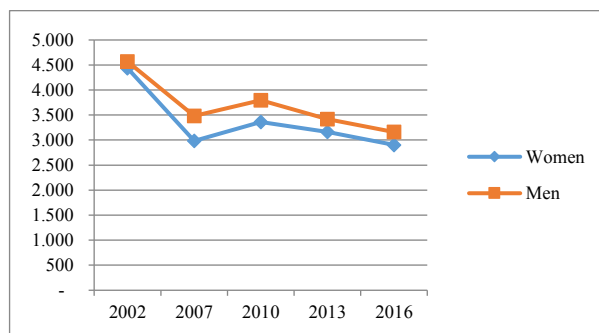


Fig. 13. The evolution of employed persons, by gender in agricultural sector 2002-2016 period (millions)

Source: Own design based on the data provided by Farm Structure Survey and Agricultural Census Data Base, 2002-2016, NIS [7, 8]

The share of men and women regularly employed in the Romanian agricultural sector has been the same in the analysed period, men represented more than 50% of the total agricultural labour force (Table 4).

Table 4. The number and share of employed persons, by gender in agricultural sector 2002-2016 period (million persons)

Specification	2002		2007		2010		2013		2016	
	Number	% of total	Number	% of total	Number	% of total	Number	% of total	Number	% of total
Women	4,437	49	2,984	46	3,359	47	3,164	48	2,904	48
Men	4,570	51	3,484	54	3,798	53	3,418	52	3,161	52
Total	9,007	100	6,468	100	7,157	100	6,582	100	6,065	100

Source: Own calculation on the basis of data from Farm Structure Survey and Agricultural Census data base 2002-2016, NIS [7, 8]

The number of persons employed in agricultural sector varies during the analysed period, but the number of worked days in agriculture has been declining in throughout the period analysed. The number of worked days by women decreased by 52% and in man by 49% (Table 5).

Table 5. The number of worked days, by gender, in agricultural holdings in 2002- 2016 (millions)

Specifi- cation	2002	2007	2010	2013	2016	2016/ 2002
Women	308	227	161	156	148	48%
Men	369	274	207	200	187	51%

Source: Own calculation on the basis of data from Farm Structure Survey and Agricultural Census data base 2002-2016, NIS [7, 8]



## CONCLUSIONS

In 2002- 2016, the situation of Romanian agriculture has improved.

Due to the land concentration process, the number of agricultural holdings decreased by 24 %, but the number of agricultural holdings without legal personality holds more than 99 % of total agricultural holdings. However, the agricultural holdings under 2 ha have only a little part of UAA. The largest part of utilised agricultural area appertains to agricultural holdings with 50 and over 50 ha, considered in this article as large and very large farms.

The land concentration process has a determined impact in the average physical size of agricultural holdings. This increased from 3.11 ha in 2002 to 3.65 ha in 2016.

It is very important to analyse the distribution of utilised agricultural area by land modality. The complete transfer of agricultural land ownership occurs after the fall of communism. The sale-purchase of lands skilled major decrease compared to the land lease.

In 2002, the land in property totalized 8,897 million ha (64% of UAA) and in 2016 decreased to 6,203 million ha (50% of UAA). The land lease had a greater development from 755 thousand in 2002 (5% of UAA) to 3.582 thousand in 2016 (29% of UAA).

Analysing distribution of utilised agricultural area by categories of use, we noticed that the arable land occupies the most important part of utilised agricultural area, more than 60 % in all analysed period. At macro regions level, the situation remains unchanged; an exception is macroregions one because of its specific climatic conditions, the majority of utilised agricultural area is occupied by pastures and meadows, over 50%. Therefore, the arable farmed areas predominate in the east, the south and the extreme west of Romania, while permanent grasslands and livestock farming are concentrated in the central and northern areas of the country.

We have analysed the evolution of arable land from 2002 to 2016 and we found that there are significantly changes. The highest increase occurred in utilised agricultural area of flowers and ornament category as opposed to

the biggest fall of analysed categories, by - 72%, in fodder roots and brassicas category.

The livestock number has undergone significant changes due to decreasing of pigs and poultry number. A positive aspect is in the beekeeping field because of the increasing of bees families by 73% in 2016 compared to 2002. In the analyse of the share of agricultural holdings with livestock by species in total of agricultural holdings, we noticed that the share of agricultural holdings with pigs was 47% in 2002 as opposed to 28% in 2016, the share of agricultural holdings with bovine was 24% in 2002 as opposed to 12 % in 2016 and the agricultural holdings with poultry was 13% and has increased to 50% in 2016, even if the number of poultry in agricultural holdings has decreased by 6% in the same period.

In researching of the Romania agricultural employment, we concluded that the number of persons employed in agricultural sector has decreased from 9 million persons in 2002 to 6 million persons in 2016. The male persons occupy the biggest share of employed persons in agricultural sector, over 51%. The number of worked days by gender also has reduced from 308 million worked days in 2002 to 148 million worked days in male persons and from 369 million worked days in 2002 to 187 million worked days in 2016 in female persons. This significant decrease was largely due to the improvement and modernisation of agriculture in order to meet new environmental and economic challenges.

In conclusion, we have achieved a satisfactory result in analysing of agricultural sector in 2002- 2016. Romania is rich in family farms which are the source of strength in the Romanian economy, society, culture and sustainability of agriculture.

## ACKNOWLEDGEMENTS

This research work was carried out with the support of National Institute of Statistics and it also will be used in the PhD thesis of the author, named “Researches on the productivity and profitability of the agricultural holdings”.

## REFERENCES

- [1]Chavas, J-P., 2005, Structural change in agricultural production: Economics, technology and policy. Handbook of Agricultural Economics. Vol. 1, Part A, 2001, Pages 263-285.
- [2]Eretova, V., Jancak, V., 2017, The past, present and future of diversification of agricultural holdings in Czechia. *AUC Geographica*, 52:27-37.
- [3]Eurostat. Statistical Books. Agriculture, forestry and fishery statistics. 2016 Edition. Available on Eurostat website at: <http://ec.europa.eu/eurostat>, Accessed January 10, 2018.
- [4]Gollin, D., College, W., 2010, Agricultural productivity and structural change. NSF-AERC-IGC Technical Session on Agriculture and Development, Mombasa, Kenya.
- [5]Investopedia Academy. Accessed on 25 January 2017 at <https://www.investopedia.com/terms/g/growthrates.asp>.
- [6]Lowder, K.S., Scoet, J., Raney, T., 2016, The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide. World Development. Volume 87, November 2016, Pages 16-29.
- [7]National Institute of Statistics. Agricultural Census. 2002, 2010.
- [8]National Institute of Statistics. Farm Structure Survey, 2005, 2007, 2013, 2016.
- [9]National Institute of Statistics, 2017, Press release no. 324/ 15 December 2017. Agriculture Field. Available on [www.insse.ro/cms/sites/default/files/com\\_presa/com\\_pdf/asa\\_2016r\\_2.pdf](http://www.insse.ro/cms/sites/default/files/com_presa/com_pdf/asa_2016r_2.pdf), Accessed on January 10, 2018.
- [10]Page, N., Popa, R., 2013, Family Farming in Romania. Fundația ADEPT Transilvania. Saschiz. [www.fundatia-adept.org](http://www.fundatia-adept.org), Accessed on January 10, 2018.
- [11]Popescu, A., Alecu, I.N., Dinu, T.A., Stoian, E., Ciocan, H., 2016, Farm Structure and Land Concentration in Romania and the European Union's Agriculture. *Agriculture and Agricultural Science Procedia* Volume 10, 2016, Pages 566-577.
- [12]Popescu, M., 2010, Physical Size of Agricultural Holdings in Romania. Gaps between Romania and the European Union Member States. Institute of Agricultural Economics, Romanian Academy. *Agricultural Economics and Rural Development*, New Series, Year VII, no. 1, p. 17–36.
- [13]Titan, E., Ghita, E., Trandas, C., *Statistica Economica*. Available on <http://www.biblioteca-digitala.ase.ro/biblioteca/carte2.asp?id=116&idb>, Accessed on January 10, 2018.
- [14]World Bank, 2007, World Development Report 2008: Agriculture for Development. Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/5990> License: CC BY 3.0 IGO, Accessed on January 10, 2018.

## THE ANALYSIS OF NATIONAL PROGRAMME FOR RURAL DEVELOPMENT MEASURES AND THE EVOLUTION OF AGRICULTURAL HOLDINGS IN THE PERIOD 2007-2016 AT THE LEVEL OF OLT COUNTY

Aurelian BULIGA-ȘTEFĂNESCU, Raluca NECULA

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 744 6474 10; Emails: aurelian\_buliga@yahoo.com; raluca\_nec@yahoo.com

**Corresponding author:** raluca\_nec@yahoo.com

### Abstract

*The paper studied the impact of the measures from the National Rural Development Programme Romania (PNDR) 2007-2013 on the agricultural holdings development at the level of Olt County, impact that can be measured for the period 2007-2016. The analysis was carried out using the data available from the National Institute of Statistics, Structural Surveys in Agriculture and General Agricultural Census. From the results at the level of Olt County, the largest number of beneficiaries was under Measure 141 for the financing of subsistence farms and Measure 322 has attracted the most money. The renewal of the generation of heads of agricultural holdings has a significant impact on the vegetable areas, with many projects on measure 112 "Installing Young Farmers". Financing farmers' projects offers them the opportunity to enter the agricultural market and to develop economically, they also contribute to rural development.*

**Key words:** agriculture, European funds, agricultural holdings, farm heads

### INTRODUCTION

Although Romania has an archaic agriculture caused by the large number of small-scale agricultural holdings, it managed over 2007-2016 through more than EUR 11 billion absorbed from the structural funds to generate the growth and capitalization of farmers who have implicitly led to higher agricultural output [7]. The PNDR 2007-2013 measures have contributed to the increase of the performances in the agricultural sector in Romania, propelling our country into a leading position at the European level regarding the production and export of grains. It remains to be seen how we will be able to process a share of the production. In this way, the workforce made redundant as a result of the purchases of high performance machinery would be directed to processing activities. One of the biggest problems faced by the agricultural sector in Romania remains the large number of agricultural holdings and, implicitly, the fragmentation of the arable land. At present, 2.38% of all holdings for

which subsidies are paid cover more than 60% of the eligible area.

Romania ranks 1st at the European level, with 3.63 million farms in 2016 and the 6th place on the agricultural area used, 13.05 million hectares.

The average size of agricultural use and exploitation in Romania is 3.65 hectares, four times lower than the EU average, which stands at 14.2 hectares (16th).

Agricultural holdings with no legal personality have an average agricultural use of 2.04 hectares, while holdings with legal personality use an area of 100 times higher, 213.64 hectares respectively.

This article presents the comparative evolution of agricultural holdings in Romania, the South-West Oltenia Region and Olt County

### MATERIALS AND METHODS

The research was carried out by analyzing the statistical data referring to Olt County. The Structural Surveys in Agriculture 2005, 2007, 2013 and 2016 were investigated. For the



years 2002 and 2010, the General Agricultural Censuses were considered.

The formulas used to calculate these indicators are presented [5] :

The annual average growth rate =

$$r_{2007-2016} = \sqrt[9]{\pi \left( \frac{p_1}{p_0} \right)} - 1; \text{ where:}$$

$r_{2007-2016}$  = average annual growth rate;

$\pi(p_1/p_0)$  = entangled growth indicators

For the standard deviation =

$$\hat{\sigma} = \sqrt{\frac{\sum(\bar{x}-x_i)^2}{n-1}}; \text{ where:}$$

$\hat{\sigma}$  = standard deviation;  $x_i$  = the average values for a number of years

$n$  = number of years taken into account

Coefficient of variation =  $C = \frac{\hat{\sigma}}{\bar{X}} \times 100$ , where:

C-coefficient of variation (expressed as a percentage). Coefficient of variation can be: between 0-10% variation; between 10-20%-

sized variation; more than 20%-large variation.

## RESULTS AND DISCUSSIONS

The results delay to appear. Although nearly a million agricultural holdings have disappeared between 2005 and 2016, there is much room for shuffling. An important role will be given to the free cadastration of agricultural lands through the National Cadastre and Land Book Program 2015-2023 which will facilitate the sale.

### Structure size of European funds attracted stock at county level I t, 2007-2013

European money came to Romania through PNDR in order to help increase the competitiveness of the agricultural and forestry sectors, and to achieve this main objective, several measures were created to finance various farmers' projects.

Table 1. Structure by contract activities signed at OJFIR OLT for the period 2007-2013

Measure's name	Projects submitted		Selected and contracted projects		Total value (Euro)		Non-refundable amount	
	No		No	%	million €	%	million €	%
Setting up young farmers (Measure 112)	1,052		619	58.8	14.22	64.12	14.22	100.00
Modernization of agricultural holdings (Measure 121)	194		66	34.0	39.00	175.82	19.85	50.89
Increasing the added value of agricultural and forestry products (Measure 123)	53		30	56.6	41.24	185.92	20.62	50.00
Improvement and development of agricultural and forestry infrastructure (Measure 125)	58		15	25.9	14.86	67.01	14.86	100.00
Basic services for economy and rural population (Measure 312)	221		77	34.8	12.56	56.63	8.91	70.92
Encouraging tourism activities (Measure 313)	22		9	40.9	2.19	9.85	1.25	57.10
Village Renovation and Development (Measure 322)	98		19	19.4	48.21	217.36	48.21	100.00
Supporting semi-subsistence farms (Measure 141)	3,399		2,388	70.3	17.91	80.75	17.91	100.00
Implementation of local development strategies (Measure 411); Quality of life and diversification of the rural economy (Measure 413)	360		307	85.3	22.18	100.00	17.37	78.32
Total	5,457		3,530	64.7	212.37	957.47	163.20	76.85

Source: Agency for Rural Investment Financing (AFIR), <http://www.afir.info/> [2]

In 2007, at the level of Olt County there were 132,835 agricultural holdings without legal personality and only 503 companies with agricultural profile. In fact, only 4.1% of the Olt county farmers were interested in European money. Thus, a total of 5,457 projects that were carried out during the period 2007-2013 were submitted at the level of the Olt County.

Of these, 3,530 projects were selected as a result of eligibility and compliance checks. As it can be seen in Table 1, the largest number of beneficiaries was under Measure 141 for the financing of subsistence farms. Out of 3,399 submitted projects, 70.25% were selected (2,388 projects). Beneficiaries are guaranteed to receive EUR 1,500 for three years. If during this period the commitments

assumed through the business plan are met, 1,500 Euros are still due for another two years. The second measure of success in terms of the number of beneficiaries was Measure 112, which concerns the installation of young farmers. A total of 619 farmers with the age up to 40 years managed to receive non-refundable funds. The success rate was 58.8 %.

As it can be seen from the Table 1 Measure 322 has attracted the most money. There were 48.21 million euros contracted in 19 funding contracts.

Measure 123 "Increasing added value of agricultural and forestry products" was ranked second in terms of attracted money, 30 projects attracted 20.62 million euros.

With a competition of 3.2 projects for a "table with money" place, 66 farmers have provided their agricultural holding with new agricultural equipment worth 39 million euros (of which 19.8 million non-profitable EU funds) in measure 121. The way in which the European funds were spent through the PNDR

2007-2013, but also their effects in rural areas will be subject to many analyzes. There are many criticisms.

At national level over the years, agricultural paying agencies have registered penalties more than 755 million euros, and there is also the decommitment of almost one billion euros from the NPRD 2007-2013.

Due to the fact that many farmers have failed to get from the co-financing from the banks in 2015 when almost 800 million euros value projects were cancelled.

Many of the projects started succeeded during implementation or after completion to go bankrupt.

**Strengthening the number of agricultural holdings at the level of the country and at the level of Olt County, for the period 2007-2016**

At least at declarative level, all NPRD 2007-2013 measures had to positively influence the consolidation of agricultural holdings in Romania.

Table 2. Evolution of the number of agricultural holdings at national level in 2005-2016

Type of holding	UM	2007	2010	2013	2016	Deviation 2016 vs 2007		Growth Rhythm 2007-2016
		Th. No.	Th. No.	Th. No.	Th. No.	Th. No.	%	%
Number of individual agricultural holdings	Th. No.	3,913.7	3,828.345	3,601.8	3,395.9	-517.7	86.8	-4.6
Number of units with legal personality	Th.No.	17.7	30.7	27.9	26.1	8.4	147.5	13.8
Total	Th.No.	3,931.4	3,859.0	3,629.7	3,422.0	-509.3	87.0	-4.5

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

The average agricultural area used on an agricultural holding did not show any spectacular changes during the analysed period. In 2016, the agricultural area used on average on an agricultural holding was 3.65 ha, in 2013 was 3.60 ha, in 2010 was 3.45 ha and in 2007 was 3.5 ha. The average utilized agricultural area on an agricultural holding without legal personality was 2.04 ha in 2016 compared to 2.29 ha in 2007. Regarding the evolution of the agricultural area used on average on a holding agriculture with legal personality can be said that the funds made available to the farmers through NPRD 2007-2013 made their number grow much faster than the used area.

Thus, if in 2007 in Romania there were only 17 thousand agricultural companies, in 2010 their number increased to 31 thousand (an increase of 82.3%). At the same time, the area used increased by only 22.3%, from 4.78 million ha to 5.86 million ha. This explains the decrease in the average of agricultural holdings with legal personality from 270.4 ha to 190.4 ha (a decrease of 29.6%).

In 2016, the used agricultural area owned by agricultural holdings without legal personality represented 42.5% of the total utilized agricultural area, while in the holdings with legal personality it accounted for 18.9%.

Table 3. The evolution of the number of agricultural holdings at the level of Olt County in the period 2007-2016

Type of holding	UM	2007	2010	2013	2016	Deviation 2016 vs 2005		Growth Rhythm 2007-2016
		No	No	No	No	No	%	%
Number of individual agricultural holdings	No	132,835	134,307	129,542	125,906	-6,929.0	94.8	-1.8
Number of units with legal personality	No	503	604	681	741	238.0	147.3	13.8
Total		133,338	134,911	130,223	126,647	-6,691.0	95.0	-1.7

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

According to the statistical data for 2007-2013, the number of agricultural holdings decreased by 3,155, while the agricultural holdings with utilized agricultural area and livestock decreased by 12,111. According to Table 2, the growth rate was different for individual agricultural holdings and with legal personality. While the number of individual agricultural holdings decreased in the period 2005-2016 by 133.6 thousand farms (registering a negative growth rate of -2.2%), the number of legal entities increased by 580 (a positive growth rate + 8.7%).

If we link the information in Table 2 and Table 3 it can be stated that 125,906 individual agricultural holdings work 209.01 thousand ha while 741 agricultural holdings with legal personality use 197.29 thousand ha. The most consistent investments in agriculture through NPRD 2007-2013 were those for the acquisition of high performance machines. They entered into equipping an important part of the 741 farms with legal personality.

In 2017 the Olt recorded 31,961 requests to the Agency for Payments and Intervention in Agriculture for a total amount of 1.529 billion euros [1]. The eligible area for which the area subsidy was claimed in 2017 was 330,000 hectares, or 75.6% of the county's agricultural area.

It follows that on the remaining 24.4% of the Olt County's surface agriculture is still done with the horse and the hoe. This rudimentary agriculture (made especially on land areas of less than 0.3ha) competes on the sixth place in 2010 in the top of the poorest areas of the European Union, of the South-West Oltenia Region, which also includes Olt County Dolj, Gorj, Mehedinți and Vâlcea [3]. In this area, purchasing power was 36% of the average GDP per capita in the European Union. "Subsistence farms reduce the performance of the agricultural sector in general"[11].

#### **Evolution of agricultural land by types of farms at the level of the country and at the level of Olt County, during 2007-2016**

Table 4. The evolution of the agricultural land used, by main categories of use at the country level, for the period 2007-2016

Type of holding	MU	2007	2010	2013	2016	Deviation 2016 vs 2007		Growth Rhythm 2007-2016
		Th. ha	Th. ha	Th. ha	Th. ha	Th. ha	%	%
Agricultural holdings without legal personality	Th. ha	7,450	7,445.3	7,271	6,927	-523.0	93.0	-2.4
Agricultural holdings with legal personality	Th. ha	5,856	5,852.9	5,785	5,576	-280.0	95.2	-1.6
Total agricultural holdings	Th. ha	13,306	13,298	13,056	12,503	-803.0	94.0	-2.1

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016[10]

"Agriculture plays an important role in the economic and social state of Olt county, considering that out of the total area of 549,828 ha, the agricultural area is 436,515 ha, of which arable 390,336 ha" [12].

The land fund and the cultivated areas structure is relevant by the existence of

differentiated territorial structures that can be illustrated by the following in the last decade: arable land is the predominant category of use, but there is a slight downward trend, the pastures and meadows share is very low; the categories vineyards / nurseries and orchards / nurseries are considered significant.[8]

According to the General Agricultural Census in 2002 in the county the agricultural exploitations used only 252.35 thousand ha of a total of 436.52 thousand ha, respectively 57.8%. The share of uncultivated land decreased due to the accession of Romania to the European Union from 2002 until 2016, only a little of 153.95 thousand hectares

falling from the land plots in a land eligible for community payments on the surface. 147.03 thousand ha was the area of land with which the level of agricultural holdings with juridical personality increased from 2002 to 2016, which represents 95.5% of the uncultivated land.

Table 5. The evolution of used agricultural areas, by the main categories of use at the level of Olt County, for the period 2007-2016

Type of holding	MU	2007	2010	2013	2016	Deviation 2016 vs 2007		Growth Rhythm 2007-2016
		Th. ha	Th. ha	Th. ha	Th. ha	Th. ha	%	%
Agricultural holdings without legal personality	Th. ha	234.09	234.63	210.54	209.01	-25.1	89.3	-3.7
Agricultural holdings with legal personality	Th. ha	126.7	171.24	183.18	197.29	70.6	155.7	15.9
Total agricultural holdings	Th. ha	360.79	405.87	393.72	406.3	45.5	112.6	4.0

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

The agricultural area used by agricultural holdings with legal personality increased exponentially between 2002 and 2013 at the level of Olt County, increasing from 50.26 thousand ha in 2002 to 183.10 thousand ha in 2013. At the same time, the individual agricultural holdings had an easier growth in the period 2002-2010, after which we witnessed a reduction in the area used,

approaching the level recorded in 2002. The reduction of the number of agricultural holdings was mainly due to the merge of agricultural holdings without legal personality.

#### **The evolution of the areas on an agricultural holding at the level of the country and at the level of Olt County, during 2007-2016**

Table 6. The evolution of the size of the agricultural exploitation at the national level for the period 2007-2016

Type of holding	UM	2007	2010	2013	2016	Deviation 2016 vs 2007		Growth Rhythm 2007-2016
		ha/farm	ha/farm	ha/farm	ha/farm	ha/farm	%	%
Number of individual agricultural holdings	ha/farm	1.90	1.94	2.02	2.04	0.1	107.2	2.3
Number of units with legal personality	ha / farm	330.87	190.66	207.50	213.63	-117.2	64.6	-13.6
Total	ha / farm	3.38	3.45	3.60	3.65	0.3	108.0	2.6

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

According to INS data, the number of agricultural holdings reached in Romania at 3.422 million in 2016, 5.7% lower than in 2013 and by 11.3% compared to 2010. The number of agricultural holdings without legal personality was 3.396 million, 5.7% lower than in 2013 while the number of agricultural holdings with legal personality was 26,000, 6.4% lower than in 2013 [9].

In the period 2007-2016, the consolidation had a positive trend in Romania, but growth

cannot be considered significant in nine years, with the average holding rising by only 0.27ha.

The average area per holding in the Olt county registered a slight increase of 3.21 ha in 2016. The growth rate in 2007-2016 was only of 5.8%.

The size of the average holding is lower in the Olt county than the average at the national level throughout the analysed period. In the year 2016 the difference was 0.44 ha.

Table 7. The evolution of the size of the agricultural holding at the level of Olt County for the period 2007-2016

Type of holding	UM	2007	2010	2013	2016	Deviations 2016 vs. 2007		Growth Rhythm 2007- 2016
		ha/farm	ha/farm	ha/farm	ha/farm	ha/farm	%	%
Number of individual agricultural holdings	ha/farm	1.76	1.75	1.63	1.66	-0.1	94.2	-2.0
Number of units with legal personality	ha/farm	251.89	283.51	268.99	266.25	14.4	105.7	1.9
Total	ha/farm	2.71	3.01	3.02	3.21	0.5	118.6	5.8

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

Depending on the legal status, the consolidation of farms is different at the level of the country compared to Olt County. Thus, if nationally the number of individual holdings registered a positive growth rate (+2.3%) in the county of Olt, we have a decrease in farms (-2%). The same reversed phenomenon is encountered in the case of

agricultural holdings with legal personality: at the national level there is a negative rate (-13.6%) and at the level of Olt county we have a positive growth rate (1.9%).

**Structure of the number and areas of agricultural holdings using agricultural land in Olt County, by size classes, for 2007-2016**

Table 8 The evolution and structure of the number of agricultural holdings, by size classes, for the period 2007-2016, in the county of Olt

Class (ha)	2007		2010	2013	2016		2016 vs 2007		Average	Standard Deviation	Var. Coeff.(%)	Growth Rhythm
	No	%	No	No	No	%	No	%	Ha	%	%	%
1 to 5	131,573	94.5	126,887	123,093	118,343	95.2	-13,230	89.94	124,974	5,618.9	4.5	-3.5
5 to 10	6,049	4.3	6,027	4,125	3,938	3.2	-2,111	65.10	5035	1,161.0	23.1	-13.3
10-20	869	0.6	1,014	843	1,005	0.8	136	115.65	933	89.3	9.6	5.0
20-30	176	0.1	207	264	257	0.2	81	146.02	226	41.9	18.5	13.5
30-50	122	0.1	185	213	132	0.1	10	108.20	163	43.3	26.6	2.7
50-100	136	0.1	193	186	176	0.1	40	129.41	173	25.5	14.7	9.0
> 100	295	0.2	392	374	406	0.3	111	137.63	367	49.6	13.5	11.2
Total	139,220	100.0	134,905	129,098	124,257	100.0	-14,963	89.25	131,870	6,554.3	5.0	-3.7

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

From the analysis of the statistical data obtained from their processing for the period 2007-2016 it was found that was preserved the structure with very many very small farms and very few large farms. In 2016 the farms in the category 1-5 hectares (95.2% of the total holdings) worked 35.2% of the agricultural area of the Olt County. From 2007 to 2016, the category 1-5 ha was reduced by 13230 holdings with a negative rate of -3.5%. A further drop is recorded in the category 5-10 ha but with a decrease of 13.3%, respectively. All categories over 10 hectares have registered positive growth rates, which proves that in the county of Olt the land is being merged in the area of medium and large farms. The highest increase was recorded in the 20-30 ha category, where the growth rate

was 13.5%, increasing from 176 in 2007 to 257 in 2016 (146.02%). A significant increase was also observed in farms larger than 100 hectares, which grew in the analysed period by 111 holdings (from 295 in 2007 to 406 in 2016), which meant a growth rate of 11.2%. The increasing trend toward the number of agricultural holdings over 50 hectares is logically accompanied by another trend- that of reducing the total number of agricultural holdings. The reduction is based on each year's disappearance of a large number of small farms unviable economically, or by the death of the farmers. Young people that left the city or abroad have created favorable conditions for the lease of land. [4]

Table 9. The evolution and structure of the surface of agricultural holdings, by size classes, during 2007-2016, in the Olt County

Class (ha)	2007		2010	2013	2016		2016 vs 2007		Average	Standard Deviation	Variation Coefficient (%)	Growth Rhythm
	Ha	%	Ha	Ha	Ha	%	Ha	%	Ha	Ha	%	%
1 to 5	182,969	50.7	159,548	142,110	143,142	35.2	-26,027	78	156,942	19,101.6	12.2	-7.9
5 - 10	34,659	9.6	31,646	26,820.37	25,480	6.3	-5,008	74	29,651	4,261.2	14.4	-9.7
10 -20	7,808	2.2	10,496	11,539.31	13,727	3.4	3,085	176	10,893	2,458.1	22.6	20.7
20- 30	2,993	0.8	4,693	6,267.21	6,223	1.5	2,051	208	5,044	1,550.8	30.7	27.6
30-50	2,615	0.7	6,679	8,140.12	5,190	1.3	3,041	198	5,656	2,357.9	41.7	25.7
50- 100	6,656	1.8	13,086	14,047.87	12,695	3.1	4,966	191	11,621	3,358.8	28.9	24.0
> 100	123,094	34.1	179,720	184,791.3	199,847	49.2	48,769	162	171,863	33,617.5	19.6	17.5
Total	360,794	100.0	405,868	535,826.8	406,305	100.0	66,404	113	427,198	75,500.9	17.7	4.0

Source: INS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

In the period 2007-2016 the area used by agricultural holdings in the Olt county increased by 66,404 ha to 406,305 ha. Growth was based on the introduction of unworked areas into the agricultural circuit. This role was attributed to agricultural holdings larger than 10 hectares, especially those over 100 ha, which increased their area from 2007 to 2016 by 48,769 ha. All classes larger than 10 ha have registered positive growth rates. The agricultural area used by agricultural holdings in the 20-30 ha category doubled during the analysed period, increasing from 2,993 ha in 2007 to 6,223 in 2016 (208%) with a growth

rate of 27.6%. The same phenomenon was recorded in the categories 30-50 ha and 50-100 ha but the increase was at a rate of 25.7% and 24%. The smallest growth rate was recorded by holdings of over 100 ha, 17.5% respectively. It should be noted, however, that 406 farms operate 49.2% of the agricultural area used in Olt County.

The agricultural area of agricultural holdings up to 10 ha decreased by 26,027 ha in the category 1-5 ha and by 5,008 ha in the category 5-10 ha. They recorded falling rates of -7.9% and -9.7% respectively.

Table 10. The evolution of the size of agricultural holdings by size classes, during 2007-2016, in Olt County

Class (ha)	2007		2010	2013	2016	2016 vs 2007		Average	Standard Deviation	Variation Coefficient (%)	Growth Rhythm
	ha/farm	ha/farm	ha/farm	ha/farm	ha/farm	ha/farm	%	ha/farm	ha/farm	%	%
1 to 5	1.4	1.3	1.2	1.2	-0.2	0.9	1.25	0.10	8.1	-4.5	
5 to 10	5.7	5.3	6.5	6.5	0.7	1.1	5.99	0.61	10.1	4.1	
10 - 20	9.0	10.4	13.7	13.7	4.7	1.5	11.67	2.38	20.4	15.0	
20 - 30	17.0	22.7	23.7	24.2	7.2	1.4	21.91	3.33	15.2	12.5	
30-50	21.4	36.1	38.2	39.3	17.9	1.8	33.77	8.33	24.7	22.4	
50-100	48.9	67.8	75.5	72.1	23.2	1.5	66.10	11.87	18.0	13.8	
> 100	417.3	458.5	494.1	492.2	75.0	1.2	465.52	36.09	7.8	5.7	
Total	2.6	3.0	4.2	3.3	0.7	1.26	3.26	0.66	20.2	8.1	

Source: NIS: RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016 [10]

In Romania, the agricultural exploitation structure in 2016 was different in terms of their number compared to the structure in terms of the agricultural area. Agricultural holdings under 1 ha used only 5.1% of the used agricultural area, although they accounted for 53.0% of the total. Agricultural holdings ranging from 1 to 5 hectares were closer to both the number and the area: 38.6% of the total worked 23.6% of the area. Although they had a small share (only

0.5%), the agricultural holdings over 50 ha owned 51.1% of the utilized agricultural area.

## CONCLUSIONS

In year 2016 the number of agricultural holdings was lower by 5.72% compared to 2013 and by 13.23% compared to year 2007. The number of holdings with legal personality was 6.38% lower in 2016 than in 2013 after an increase of 57.52% in 2013 compared to 2007.

In the period 2002-2016 the number of individual agricultural holdings decreased by 1,066,296.

Regarding the evolution of the units with juridical personality, it can be noticed that during 2002-2005 there is a decrease in their number, with the spectacular increase of the number of farmers with juridical personality (+10,181).

Both at national level and at the level of South-West Oltenia and Olt County, the share of agricultural holdings led by young farmers under 35 years of age registered a downward trend during 2013-2016. Given that the 35-55 age segment currently holds a very large share without taking rejuvenating measures, the share of heads of farms over the age of 55 will increase in the coming period.

Professor Dona confirms that "This trend, which is manifested at the level of the entire country, risks endangering the future agricultural activity with effects on the economy, culture, landscape and traditions of the Romanian village" [6].

Statistics show only some figures at county, regional or country level. In reality, European money has moved into certain areas for certain types of activities.

For example, at the level of Olt County, the renewal of the generation of heads of agricultural holdings has a significant impact on the vegetable areas, we have dozens of projects on measure 112 "Installing Young Farmers".

Instead there are villages in the hilly area where there is no project on this measure. It is sad that there are no other projects on other measures to compensate. We already have localities where there are young people and economic activities and localities with old population and where young people have migrated to the city or abroad.

Financing young farmers' projects offers them the opportunity to enter the agricultural market and to develop economically. In parallel, they contribute to rural development.

## REFERENCES

[1] Agency for Payments and Intervention for Agriculture, (APIA), 2018,

<http://www.apia.org.ro/en/centre-judetene-apia/olt>, Accessed March 5, 2018

[2] Agency for Rural Investment Financing (AFIR), <http://www.afir.info/>, Accessed March 5, 2018.

[3] Atkinson, AB, Marlier, E., Montaigne, F., Reinstadler, Anne (2010). Income and income inequality in Atkinson, AB and Marlier, E., Income and living conditions, Eurostat, European Commission, Luxembourg, <http://ec.europa.eu/eurostat>, Accessed March 5, 2018.

[4] Buliga-Ștefănescu, A., Stănescu, St., Necula, Raluca, 2016, "The evolution of agricultural holdings and eligible agricultural surfaces for grant award, at Olt County-Level for the period 2007-2014", Scientific Papers. Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 16, Issues 1, pg. 67-72.

[5] Ceapoiu, N., 1968, Applied statistical methods in agricultural experiments and statistical Ed. Agro-Silva, Bucharest

[6] Dona, I. et al, 2005, Rural Development (Course Notes, Synthesis), Bucharest 2005, <http://www.managusamv.ro/images/pdf/dezvoltare.pdf> Accessed March 5, 2018.

[7] Gherghișan, Mihaela, 2017, România 2007-2017: povestea unui posibil insucces, <https://www.rfi.ro/politica-92260-romania-uniunea-europeana-poveste-posibil-insucces>, Accessed March 5, 2018.

[8] Marinescu, E., Necula, Raluca, 2013, The potentialities and the agricultural production achievement level in Olt County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.13(3)/2013, pp.125-130.

[9] National Institute of Statistics (INS), 2018, Structural Survey in Agriculture 2016

[10] National Institute of Statistics (INS), RGA 2010, Structural Survey in Agriculture 2007, 2013, 2016

[11] National Rural Development Programme Romania (PNDR) 2007-2013,

[http://www.madr.ro/docs/development-rurala/PNDR\\_2007-2013\\_versiune-consolidat-nov2013.pdf](http://www.madr.ro/docs/development-rurala/PNDR_2007-2013_versiune-consolidat-nov2013.pdf), Accessed March 5, 2018.

[12] Olt County Prefect Institution, 2017, Report on the economic and social state of Olt County in 2016 of the Olt County Prefect Institution, <http://www.prefecturaolt.ro/comunicate/2017/raport2016.pdf>, Accessed March 5, 2018.

## CONSIDERATIONS ON AGRICULTURAL PRODUCT QUALITY MANAGEMENT

Ion CERTAN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: ioncertan@gmail.com

*Corresponding author:* ioncertan@gmail.com

### *Abstract*

*Global economic liberalization, progress in the means of transport, the revolution in the communication system have contributed to the acceleration of the economic value chain, including the agro-alimentary ones, in other words internationalization and globalization of human activity. We subscribe in the opinion of Ion Stanciu who states that "there are two ways to approach quality" A "and" Z ". If the quality in the "A" approach is considered a technical function, then the "Z" approach is conceptualized as a management system. This situation urges us to amplify and intensify the study of the factors influencing the quality management of agro-food products in the hope that we will suggest some proposals regarding the increase of the quality of the agro-food products and ensuring the competitiveness of the agricultural sector in the value chain specific to the conditions of internationalization and globalization of human activity.*

**Key words:** evolution, milk production, NW Region, Romania, trends

### INTRODUCTION

Aspects concerning the study of the quality management system including agro-food products have been discussed in the field of national and international public authorities, in many scientific centres and in the street. However, scientific research on quality management of agri-food products under the conditions of internationalization and globalization of human activity is very modest and remains current.

This situation has prompted us to return to the investigation of the quality management of agro-food products, including the factors that influence it in order to elaborate some proposals regarding the improvement of the quality of agro-food products, improving the competitiveness of the agricultural sector in the conditions of internationalization of human activity.

### MATERIALS AND METHODS

The materials used in the research include publications in the field that have helped us to understand and explain the phenomena and processes that occur in the quality management of agro-food products. The

quantitative analysis provided us with relevant meanings and explanations in relation to the impact of the factors influencing the quality management of agro-food products, which suggested some proposals regarding the improvement of the quality of agro-food products, improving the competitiveness of the agricultural sector in the conditions of internationalization of human activity.

### RESULTS AND DISCUSSIONS

#### **Quality management of agri-food products: general characteristics**

Quality can be perceived as a result of meeting the consumer's expectations and/or as a result of the characteristics of the product or service reported to standards, which, as a rule, are complemented by rules and rules. We perceive "quality" as a result of product or service characteristics reported to standards that meet consumer expectations.

The notion of "management" is presented differently, often contradictory. So, Henry Fayol [10] in 1916 wrote that management activity means to predict and plan, organize, command, coordinate and control. Samuel C. Certo [6] argues that "management is the process of accomplishing the organization's



goals by working with and through people and other resources of the organization." To a combination of these opinions, Panaite Nica inclines [11] that "management means the process of efficient and effective realization, through planning, organization, coordination and control, of things through and with other people, in order to achieve organizational objectives ". Generalizing, we support the opinion of Professor Simion Certan [2], who considers that "management, in general, is the set of activities aimed at changing the position of any system in order to achieve the desired result." In our case, the "system" is "the quality of agrifood products".

As a result, "the quality management of agro-food products represents the activity of planning, organization, training and control undertaken by one or more persons in order to combine the factors that contribute to the improvement of the quality of agro-food products and to improve the competitiveness of the agricultural sector under the conditions of internationalization of human activity".

Quality management of agri-food products is required to start from two premises:

- is an area of management, and as a result, the basics of management, including the theoretical foundations, are found in quality management of agri-food products;
- has a high specificity in relation to the classic management that comes from the nature and content of the quality of the agri-food products.

The quality of agri-food products depends to a large extent on the judicious selection and effective application of the methods and techniques applied in quality management, which are influenced, first of all, by the economic system. Most researchers specify two types of economic systems:

a. based on centralized management, dominating the consumer relationship. The quality of the goods and / or services is dictated by the manufacturer. Quality management is done by the person with the position of manager. The focus is on inspection and quality control of the finished product. The degree of involvement of the members of the producer group is low. In

such a system, everyone is doomed to buy and consume what is produced.

b. based on market relations, dominated by the producer-consumer relationship. The quality of the goods and / or services is dictated by the consumer. In this economic system, the key role lies with the client, because of which the business exists and can thrive. Manufacturers are dependent on their customers, so they need to know their needs, including the quality of the product, to meet them. All employees are involved in quality management.

The economic methods and techniques applied in the quality management of agro-food products are based on theories, among which we nominate:

- The theory of comparative advantage stating that potential superiority in exchange relationships depends on differences in comparative costs.

- The theory of free trade or free circulation of products, services, capital and human resources can strongly influence the quality of agri-food products and the competitiveness of the agricultural sector. For this reason, there are constraints such as customs duty.

The theories used by the economic methods and techniques applied in the quality management of agri-food products will be effective in selecting and using binding rules, ie laws, such as:

- The law of the reality of resources according to which everything that surrounds us is a constant size and the economic circuit is nothing more than a closed rotation. The gain of one is a loss for another.

- The Law of Proportional Returns that mentions that increasing a factor increases quality to a certain point beyond which it tends to diminish more and more.

- The competition law, which is manifested by the fact that a multitude of producers - vendors are confronted with a lot of buyers - consumers and each can make decisions only for reasons of market reasoning.

- Say's law [7] provides that aggregate (total) offer creates its own aggregate demand. Otherwise what is consumed must be done.

- The decreasing utility law, according to which, as the quantity of the goods consumed

increases, its marginal utility will tend to decrease.

- The law of the management system unit that requires all elements [9] to be handled based on the same principles (rules).

It should be noted that laws do not act in isolation but as a system of all laws. The most important and sensitive instrument in market relations is the price that broadly expresses "the power of society" over its members as the main and ultimate mechanism governing the

relationship between producer and consumer. The selling price of agri-food products must at least the cost of selling the vegetable products from the Republic of Moldova, as a rule, exceeds those of the costs. Thus, the sales price per ton of grain produced in agricultural enterprises increased from 315 lei in 1995 (Figure 1) to 1,030 lei in 2005 or 3.3 times, then it varies from 1,783 lei in 2010 to up to 2,592 in 2012.

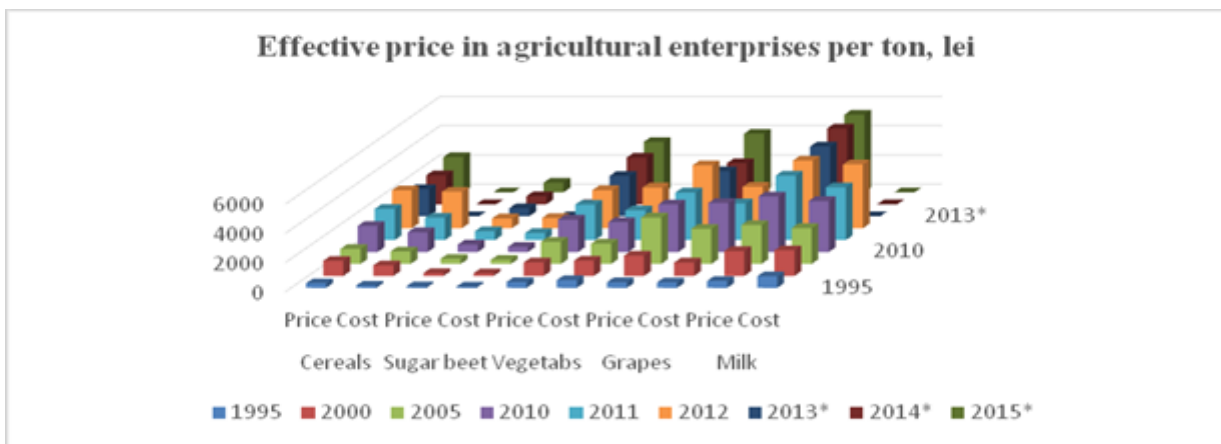


Fig. 1. Effective price in agricultural enterprises (Lei.Ton)  
 Source: authors calculations based on www.statistica.md

However, if in 1995, the price of cereal products exceeded its cost 2 times, then in 2013 - only 4%. The selling price for one tonne of sugar beet in 2013 accounted for 95% of the grain in 2010 accounted for 97% of the cost price. Most of the vegetables had suffered the selling price of which in 1995 accounted for 75%, in 2000 - 89%, in 2012 - 93% of the realization price. The sale price of milk amounted to 60% in 1995 and 97% in 2000 from the cost.

The respective sales price and cost price ratio did not ensure the production of high-quality food, further encouraged abandonment of agricultural land and the expansion of land plots.

The price, influencing the profits or losses of the economic agents, is meant to ensure the balance of the interests of those who grow agricultural production, those who process it and those who market it to put qualitative foods on the table.

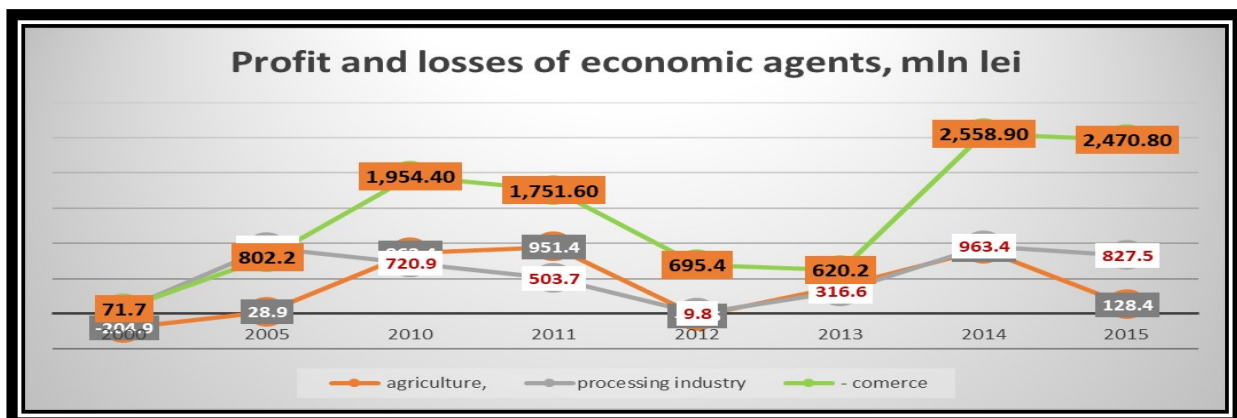


Fig. 2. Profit and losses of economic agents, million lei  
 Source: authors calculations based on www.statistica.md

If in 2000 the economic agents in agriculture, the hunting and forestry economy recorded losses amounting to -204.9 mil lei (Figure 2), then to the processing industry - 70.7 and trade - 71.7 mil lei profit.

We mention the disproportionality of the profit obtained by economic agents in various types of activities. Thus, the profit ratio of economic agents in agriculture, hunting economy and forestry: manufacturing: wholesale and retail trade in 2005 was 1: 32.50: 27.86; in 2010 - 1: 0.83: 2.26; in 2015 - 1: 6.44: 19.24. Thus, the "profit basket" is the economic agents in the wholesale and retail trade.

Public authorities may encourage or limit any activity, including in the quality management of agri-food products through the taxation system. In national agriculture, a very burdensome taxing system, which is sufficiently complicated and inefficient, has been formed. In 2006, the agricultural sector made a 14.4% contribution from sales revenue, and in 2009 the share of taxes and fees amounted to 15.67%. The tax burden on agriculture practically remains at the same level. The value added tax is dominated by 44.4% in 2006 and 58.8% of all taxes, taxes and mandatory payments in 2009, followed by land taxes of 10.5% and 7.6%, respectively.

The quality management of agrifood products is influenced by a large number of factors that are typically grouped into natural, human and material.

#### **Natural resources and quality of agri-food products**

Investigations of scientists from the Moldovan State Agrarian University (Valentin Ungurean, Simion Certan [3], [4] and others) from the institutions of the Academy of Sciences of Moldova (Mihail Lupascu, Ilie Untila and others), the Institute of Pedology, Agrochemistry and Protection of the "Nicolae Dimo" (Serafim Andrieş and others) confirms the correlation between the natural factor and the production quality. For example, according to professors S. Certan and V. Ungurean, sparkling wines made from grapes harvested in the centre zone (Codru) will have superior quality in relation to other areas, and "Cabernet" wines will be more qualitative if they are produced of grapes harvested in the

south of the country. Therefore, obtaining quality agricultural products requires the selection and adjustment of crops to natural conditions that, as P. Bran [1] states, participate with "the force of its laws and its" goodies ", substance (s), energy (e) and information (i) "on the formation of goods.

Natural resources [5] are a sufficiently complicated system to which they belong:

a. The climate in the Republic of Moldova is moderately continental and is characterized by mild and short winter, hot and long summer.

The average annual temperature increases from 8.9 ° C to 9.7 ° C in the North, 10.6 ° C to 11.7 ° C in the South. The absolute annual maximum reaches 40-42 ° C. The length of the vegetation period increases from 167-176 days in the North to about 177-187 days in the South.

b. Atmospheric deposits are characterized by annual rainfall rate in the North ranges from 439 mm to 960 mm in the Centre area - from 428 mm to 734 mm and in the South - from 342 mm to 699 mm.

Insufficient atmospheric deposits, hot and strong winds that cause moisture evaporation bring drought that have become more common in recent years. If in the years 1945-1970 in the centre of the republic there were 7 years with such a drought, then in 1971-1996 - 9 years (since 1982 the drought is repeated over 2 years, and from 1989 over a year). The available water resources are 7.21 km<sup>3</sup> in the average per year and are represented by those 3085 large and small rivers, permanent and temporary streams, natural and artificial lakes.

c. Land resources are the main natural wealth of the Republic of Moldova. Their area is practically maintained at 3,384.6 thousand ha. The agricultural land on 01.01.2016 was 2,499.6 thousand ha (Table 1), including 648.6 thousand ha or 25.95% in public property and 1,851 thousand ha or 74.05% in private ownership.

On our agricultural land the chernozem (about 80%) with a humus content of 2.5 - 5 percent and the average yield of 68 points.

Agricultural land dominated and dominated the arable land which on January 1, 2016 constituted 1,822.9 thousand ha or 72.8% of the total agricultural land.

Table 1. Agricultural land on 1 January 2016

Indicators	Total		Of which			
			public		private	
	'000 ha	%	'000 ha	%	'000 ha	%
Agricultural land, total	2,499.6	100	648.6	100	1,851.0	100
of which: - arable land	1,822.9	72.8	265.2	40.9	1,557.7	84.2
- multiannual plantings	288.9	11.6	37.3	5.8	251.6	13.6
including: - orchards	132.6	5.3	21.9	3.4	110.7	6.0
- vineyards	136.2	5.4	8.1	1.2	128.1	6.9
- pastures	345.0	13.8	339.8	52.4	5.2	0.3
- meadows	2.1	0.1	1.6	0.2	0.5	0.0
- the fall	40.7	1.6	4.7	0.7	36.0	1.8

Source: authors calculations based on www.statistica.md

If the arable land accounted for 40.9% of the total public agricultural land, then the private property - 84.2%. Among the 52.4% public land owned by the agricultural land dominates the pastures, and the lowest share (0.3%) belongs to the meadows.

Multi-annual plantations in 2016 have recovered 288.9 thousand ha, including orchards 132.6 thousand ha of which 110.7 thousand ha (83.5% of the total number of orchards) in private property and vineyards 136.2 thousand hectares of which 128.1 thousand ha (94.05% of the total vineyards) in private ownership.

We find that 40.7 thousand ha or 1.6% of the total agricultural land is plunged. Land plots in private ownership are 36.0 thousand ha or 88 percent.

For the territory of our country is specific varied relief, which is a hilly plain crossed by valleys and ravines. Only 20.2% of the territory is inclined to a degree. Such land ranges from 10.8% in the North to 48.9% in the South East.

On average, 60.6% dominates the inclined terrain from 1 ° to 5 °. The largest share of them (72.1%) is in the north of the country. The lands with slopes of more than 8 ° form 4.4% and are specific to the central area (Codru - 8.1%). About 80% of the total stretches are west, south and east and only 20% north. At least, we consider inefficient when over 58% of the existing vineyards in the Republic of Moldova are located on land with a slope of up to 5 degrees. At the same time, almost half of the 5 to 10 degrees terrain are arable. Of all arable land, 45 percent have

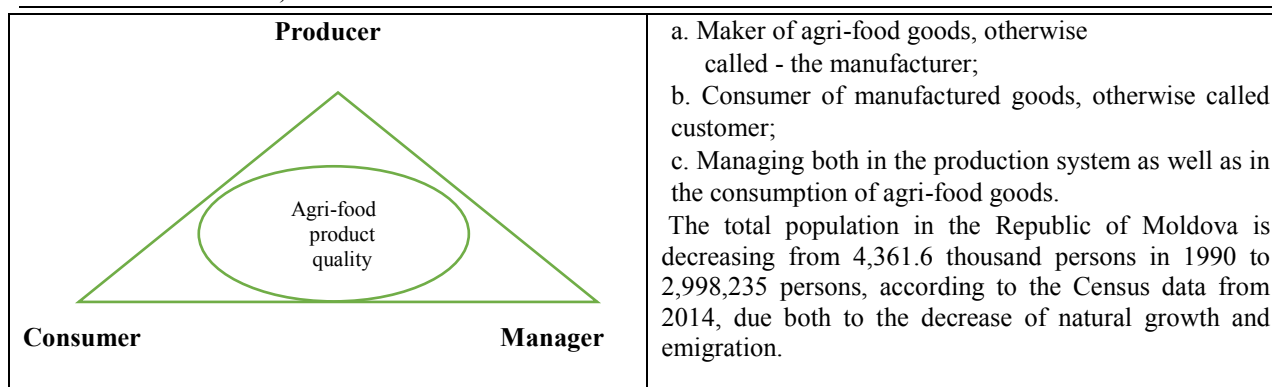
a slope of 5-10 degrees. The peak is that 24% of the lands with a tilt of more than 10 degrees are arable.

This relief causes land degradation, landslides and land erosion. The total surface area of the sloping land grows from about 21 thousand ha in 1970 to just over 81 thousand ha now. It is highlighted the area of the Centre, where the area of landslides is maintained at the level of 53% of the total in the republic. If in 1965 the eroded land consisted of 594.2 thousand ha (23.6% of the total agricultural land) then it now forms 35%. The share of heavily eroded land increased from 3.8% to 4.5%, respectively. The annual loss of fertile soil as a result of erosion is about 26 thousand tons. Agricultural production losses are estimated at 525 thousand tons of nutrients on arable land and 57 thousand tons of grapes and fruit on the fields planted with trees and vines.

#### Human factor in quality management of agrifood products

A. Smith's statement [12] "human activity creates the mass of goods" is incontestable. In the quality management system for agri-food products (Figure 3) man has the following roles:

Natural growth has evolved from + 8.0 in 1990, including + 9.3 in urban and + 6.6 in rural areas to -0.2 in 2014, including + 0.6 in urban areas and -0.9 in rural areas. Reducing natural growth is accompanied by an aging population. Currently, the aging rate is 16.2%, including men - 15.9%, women - 16.4%, and it exceeds the 12% indicated on the G. Bojio-Gamier scale.



a. Maker of agri-food goods, otherwise called - the manufacturer;  
 b. Consumer of manufactured goods, otherwise called customer;  
 c. Managing both in the production system as well as in the consumption of agri-food goods.  
 The total population in the Republic of Moldova is decreasing from 4,361.6 thousand persons in 1990 to 2,998,235 persons, according to the Census data from 2014, due both to the decrease of natural growth and emigration.

Fig. 3 Person and quality

Source: Certan Simion, Teoria Administrării Afacerilor, CEP, Chişinău, 2012

Emigration has contributed most to reducing human potential. The total population in our country working or looking for work abroad has increased from 138.3 thousand persons in 2000 to 311 thousand persons in 2010 or 2.25 times, then slightly varies to 319 thousand persons in 2016.

The number of the population in the rural area of our country working or looking for work abroad increased from 82.1 thousand persons (59.36% of the total number of those left) in 2000 to 220.5 thousand persons (70.9% of the total number of those left) in 2010 or 2.69 times, and rises steadily to 224.9 thousand people (70.5% of the total number of those left) in 2016 or about 2 percent compared to 2010.

According to the Moldovan diaspora mapping study carried out by the International

Organization for Migration (IOM) experts, mission to Moldova, over 70 percent of Moldovan emigrants are young people up to 40 years of age. The selected and processed information shows that in 2000 the number of those aged between 25 and 44 from the rural area working or looking for work abroad amounted to 38.7 thousand persons (47.1% of the total number of those who left the rural area) and rises to 130.7 thousand people (68.1% of all those left out of rural areas) in 2016. The same ILO study claims that emigrants are those with studies. It is clear that the number of economically active population remaining in the country decreases from 1696 thousand in 1995 (Table 2) to 1266 thousand in 2015 or 27.13%.

Table 2. Distribution of the population on economic activity's participation

	1995	2000	2005	2010	2011	2012	2013	2014	2015
Population, total	3,604	3,639	3,595	3,582	3,560	3,560	3,558	3,557	3,555
Of which: labor force activity rate,%	1,696	1,655	1,422	1,235	1,258	1,215	1,236	1,232	1,266
of which employed	1,673	1,515	1,319	1,143	1,173	1,147	1,173	1,184	1,203
occupancy rate, %	46.5	41.2	36.6	32.1	33.0	32.2	32.9	33.3	33.8
of which occupied in agriculture	711	765	537	315	323	303	338	361	382
employment rate in agriculture,%	42.8	50.5	40.7	27.5	27.5	26.4	28.8	30.5	32.0

Source: authors calculations based on www.statistica.md

The rate of activity decreased from 47.1% in 1995 to 35.6% in 2015 or 11.5 percentage points. Obviously, the number of employed fell from 1,673 thousand in 1995 to 1,203 in 2015 or by 28.1%. The employment rate is reduced from 46.5% in 1995 to 33.8 in 2015 or by 12.7 percentage points. The number of those employed in agriculture decreased from 711 thousand in 1995 to 382 thousand in 2015

or 1.86 times. The employment rate in agriculture has fallen from 42.8% in 1995 to 32.0% in 2015 or with 10.8 percentage points. The most pronounced was the productive population. If the number of 25-54 years employed in the national economy in 2005 amounted to 977 thousand, then in 2015 there were 883 thousand people or about 10% less. The number of persons aged 25-54 employed

in agriculture decreases from 348.1 thousand persons in 2005 to 231.7 thousand persons in 2015. In 2005, the share of the population aged 25-54 years in agriculture was 35.63% and in 2015 - 26.25 percent.

The quality of agri-food products is influenced by the consumer's behaviour, which is largely dictated by its purchasing power. Average monthly incomes available per person in the Republic of Moldova increased from 586.6 lei in 2005 to 2,060.2 lei in 2016 or 3.62 times.

In rural areas, average incomes per person increased from 1,054.7 lei in 2010 to 1,771.3

lei in 2016. Thus, the main problem for the consumer of the Republic of Moldova, especially the rural one, is the quantity and not the quality.

Currently, there are spectacular changes in the ratio of employees, self-employed, unpaid family workers and other categories of people employed in agriculture. Thus, as shown in Table 3, among those employed in agriculture, the number of self-employed workers is high, with 372.0 thousand (72.6% of the total) in 2005 and 258.6 thousand (72.4% of the total) in 2015.

Table 3. Main indicators of populations' purchasing power

	Total		Employed		Self-employed		Unpaid family workers		Owners	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
Total, 000' people	1,318.7	1,203.6	830.6	787.6	464.7	362.8	14.6	45.9	8.7	7.2
in rural areas	745.1	648.3	339.6	308.8	391.3	291.3	13.1	45.3	7.0	2.9
of which: agriculture	512.5	358.4	127.6	54.8	372.0	258.6	12.8	44.6	1.69	2.88

Source: authors calculations based on [www.statistica.md](http://www.statistica.md) and <http://data.worldbank.org/indicator>.

The number of employees in agriculture has decreased from 127.6 in 2005 to 54.8 thousand persons in 2015 or 2.3 times. Extending private ownership of land, organizing peasant farms (farmers), increasing the number of self-employed workers in agriculture has led to a significant increase in the number of decision-makers, managers. Sure that requires high-quality, productive managers. Therefor "Making people productive through education, - claims Peter Drucker [8], - is "the first of the challenges of our time".

The number of those with higher education and special occupations in the national economy is increasing from 418.1 thousand persons (31.7% of the total) in 2005 to 443.0 thousand persons (38.7% of the total) in 2010 and 464.6 (38.6% total) in 2015 or 11.1% more than in 2005. In agriculture, those with high school, gymnasium and without studies form 352.5 thousand (68.8% of the total employed in agriculture, hunting and forestry) in 2005 dominate categorically in 183.1 (61.9%) in 2010 and 229.0 (63.9%) in 2015. Even if the number of those with higher education and special environments occupied in agriculture, the economy, hunting and

forestry increases from 31 thousand persons (7.4% of all those with higher education) in 2005 to 31.1 thousand people (7.0%) - in 2010 and 42.1 thousand (9.1%) in 2015, it remains far too insufficient.

It is well-known that material resources are required to create values, especially qualitative.

#### **Material resources and quality of agrifood products**

Material resources are primarily represented by fixed assets. Total fixed assets in agriculture, hunting, and forestry increased from 7,687 million lei to their original value at the end of 1995 to 14,189 million in 2014 or only 1.84 times.

If fixed assets for agriculture, hunting and forestry in 1995 accounted 35.0% of the total, then in 2014 - only 6.5%, which is very serious and basically reproduces in the current state of the national agriculture. Vertiginous increased fixed assets in manufacturing from 4,367 million lei in 1995 to 26,842 million lei in 2014 or 6.14 times. However, their share dropped from 19.9% in 2005 to 12.2% in 2014. If in 1995 the fixed assets in the manufacturing industry accounted for 56.8%

of those in agriculture, hunting and forestry, then in 2014 they exceeded 1.89 times. In Moldova, according to the 2011 agricultural census, only 16,064 agricultural farms (Table 4) or 2.3% of the total, owns tractors. Only 990 farms have mini-tractors.

Tractors of all types used 687,765 agricultural holdings, which make 76% of the total indicated in the census.

Table 4. Number of agricultural machinery and equipment, according to the 2011 census

machines and aggregates (MA)	Farmers that used MA	Number	Farms owning MA in property	Number of used MA	
				total	<10 years old
Tractors, total	687,795	23,381	16,064	24,695	19,092
of which: - on wheels	672,795	21,377	15,342	22,303	16,972
- on the rails	36,982	2,004	1,537	2,392	2,102
Garden	6,379	965	990	1,090	449
Trucks	75,309	6,260	4,672	7,604	6,788
combines and harvesters	98,746	2,854	1,652	3,000	1,997
sowing and planting	581,455	8,915	5,139	8,431	5,436
Cultivators	579,752	12,154	7,934	12,045	8,198
plows for tractors	673,266	13,882	10,099	13,782	9,736
irrigation	3,388	712	475	773	266
milking	190	104	98	191	69
for treatment	24,425	2,445	1,556	2,627	1,374
other	53,048	8,497	3,613	9,382	6,214

Source: authors calculations based on www.statistica.md

Mini-tractors are used by 6,379 households. The agricultural holdings owning tractors owned 1.54 tractors. A farm with owner-occupied tractors provided services to about 43 households, and those holding mini-tractors - 6.44 farms.

Trucks were used by 75,309 agricultural farms or 11.2% of households using tractors of all types. Combines of all types and other harvesters used 98,746 trucks were used by 75,309 agricultural farms or 11.2% of households using tractors of all types.

Combines of all types and other harvesters used 98,746 agricultural holdings, which make up 14.7% of the number of tractors. The catastrophe of few households (3,388 or 0.5%

of those using tractors) uses irrigation machinery and equipment.

Of the total of 24,695 tractors used, 77% or 19,092 units are 10 years old and over. The same age of 10 years and over have 89.3% of trucks, 66.6% of combine and harvesting machines, 64.5% of seeders and planters, 68.1% of cultivators, and 70.6% of tractor plows. The machines, equipment and transmission systems being outdated have an advanced degree of physical and moral wear. Obviously, they cannot ensure the desirable quality of agri-food products.

The quantity and quality of agri-food products depend to a large extent on natural and / or chemical fertilizers.

Table 5. Fertilizer use in agricultural enterprises

	1995	2000	2005	2010	2011	2012	2013	2014	2015
Natural fertilizers, total, 000' of tons	1,517.5	22.2	38.7	15.1	29.2	20.0	41.5	28.1	56.2
On average, 1 ha of seed, tons	1.2	0.03	0.04	0.02	0.04	0.03	0.05	0.03	0.07
Chemical fertilizers, total, 000' tons	11.2	11.3	16.5	20.1	23.6	34.7	44.8	72.4	40.1
On average 1 ha of seed, kg	9	10	21	24	29	44	53	84	45.8

Source: authors calculations based on www.statistica.md

The use of natural fertilizers has a clear tendency to decrease from 1,517.5 thousand tons in 1995 (Table 5) to 22.2 thousand tons in 2000 or 68 times, then it varies from 15.1 thousand tons in 2010 to 56.2 thousand tons in 2015. Sure with 20 kg (2010) or even 1,200 kg (1995) of natural fertilizer per hectare of seed, it is impossible to practice high-performance agriculture and get quality products.

Chemical fertilizers used in agricultural enterprises increased from 11.2 thousand tons in 2001 to 72.4 thousand tons of active substance in 2015.

Report on each ha of seedlings, chemical fertilizers increased from 9 kg / ha in 1995 to 84 kg / ha in 2014 or 9.3 times and reduced to 45.8 kg in 2015 or 1.83 or in relation to 2014. But they also remain insufficient to guarantee an acceptable and stable production.

## CONCLUSIONS

In conclusion, we find that the resources that ensure the quality of the agrifood products are at least alarming. The natural question arises "What to do?"

Improving the quality of agri-food products and ensuring their competitiveness requires:

(i) Improving the natural potential that requires consistent investment. Even if they increased from 6,060 thousand lei in 2000 to 72,369 thousand lei (current prices) in 2014 or 11.9 times, investments for environmental protection and rational use of natural resources remain very modest. Moreover, it leaves their structure desirable. If in 2000 the investments for the protection and rational use of land exceeded those for the protection and rational use of water resources by 3.59 times, then in 2014 the situation reversed and accounted for 59.88%. Basically, investment in air protection is lacking.

(ii) To develop and apply economic mechanisms and instruments that can contribute to the natural increase of the population, especially of the rural ones.

(iii) Stop, or at least temper, the emigration of our country's citizens, especially the youth, by

developing and implementing ways that would equal or at least bring the incomes of the rural population to the rural areas of the countries in eastern EU.

(iv) Encourage [5] the growth of agri-food products processed from cereals processed from vegetables, fruits and grapes, especially bottled wines, home wines and reduced agri-food commodity trade.

(v) Enhance the application of technologies and techniques that ensure the quality of agri-food products. To this end, we consider it imperative to at least double the investment in agriculture. Currently, investments in agriculture, hunting economy and national forestry, even if they have risen from 0.09 billion in current prices in 1995 to 1.93 billion lei in 2016, forming 10.7% in 1995 and 10.2% in 2016, are far too short.

(vi) Encourage the crediting of agricultural producers by public authorities, especially for planting orchards and vineyards, for expanding irrigated areas, for purchasing the means of production and for everything that would contribute to the efficiency of this sector.

## REFERENCES

- [1] Bran, P., *Economica valorii*, Editura Știința, Chișinău, 1991, p. 140
- [2] Certan Simion, 2012, *Teoria Administrării Afacerilor*, CEP, Chișinău, 261
- [3] Certan Simion, (Качество винограда и доход от винограда, în revista „Виноделие и виноградарство СССР”, 1966, N6
- [4] Certan Simion, Концентрация производства винограда и его себестоимость, în revista N11 „Садоводство и виноделие Молдавии”, 1966,
- [5] Certan Simion, Certan Ion, 2015, *Satul din Republica Moldova: realizări și speranțe în Economia agrară și dezvoltarea rurală*. Noiembrie, 2015.
- [6] Certo Samuel, C., 2002, *Managementul modern*, București, Teora, 2002, p. 784
- [7] Cole Gerald A., 2006, *Management: Teorie și practică*, Chișinău, Știința, p. 350
- [8] Drucker Peter F., 1999, *Realitățile lumii de mâine*, Editura Teora, București, p. 271
- [9] Dumbravă Ionel, 2001, *Management general*. – București, p. 256
- [10] Fayol, H. L., 1966, *Administration industrielle et general*. – Paris, p. 256
- [11] Nica Panaite, Prodan Adriana, Iftimescu Aurelian, 2004, *Management. Concepte și aplicații practice*. – Ed. Sedcom Libris, Iași, p. 424



[12] Smith, A., *Avuția națiunilor, cercetare asupra naturii și cauzelor ei*, Vol. I, Universitas, Chișinău, 1992, p. 401

[13] <http://data.worldbank.org/indicator>, Accessed January 10, 2018

[14] [www.statistica.md](http://www.statistica.md), Accessed January 10, 2018.

## ASPECTS IN THE TRADE OF THE AGRICULTURAL PRODUCTS IN THE REPUBLIC OF MOLDOVA

Ion CERTAN<sup>1</sup>, Simion CERTAN<sup>2</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: ioncertan@gmail.com

<sup>2</sup>Romanian Academy of Agriculture and Forestry, 61 Marasti Blvd, District 1, Bucharest, Romania, Email: simcertan@hotmail.com

**Corresponding author:** ioncertan@gmail.com

### **Abstract**

*Wishing to achieve economic integration in the European Union's internal market in 2013, the Republic of Moldova authorities signed and launched the Association Agreement between the Republic of Moldova and the European Union and the European Atomic Energy Community and their Member States. This objective is explicitly stated in the "g" paragraph of Article 1, paragraph 2, which aims to "create favourable conditions for improving economic and trade relations, the ultimate goal of which is the gradual integration of the Republic of Moldova into the EU internal market ... including through the establishment of a comprehensive and comprehensive free trade areas ... in accordance with the rights and obligations arising from the WTO Membership of the Parties and the transparent application of these rights and obligations ... ". Of course, the export of agri-food products from the Republic of Moldova to the markets of the 28-member states of the European Union differs. Undoubtedly, this situation encouraged us to initiate this modest study on the impact of Moldovan partners on foreign trade in agri-food products, hoping to suggest some proposals for selecting those that would contribute to increasing efficiency and improving the competitiveness of the agricultural sector in the national economy.*

**Key words:** agriculture, market, foreign trade, creativity, efficiency

### **INTRODUCTION**

Aspects regarding the study of the foreign trade of agri-food products from the Republic of Moldova were discussed in the public space at various official meetings, exhibited in various national and international publications. However, scientific research on this subject is very modest and obviously after the initialing of the Association Agreement between the Republic of Moldova on the one hand and the European Union and the European Atomic Energy Community and their Member States on the other [1] remains to be a current investigation.

### **MATERIALS AND METHODS**

The materials used in the research include publications in the field that helped us to understand and explain the phenomena that occur in the external trade of agro-food products. The quantitative analysis of the

evolution of the exports of agro-food products, the factors that influence it, gave us relevant meanings and explanations in relation to the impact of the Association Agreement between the European Union and the Republic of Moldova on the export of the national agri-food products, which suggested some proposals on export efficiency and on increasing the competitiveness of national agri-food products.

This study is a continuity of other researches whose results are mentioned in various publications. [3,4,5,6,7].

### **RESULTS AND DISCUSSIONS**

#### **Consumption and internal market for agri-food products**

For all countries, including Moldova, agriculture has been, is and will remain the support of human existence. Agricultural production, in current prices, increased from 4,243 million lei in 1995 (Figure 1) to 30,362

million lei in 2016 or 7.16 times. This growth, for the most part, is due to prices. If in 1995-2005 the global agricultural production in current prices increased three times and in the years 2005-2014 - 1.9 times, then in comparable prices of 2000 - only by 10.8% and in 2005 - by 4 percent.

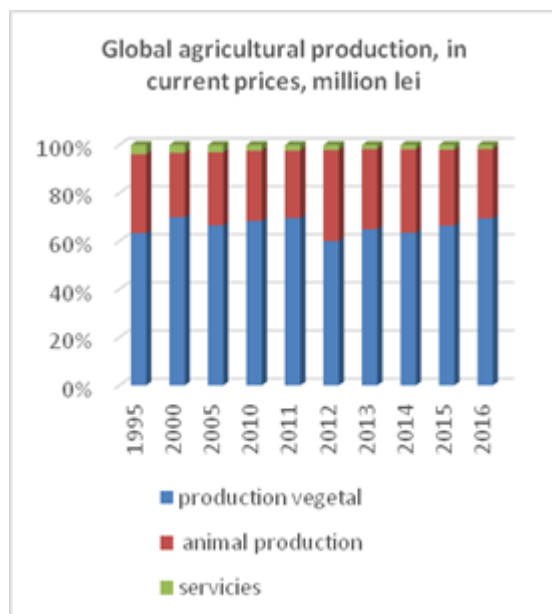


Fig. 1. Global agricultural production, in current prices, million lei

Source: Authors based on selected information on [http / www.statistica.md](http://www.statistica.md), [2,9]

The most spectacular, from 2,687 million lei in 1995 to 18,082 million lei in 2015 or 6.73 times, the vegetable production increased. Vegetal products show the cereal crops, which in 2015 accounted for 20.3%. Over 80% of the area cultivated in the Republic of Moldova is covered by low-value crops such as cereals, oilseeds, sugar beet and fodder crops. Only cereals (including wheat, corn and barley) occupy more than half of the sown areas. Fruits and vegetables occupy less than 20% of the cultivated area. If in the 90s of the last century the fruit was 17%, then in 2016 neither the fruit, nuts, berries nor grapes nor fruits, fruit, nuts and grapes reached the share of fruit in the 90s, forming only 13.5%, which is by 6.8% than the share of cereal crops.

Note that the sum of the global agricultural production in 2012-2013 has increased by 2.95% in 2010-2011 and that obtained in 2014-2015 increased by 24.5% compared to the 2012-2013 period. Of course, this is due to

several factors, but the significant contribution lies in the Association Agreement between the European Union and the Republic of Moldova initially by our country in November 2013, Article 68 of which specifies, inter alia, "the promotion of modernization and sustainable production agricultural ... improving the competitiveness of the agricultural sector and efficiency ... promoting quality policies and their control mechanisms, in particular ... geographical indications and organic farming ..."

Agri-food products are primarily intended for consumption within the country. Consumption of bread and bread products by one person decreased from 128.7 kg in 2006 (Figure 2) to 110.4 kg in 2010, then practically remained at the same level, oscillating slightly from 109.9 kg in 2011 to 116.8 in 2016.

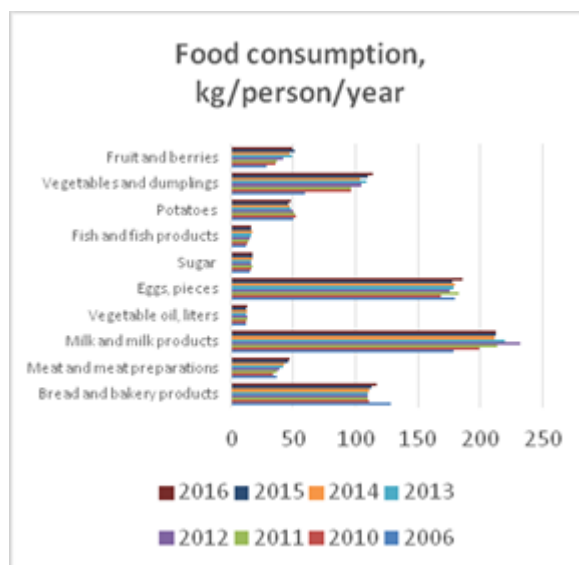


Fig. 2 Food consumption, kg/inhabitant/year

Source: Authors based on selected information on [http / www.statistica.md](http://www.statistica.md), [2,9]

The consumption of meat and meat products increased from 37.0 kg in 2006 to 47.1 kg in 2016 or 27.29 percent. The clear tendency to increase consumption of milk and milk products, sugar, and fish. The most pronounced (1.93 times) in those years, increased the consumption of vegetables and pheasants, (1.76 times) - of fruits and berries. However, this consumption does not cover the calorie requirement.

Economic activity in any area of the national economy, including in the agri-food sector,

requires the exchange of the products obtained with other goods as well as with the necessary resources. This exchange takes place through the market. Undoubtedly, food is aimed at exchange, primarily on the domestic market.

The total retail sales in the national commercial units is continuously increasing, rising from 1,692 million lei in 1995 (Table 1) to 48,517 million lei in 2016 or 28.68 times.

Table 1. Retail sales (million lei)

	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
Retail sales – total	1,692	3,394	11,031	25,097	32,133	33,707	39,368	45,972	42,444	48,517
including: - food	1,035	1,443	7,060	12,634	9,914	10,958	13,004	14,004	15,482	18,165
% of total	61.2	42.5	64.0	50.3	30.9	32.5	33.0	30.5	36.5	37.4

Source: Authors based on selected information on [http / www.statistica.md](http://www.statistica.md), [2, 9]

Retail sales of food in national commercial establishments increased from 1,035 million lei in 1995 to 18,165 million lei in 2016 or 17.55 times. If the share of retail sales in total retail sales amounted to 61.2% in 1995, then in 2016 to 37.4%.

The total retail sales in 2016 compared to 2013, the year of the signing and ratification of the agreement, increased 1.23 times, and the retail ones - 1.40 times. The share of food sales in total sales increased from 33.0% in 2013 to 37.4% in 2016.

The internal market of the Republic of Moldova is influenced by the number of consumers who at the time of the 2014 census amounted to 2,998,235 people and their purchasing power.

Monthly average earnings per person increased from 586.6 lei in 2005 (Figure 3) to 2,060.2 lei in 2016 or 3.62 times.

In rural areas, average incomes per person increased from 1,054.7 lei in 2010 to 1,771.3 lei in 2016 or 1.68 times, practically identical (1.61 times) to average per person.

The annual average of the subsistence minimum has evolved from 766.1 lei in 2005 to 1,799.2 lei in 2016. The monthly average income exceeded the monthly average of the subsistence minimum only in 2013, reaching 20.1% to 114.5%, but in rural areas even in 2016 accounted for 99.4 percent. In other words, the income of rural people does not cover the subsistence level, and retail sales in commercial establishments, especially in rural areas, have increased due to remittances, which have created a higher demand for agri-food.

Evidently, the production of agri-food goods in the Republic of Moldova exceeds their consumption by the population of the country and the needs of the internal market. So it is necessary to market agri-food products on foreign markets, based on national interest [7].

### Export of agri-food products

Exports of agri-food products shrank from \$ 584.7 million in 1996 (Table 2) to \$ 291 million in 2000 or 2 times, then rises to \$ 1,056.4 million in 2014 or 3.63 times, and slightly decreases to 945.6 in 2016 or 10.5 percent.

The share of agro-food products exported in total exports in 1996 was 73.55%. and in 2016 - 46.25 percent.

This situation is largely due to the tensioned relationship on the foreign market generated

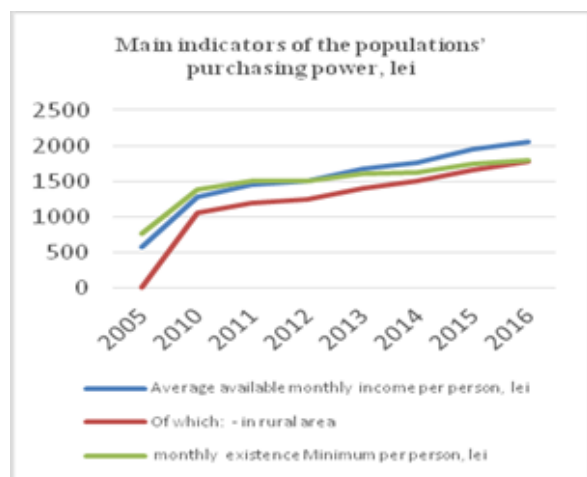


Fig. 3 Main indicators of the populations' purchasing power, lei

Table 2. External trade of agri-food products, million \$

	1996*	2000	2005	2010	2011	2012	2013	2014	2015	2016
Export, total	795.0	471.5	1,090.9	1,541.5	2,216.8	2,161.9	2,428.3	2,339.5	1,966.8	2,044.6
Of which: food products	584.7	291.0	582.9	732.2	917.1	878.9	1,015.5	1,056.4	914.5	945.6
Import, total	1,072.3	776.4	2,292.3	3,855.3	5,191.3	5,212.9	5,492.4	5,317.0	3,986.8	4,020.4
Of which: food products	142.9	109.6	279.6	591.4	687.8	743.3	783.8	719.3	586.6	608.0
comercial balance	+441.8	+181.4	+303.3	+140.8	+229.3	+135.6	+231.7	+337.1	+327.9	+337.6

Note: information on foreign trade is missing until 1996

Source: Author's calculations based on the information on [www.statistica.md](http://www.statistica.md), [2,9]

by the endless embargoes of the Russian Federation for agri-food products in our country.

Imports of agri-food products increased from \$ 142.9 million in 1996 to \$ 783.8 million in 2013, then fell to \$ 608 million in 2016. The share of imported food products in total imports slowly increased from 13.33% in 1996 to 14.27% in 2013 and to 15.12 percent in 2016.

The trade balance of agrifood products fluctuates between +135.6 million dollars in 2012 and +441.8 million dollars in 1996, reaching \$ 337.6 million in 2016.

For any country, including the Republic of Moldova, it is extremely important to orientate the export of agri-food products to

countries that guarantee favourable customs tariffs and the highest incomes obtained from marketed agri-food products. Article 143 of the Association Agreement between the European Union and the Republic of Moldova specifies "The Parties shall progressively establish a free trade area ...". Moreover, the first paragraph shows that "each party reduces or eliminates customs duties on goods originating in the other ...".

Exports of live animals and their products range from \$ 17.2 million in 2005 (Table 3) to \$ 59.7 million in 2014. In 2005, exports of live animals and their products accounted for 2.95% of total agri-food exports, 5.65% in 2014 and 2015 - 4.1 percent.

Table 3. Trade of live animals and their products (million \$)

	2005	2010	2011	2012	2013	2014	2015	2016
<b>Export total, of which:</b>	17.2	27.0	38.0	37.8	37.2	59.7	37.5	-
- CIS countries	3.4	14.0	27.9	26.9	25.0	43.3	12.5	18.3
- UE-28	5.8	0.2	0.8	1.8	2.9	9.3	8.7	8.4
Of which export of meat	1.9	10.23	21.55	21.55	18.77	35.30	8.89	-
- CIS countries	1.81	9.70	21.51	21.55	17.29	34.98	5.88	7.55
- UE-28	0.09	-	0.002	0.004	-	0.001	-	0.01
<b>Import total, of which:</b>	57.2	94.7	107.8	130.3	146.8	158.8	99.9	-
- CIS countries	9.6	21.7	34.6	39.1	45.7	55.0	26.4	24.7
- UE-28	16.1	35.7	35.2	47.7	56.2	65.5	50.5	57.6
Of which import of meat	32.15	27.56	30.83	41.77	45.57	54.25	26.15	-
- CIS countries	0.08	3.26	10.35	13.63	18.04	33.25	9.87	7.87
- UE-28	7.42	11.45	12.41	17.68	15.08	13.76	13.58	14.24

Source: Authors calculations based on [http:// ec.europa.eu/](http://ec.europa.eu/) and [www.statistica.md](http://www.statistica.md), [2,8,9]

If in 2005 dominated the export of live animals and their products to the EU-28 countries, then in the other years indicated in the table - to the CIS countries. import of live

animals and their products has steadily increased from \$ 57.2 million in 2005 to \$ 158.8 million in 2014 or 2.78 times, then decreases to \$ 99.9 million in 2005 \$ million

in 2015 or about 37 percent. In 2005 the import of live animals and their products exceeded their export by 3.33 times, and in 2015 - by 2.66 times. Except for the years 2013 and 2014, the import of live animals and their products from the EU Member States - 28 dominated. In 2005 the import of live animals and their products from the EU - 28 Member States dominated the CIS countries from 1.68 times in 2005 to 2.33 times in 2016.

Total exports of plant kingdoms grow from \$ 131.8 million in 2005 (Table 4) to \$ 549.7 million in 2014, then decreases. If the export of vegetable products to the CIS countries decreased from \$ 158.7 million in 2013 to \$ 68.1 million in 2016 or 2.33 times, then in EU member countries it increased from \$ 198.2 million to \$ 343.2 million or 1.73 times.

Table 4. Vegetable products trade, (million \$)

	2005	2010	2011	2012	2013	2014	2015	2016
Export, total	131.8	340.7	471.0	360.5	507.0	549.7	501.7	-
Of which:								
-CIS countries	43.1	136.9	189.8	149.9	158.7	138.40	102.5	68.1
- UE-28	65.5	127.9	219.9	141.1	198.2	247.6	309.4	343.2
Of which:								
a. fruits & nuts	60.9	167.6	187.0	202.3	203.0	194.0	194.7	-
-CIS countries	23.1	104.7	112.5	98.6	104.0	73.9	79.1	52.4
- UE-28	33.5	49.2	58.9	73.2	86.8	101.3	96.4	85.0
b. cereales	43.2	71.0	72.0	36.5	120.8	181.2	113.9	-
-CIS countries	12.6	6.9	11.4	7.2	8.8	20.8	9.5	7.3
- UE-28	15.8	39.0	47.5	14.5	38.5	70.9	69.1	101.7
c. oleaginous seeds and fruits	21.5	90.4	181.5	99.9	166.6	154.2	178.2	-
-CIS countries	4.9	16.3	41.9	25.8	32.4	29.7	5.9	3.7
- UE-28	13.1	37.6	107.7	50.2	71.6	71.6	139.9	152.2
Import, total	65.0	168.9	199.1	204.6	203.5	195.4	194.2	-
Of which:								
-CIS countries	12.0	34.5	48.7	47.4	46.3	35.2	41.5	44.6
- UE-28	31.0	72.3	69.9	86.3	83.2	90.3	61.5	72.4
Of which: a. fruits & nuts	17.7	58.0	68.4	68.7	67.0	65.5	74.6	-
-CIS countries	1.32	1.63	2.97	1.18	3.83	4.38	6.21	2.71
- UE-28	9.77	33.13	28.89	32.64	25.95	28.75	13.92	16.85
b. cereals	3.59	9.71	10.09	12.57	12.68	15.63	14.05	-
-CIS countries	0.43	2.42	4.68	5.16	4.15	1.52	0.91	2.38
- UE-28	0.43	2.34	2.88	5.97	6.47	10.18	8.90	10.55
c. oleaginous seeds and fruits	8.78	26.60	19.96	22.92	26.16	27.72	30.63	-
-CIS countries	0.92	2.68	0.97	1.34	1.55	2.01	5.10	4.80
- UE-28	4.76	10.46	11.92	13.37	15.41	17.23	12.24	21.02

Source: Authors calculations based on [http:// ec.europa.eu/](http://ec.europa.eu/) and [www.statistica.md](http://www.statistica.md), [2,8,9]

The total imports of plant kingdom products grow from \$ 65.0 million in 2005 to \$ 204.6

million in 2012, then slowly but steadily declining.

Exports of vegetable products exceeded their import twice in 2005 and 2.58 times in 2015. It dominated the import of vegetable products from the EU Member States. in relation to the CST countries.

Exports of vegetable products also show edible fruits and nuts even if their share in total decreases from 49.7% in 2005 to 38.8% in 2015. By 2013 the export of edible fruits and nuts to the CIS countries dominated, then the situation was reversed. The largest export gap between EU Member States and CIS countries recorded oilseeds and fruits, which in 2005 recorded the ratio of 2.17 to 1 and in 2016 - 41.14 to 1.

Extremely few vegetables are exported, with only 4.8 thousand 2005 and \$ 9.2 thousand in 2015.

Exports of fats and oils to CIS countries decreased from \$ 27.4 million in 2005 (Table 5) to \$ 0.5 million in 2016 or about 55 times. Exports of fats and oils to EU-28 countries increased from 9.7 millions in 2005 to \$ 86.4 million in 2012, then fluctuating, with a tendency to decrease to \$ 36.8 million in 2016.

Fats and oils are products that can be successfully exported to the EU market.

Table 5. Fats and oils trade, (million \$)

	2005	2010	2011	2012	2013	2014	2015	2016
Export total	37.8	47.6	77.5	89.7	44.0	77.5	72.0	-
Of which: -CIS countries	27.4	11.8	3.1	0.5	0.3	0.4	0.4	0.5
- UE-28	9.7	34.2	72.4	86.4	43.5	72.5	68.1	36.8
Import total	9.89	19.29	25.06	28.38	30.02	25.58	20.29	-
Of which: -CIS countries	3.10	12.89	16.16	19.12	17.46	16.38	11.66	16.52
- UE-28	3.96	3.24	4.03	3.89	4.44	4.36	4.42	5.39

Source: Authors calculations based on [http:// ec.europa.eu/](http://ec.europa.eu/) and [www.statistica.md](http://www.statistica.md), [2,8,9]

Table 6. Food, alcohol and non-alcoholic beverages, millions of dollars

	2005	2010	2011	2012	2013	2014	2015	2016
Export, total	395.9	316.9	330.6	390.9	427.3	378.4	303.3	-
Of which: -CIS countries	348.4	231.8	208.6	229.3	212.6	185.9	123.5	87.0
- UE-28	39.7	55.6	89.3	110.4	135.0	111.9	102.1	149.5
Of which: a. sugar and sugar products	7.5	29.1	14.6	35.0	30.5	55.8	38.5	-
-CIS countries	1.7	25.3	3.3	5.1	2.8	42.0	31.4	0.73
- UE-28	5.8	3.2	10.9	29.5	26.9	13.1	6.5	42.5
b. cereals based products	2.8	7.3	11.5	13.4	17.6	17.2	13.4	-
-CIS countries	1.1	0.4	0.9	0.7	1.3	1.6	0.7	3.2
- UE-28	1.4	5.7	9.2	11.2	14.3	13.8	11.1	11.3
c. fruits and veges products	46.5	52.3	68.8	60.4	76.1	59.7	49.9	-
-CIS countries	29.5	33.9	35.1	27.7	24.5	19.2	13.0	12.4
- UE-28	15.8	17.6	33.1	31.4	50.2	37.5	35.2	27.9
d. non and alcool beverages	314.5	178.2	181.3	215.0	252.3	193.7	160.0	-
-CIS countries	302.1	144.9	140.0	161.5	164.7	108.2	75.2	67.2
- UE-28	10.7	22.0	25.6	25.3	33.4	35.7	40.7	53.3
Import, total	147.5	308.6	355.8	380.1	403.5	339.6	272.3	-
inclusiv din: - țările CSI	81.9	181.2	208.7	209.3	230.2	177.2	143.4	161.69
- țările UE-28	54.63	93.95	102.86	120.85	123.94	110.56	95.60	114.51
Of which: a. sugar and sugar products	6.8	12.5	23.0	30.8	37.7	17.5	13.1	-
- CIS countries	2.66	6.36	15.30	20.18	31.84	7.23	5.16	15.22
- UE-28	3.57	4.83	4.97	8.23	3.59	5.18	6.06	10.26
b. cereals based products	12.21	33.96	41.56	43.06	48.04	44.80	33.12	-
-CIS countries	9.17	22.56	25.24	27.10	30.18	27.24	20.65	21.12
- UE-28	2.85	9.12	11.81	11.39	13.13	12.81	9.91	9.64
c. fruits and veges products	13.60	22.72	25.12	24.43	26.26	21.79	16.82	-
-CIS countries	5.61	8.46	8.84	8.86	9.68	6.94	4.62	4.82
- UE-28	4.94	9.03	10.76	10.73	11.35	10.60	8.67	9.37
d. non and alcool beverages	34.02	44.95	50.29	68.28	76.07	57.80	40.01	-
-CIS countries	10.91	24.91	26.20	29.90	29.23	25.15	16.59	21.48
- UE-28	22.71	16.65	20.38	32.81	39.32	25.73	18.02	23.22

Source: Authors calculations based on [http:// ec.europa.eu/](http://ec.europa.eu/) and [www.statistica.md](http://www.statistica.md), [2,8,9]

In the export of agrifood products with 395.9 million dollars (67.92% of the total) in 2005 (Table 6), 427.3 million dollars (42.08% of the total) in 2013 and 303.3 million dollars (15.53% of total) in 2015 dominated food, and without alcohol.

The export of food, alcoholic and non - alcoholic beverages to CIS countries has a clear tendency to reduce from \$ 384.4 million in 2005 to \$ 87.0 million in 2016 or 4.42 times.

Exports of these products to the domestic market of EU Member States increased from \$ 39.7 million in 2005 to \$ 149.5 million in 2016 or by 3.77 times.

Even if the value of non-alcoholic alcoholic beverages and vinegar declined from \$ 314.5 million in 2005 to \$ 160 million in 2016, they remain the most exported products in our country. A significant reduction in the export of alcoholic beverages to CIS countries from \$ 302.1 million in 2005 to \$ 67.2 million in 2016 or 4.5 times.

Only after 2013, the year of signing the Association Agreement, so far the export of alcoholic beverages has decreased by 2.45 times due to the embargo imposed by the Russian Federation on the original agro-food products in our country.

But these restrictions have encouraged the export of alcoholic beverages to the European Union's internal market, which rose from \$ 10.7 million in 2005 to \$ 53.3 million in 2016 or five times.

## CONCLUSIONS

(i)The development of the agri-food sector of the national Moldovan economy is dependent both on the domestic market and on the foreign market for the original agri-food products in our country.

(ii)The export of agri-food products in the Republic of Moldova dominates low-value products and unprocessed raw materials while in the import of agri-food products dominate the processed ones.

(iii)The situation in the agriculture of our country was considerably influenced by the Association Agreement between the Republic of Moldova and the European Union and the European Atomic Energy Community and their Member States [1] which was signed and launched in 2013.

(iv)Under Article 364 (1), the parties to the agreement "recognize the right of each party to define its own sustainable development policies and priorities, to establish its own levels of national protection ... to adopt or amend ... its own legislation and its own relevant policies". Obviously, the natural question "What needs to be changed in the economy of the agri-food sector of the Republic of Moldova in order to ensure its sustainable development and meets the requirements of the Common Market of the European Union?"

What we recommend:

-To encourage economic association and / or cooperation of agricultural holdings to ensure more efficient use of means of production, technological, economic, legal, etc., business plans, market study, acquisition and processing of agricultural raw materials and supplying farmers with the necessary production factors and others.

-To improve the competitiveness of the national agri-food sector by adjusting the multi-annual sowing and planting structure to the requirements of the internal market of the European Union. In other words, we consider it appropriate to increase the share of vegetable and leguminous crops, and to extend the vineyards and orchards by planting the varieties requested on the market.

Table 7. Investments in fixed capital by types of economic activities (billions lei)

	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
Investments in fix assets	0.84	1.76	7.80	13.80	16.45	17.15	19.13	21.2	21.1	19.7
Of which:- agriculture,	0.09	0.06	0.46	1.05	1.82	1.66	1.85	2.33	1.80	1.93
Processing industry	0.16	0.26	1.14	1.43	2.11	2.31	2.87	2.34	2.53	2.50
- comerce	0.04	0.16	0.79	1.52	1.99	2.12	2.22	2.51	2.86	2.37

Source: Authors calculations based on [www.statistica.md](http://www.statistica.md), [2,9]



To this end, it is imperative at least to double the investments in agriculture.

At present, investments in agriculture, hunting economy and national forestry remain far too high even though they have risen from 0.09 billion in current prices in 1995 (Table 7) to 1.93 billion lei in 2016, 10.7% in 1995 and 10.2% in 2016 of total investments in national capital.

-To increase the share of exports of agri-food products prepared from cereals processed from vegetables, fruits and grapes, especially bottled wines, wines of origin and the reduction of trade with agri-food raw material.

-To support farmers by taking surplus products from agricultural holdings at prices covering costs, storing and / or processing them and selling them in a situation where demand on the market increases.

-To abandon the ex anti / before the production / / and to practice the intervention of the public authorities after the production has been sold, stimulating the farmers to produce the ones requested on the market, in specifically, the external one.

-To encourage the crediting of agricultural producers by public authorities, especially for planting orchards and vineyards, for expanding irrigated areas, for purchasing the means of production and for all that would contribute to the efficiency of this sector.

-To stimulate the export of agro-food products by increasing the exchange rate by 5-10% in relation to the one set by the National Bank and reducing the import taxes on new technologies, which would help the farmers in our country to become more competitive.

-To adjust the training and education system of those who practice agriculture by providing them with innovating, performance and competence qualities to make decisions that are appropriate to the requirements specified in the Association Agreement.

[3] Certan Simion, 2001, Politici Agricole Comune ale Comunității Economice Europene, TACIS, Chișinău, p. 144

[4] Certan Simion, 2002, Studiu Comparativ privind organizarea pieței agricole, TACIS, Chișinău, p. 55

[5] Certan Simion, Certan Ion, 2013, Agriculture in the Republic of Moldova: present and future. Scientific Papers Series "Management, Economic Engineering in Agriculture and rural development", 2013, Vol. 12,

[6] Certan Simion, Certan Ion, 2013, Integrarea economică în Uniunea Europeană, CEP USM, Chișinău, p. 346

[7] Certan Simion, Certan Ion, 2015, Reflecții cu privire la interesul național și integrarea economică a Republicii Moldova, În materialele conferinței științifico-practice internaționale „Impactul politicilor externe asupra interesului național”, IRIM, Chișinău, Ed. ASE, București, 2015, p.576.

[8] [http:// ec.europa.eu/](http://ec.europa.eu/), Accessed January 10, 2018.

[9] [www.statistica.md](http://www.statistica.md), Accessed January 10, 2018.

## REFERENCES

[1] The Association Agreement between the Republic of Moldova on the one hand and the European Union and the Community European Atomic Energy Community and their Member States (2014)

[2] Anuarul Statistic al Republicii Moldova, Chișinău, 1995-2016

## MARKETING STRATEGIES FOR ROMANIAN TRADITIONAL PRODUCTS

Iuliana CETINA<sup>1</sup>, Dumitru GOLDBACH<sup>2</sup>, Natalia MANEA<sup>3</sup>, Loredana POPESCU<sup>4</sup>

<sup>1</sup>The Bucharest University of Economic Studies, 6 Piata Romana, District 1, Bucharest, Romania

<sup>2</sup>Valahia University of Targoviste, Carol I Bd., Targoviste, Romania

<sup>3</sup>University Politehnica of Bucharest, 313 Splaiul Independentei, Bucharest, Romania

<sup>4</sup>The Bucharest University of Economic Studies, 6 Piata Romana, District 1, Bucharest, Romania

**Corresponding author:** goldbach.dumitru@gmail.com

### **Abstract**

*The article presents the main agro-food marketing strategies (product, price, placement, promotion) based on two researches (qualitative among producers and key decision makers, and quantitative among urban consumers) in South Muntenia Region. The main objective of the research was to determine the extent to which the small traditional producers have the willingness to group together in an associative form. The research shows that traditional manufacturers encounter barriers to the valorisation-marketing of products to end-users. At the same time, urban propensity to traditional products has been reported. Based on the conclusions drawn from the qualitative research, a model has been developed that includes the main dimensions of sustainable development (economic, ecological, social and cultural dimension). Qualitative research has led to the hypotheses for quantitative research, which was based on a questionnaire consisting of dichotomic and multichatal questions. Following the research, a set of strategies were proposed to support traditional producers. Research has been limited to the South-Muntenia area, with research being extended at national level in the future.*

**Key words:** marketing strategies, capitalization, traditional products, marketing research

### **INTRODUCTION**

The article addresses an important problem of small traditional producers, that of selling products. In order to present a better image of this reality, we conducted two researches, a qualitative one and a second quantitative. The researches were carried out in the South-Muntenia area and had a series of well-defined objectives, which were confirmed by the researches. The article starts with some conceptual delimitations of traditional products, and then a SWOT analysis of the agro-food sector in Romania is carried out. The research methodology, qualitative research, objectives and conclusions, quantitative research with purpose, objectives, assumptions, results and conclusions will be presented. After research and identification of the problems faced by small producers, some marketing strategies will be presented in agriculture, both in support of small producers and in support of urban consumers. The

article ends with the presentation of the conclusions and limits of the research.

### **MATERIALS AND METHODS**

The purpose of the research is to develop a model to support small individual producers or producers who normally have major difficulties in realizing production. For this we had to carry out two qualitative research to better identify the problems faced by small producers, and to provide us with the bases of the second, quantitative research.

### **RESULTS AND DISCUSSIONS**

#### **The traditional product: A theoretical point of view**

From a theoretical and legislative point of view, the traditional product is a "food product made in the national territory and for which local raw materials are used, which does not have food additives, with a

traditional recipe, a way of production and / or processing and a traditional technological process and distinguishable from other similar products belonging to the same category.

For a product to be considered as traditional in the sense of the law, it is, besides being natural, produced in peasant households, the National Register of Traditional Products (RNPT) of the Ministry of Agriculture and Rural Development must be registered.



Fig. 1. The logo of traditional product in Romania

### SWOT analysis of the agri-food sector in Romania

Agri-food sector has a lot of *strengths*, like:

-Romania holds 6% of the eu-27 Agricultural Surface Used, which is a very important potential;

-Agricultural Surface Used per inhabitant is 0.411 ha, occupying the 6th place in the eu-27, while the european average is only 0.234 ha / inhabitant;

-the existence of an irrigation infrastructure, a factor favoring productivity growth.

The main *weaknesses* of agri-food sector are:

-Poor equipment from a technical point of view;

-lack of investment;

-the small percentage of organic surface area reported to Agricultural Surface Used;

-Low productivity;

-The need to register in the National Registry of Traditional Products (RNPT), many individual producers being unable to do so.

Agri-food sector has also a lot of *opportunities*, like:

-a large number of unused agricultural areas;

-increased export demand for bio-Romanian products;

-pooling of agricultural land would increase the competitiveness of the sector;

-setting up non-bank institutions for microfinance;

-Increased foreign investment.

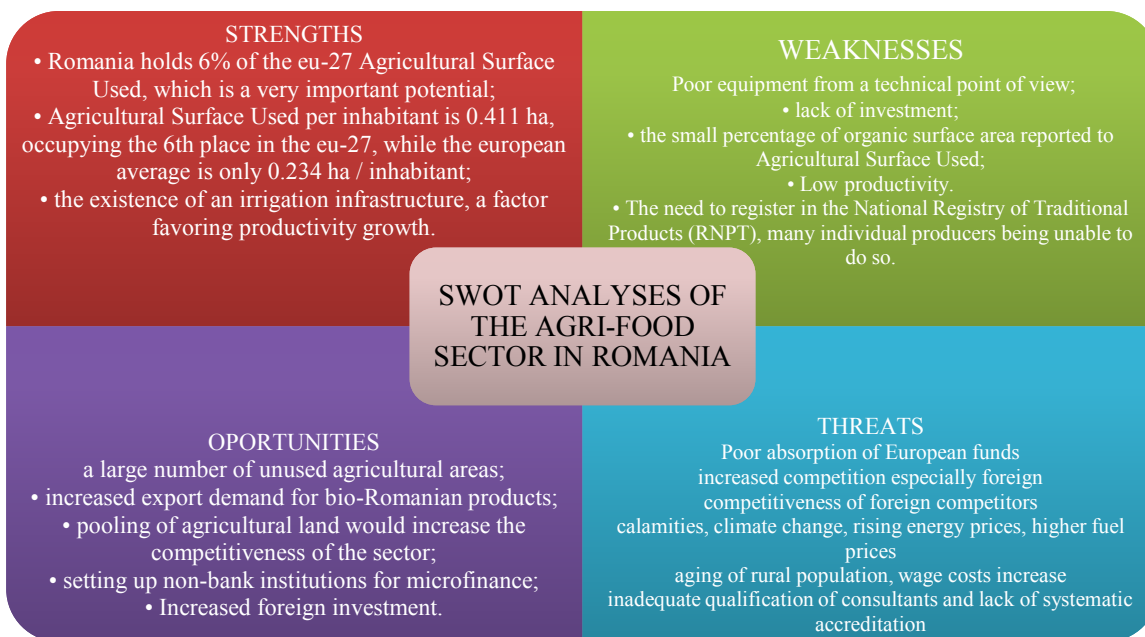


Fig. 2. SWOT Analyses Of The Agri-Food Sector In Romania

Source: Own design.

The main *threats* of the sector are:

-Poor absorption of European funds;

- increased competition especially foreign;
- competitiveness of foreign competitors;
- calamities, climate change, rising energy prices, higher fuel prices;
- aging of rural population, wage costs increase;
- inadequate qualification of consultants and lack of systematic accreditation.

### **Qualitative research**

#### *Research Methodology:*

The purpose of qualitative research is to identify the main problems faced by small traditional product manufacturers in capitalizing on their products.

The objectives of the qualitative research are:

Q1. *Critical analysis of the existing legal framework.*

Q2. *Determining the availability of small producers to join a producer association.*

Q3. *Identifying the mayors' motivation to support such an initiative.*

Q4. Identifying ways to shorten the logistics chain.

Q5. *Create a procurement and distribution model that will support subsistence households.*

Q6. *Creating traditional shops in the county seat.*

Q7. *Creating an online platform (ecoboutique.ro).*

The information was collected from 02.12.2017 to 10.01.2018 in the South Muntenia area. The individual interview was the main method used.

The sample consisted of 7 mayors and 9 traditional rural producers.

Interviews took place at the headquarters and at the manufacturers' home.

*Analysis and interpretation of the data obtained*

*The critical analysis of the existing legal framework* is the first objective that has been reached in the interview. Production and mayors were very angry at the fact that the state is supporting the big producers to the detriment of the small ones.

The second objective, *Determining the availability of small producers to join a producer association* has highlighted that the manufacturers do not understand the associative form and the benefits of the

*association*. Producers have the impression that if they associate themselves to come back to a form of communism, they think the association can strip them of the earth.

Objective 3, *Identifying mayors' motivation to support such an initiative* has shown the motivation of mayors who would not support such an initiative in compassion for the citizens, but for strictly electoral reasons and to build a good image in the community, help them in winning the next election. Support often ceases when asked to provide certain logistical facilities, namely transport and the location of the collection centers.

The help of mayors consists of consulting and supporting the obtaining of necessary permits and approvals.

Identifying ways to shorten the logistics chain is the fourth objective for qualitative research. Those interviewed said it would be a great help because they would relieve them of the roads they spend almost daily in the city where they spend the whole day selling their products.

At the same time, those involved in the research were delighted that they would not have to make an effort to pay the cost of transport to go with the products in cities.

It was furthermore clear that he would agree to sell his products in any payment condition, on the spot, weekly or even monthly, if the mayor guarantees them that the products will be paid.

Goal 5, *Creating a procurement and distribution model to support subsistence households* has been met. The pattern found is to create local purchasing centers and traditional shops, both physical and online, where purchased products are made available to urban consumers.

Here two types of organization were investigated, the first being the association of small producers, who alone manage the whole business flow, the second being the involvement of a third party to handle the whole process.

In choosing the two ways, the winner was the latter because the small producers are reluctant to join, as we have seen in the second goal.

Those involved in the research have found it useful to create traditional shops in the county's capital cities, this being the sixth objective of our qualitative research. The objective has been met and we have learned that all the manufacturers and mayors involved have appreciated that more traditional shops could be set up because each producer has a number of loyal customers, many of whom are disappointed that sometimes they can not find suppliers at known places, being driven by law enforcement. At the same time, the existence of shops would also ensure an adequate level of hygiene.

The last goal, *Creating an online platform (ecoboutique.ro)*, has been fulfilled, even if the interviewed agree that this new type of modern trade has a number of advantages, the most important being the time saving.

#### *Conclusions*

Following qualitative research, we found out that small producers are disappointed with the existing legal framework. They believe that the state is not doing anything concrete to support them.

In doing so, they do not see association as a form of salvation, associating the association with the communist period.

It was found that those who could help them a little, or the mayors of their communes, would only be involved with the motivation to gain electoral or image capital. The most involved in the research consider the collection centers a viable solution.

At the same time, producers believe that developing a network of traditional shops would solve some of the problems.

#### **Quantitative research**

##### *Research Methodology:*

The purpose of the research is to identify consumers' perception of the consumption and acquisition of traditional indigenous products. Research objectives. The main objectives of this research that derive from its purpose are as follows:

Q1. *Identifying Romanian consumers' preferences regarding traditional products versus industrial products.*

Q2. *Identifying why consumers buy traditional indigenous products.*

Q3. *Identify the stores where traditional products are purchased.*

Q4. *Identifying the frequency of buying traditional products*

Q5. *Identify the extent to which price is a decisive factor in the decision to buy domestic products.*

Q6. *Identifying the most bought traditional products.*

The hypotheses of the research are formulated in the form of an anticipation of the answers regarding the investigated issues.

H1. *Over 70% of consumers prefer traditional products to the detriment of industrial ones.*

H2. *Over 50% of consumers prefer traditional products due to their better taste.*

H3. *Over 50% of consumers purchase traditional products from agri-food markets.*

H4. *More than 50% of respondents buy traditional products weekly.*

H5. *More than 50% of respondents consider price to be a decisive factor in the purchase decision*

H6. *The most traditional products are fruit and vegetables, followed by dairy, cheese and meat products.*

The data were collected between December 2 and 20, 2017, on a sample of 147 respondents, 77 women and 70 men from the South Muntenia area, using a questionnaire. The questionnaire was composed of closed, open, dichotomous, trihotic and multihomous questions and covered all existing possibilities.

##### *Analysis and interpretation of the data obtained*

The first objective of this research is to identify Romanian consumers' preferences regarding traditional products versus industrial products and was reached by answering the question: Do you prefer traditional products to the detriment of the industrial ones? Of the 147 respondents, 118 consumers (80%) responded that they preferred traditional products at the expense of industrial ones. This confirms the hypothesis that more than 70% of consumers prefer traditional products to the detriment of industrial ones.

To the question What are the reasons why you buy traditional products? the answers can be seen in Figure 3.

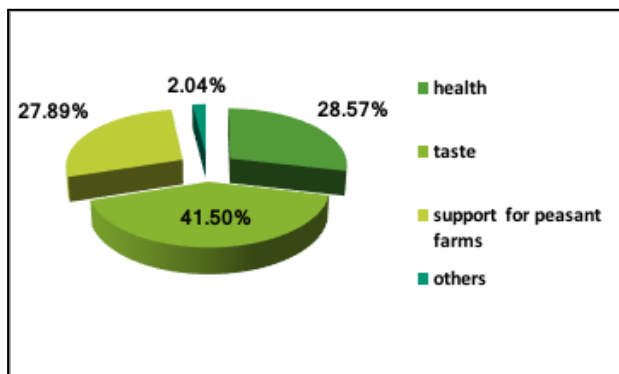


Fig. 3. Reasons why you buy traditional products  
Source: Own results.

The above figure shows that taste is the main factor in the decision to purchase traditional products by 41.50%. Thus hypothesis 2 is partially confirmed, because although most consumers purchase traditional products for taste, the percentage is not as high as it was estimated.

Objective 3 The identification of the shops where the traditional products are purchased was reached through respondents' answers to the question "How do you get used to buying traditional products?". The answers can be seen in Figure 4.

It can be noticed that the agro-food markets are preferred by the respondents in the proportion of 53% and the traditional stores in the proportion of 31, 82%. This confirms the hypothesis that more than 50% of consumers buy traditional products from agri-food markets.

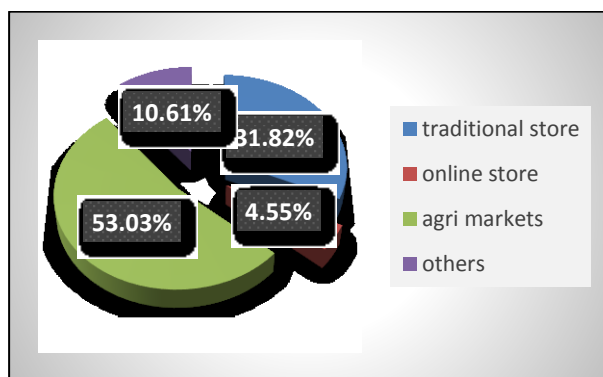


Fig. 4. Places where food is purchased  
Source: Own design.

These results show that respondents have more confidence in agri-food products by associating them with traditional products, which in some cases is not true.

In terms of purchasing frequency, the results in Figure 5 show that most respondents buy traditional products weekly, while only 12 respondents purchase these types of products per month.

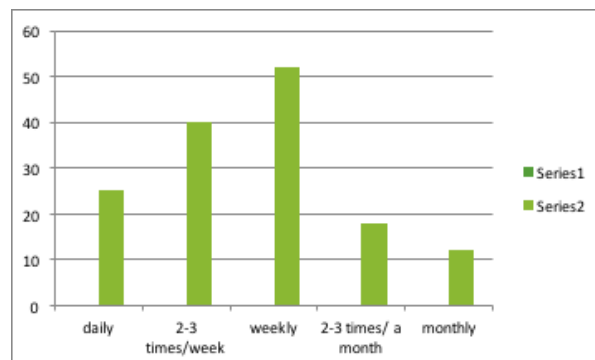


Fig. 5. Frequency of buying traditional products  
Source: Own design.

Another objective of the research is to identify the extent to which price is a decisive factor in the decision to buy domestic products. In response to the respondents' answers, the price of the products is high. Although the consumption of these products is most often once a week (35, 37%), the respondents want to buy traditional products several times a week, but not - and can afford because of their high price. At the same time, respondents are aware that the price of these products should be higher than conventional ones because they are more tasty, healthier and contain no food additives. This confirms hypotheses 4 and 5.

The ultimate goal of research is to identify the most purchased traditional products. As a result of the respondents' responses, it was found that the most traditional products purchased were fruit and vegetables, followed by cheese and dairy products.

**Conclusions**

The results of this research have highlighted that respondents prefer to purchase traditional products at the expense of industrial ones. The most traditional products purchased are fruits and vegetables, followed by cheese and meat products. They are purchased because they are tasty, healthy and look good. The price is the

main impediment to the purchase of traditional products. If their price were lower, consumers would be allowed to buy traditional products several times a week.

### Marketing strategies in agriculture

Intensive agriculture does not lack resources. Moreover, it has become a very profitable business.

Subsistence agriculture, however, is in a great stalemate. This deadlock is primarily caused by the lack of initiatives, both among producers and authorities.

In all debates, concerns are about large producers, what subsidies to receive, how to be supported, that is, the small producer must live to the limit of subsistence.

However, whether we want it or not, a natural question comes to mind, is it right?

No, it is not fair either from a social point of view, from an economic point of view or from an ecological point of view.

Organically speaking, small producers are those who usually do not use chemical fertilizers, first because they do not allow them, and secondly because they do not practice a way to produce intensive.

In spite of this, the state, through its policies, stimulates the big producers, who have an intensive production system without a policy of environmental protection.

It would be right for the polluter to be charged and not to receive the same subsidy as the one that does not pollute, while not being competitive on the market.

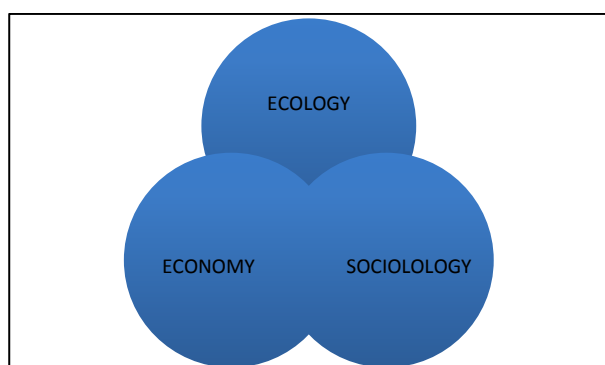


Fig. 6. Schematic representation of sustainable development: at the confluence of the three pillars  
 Source: S. Bonetti 2009, in D. Goldbach, 2012, p.58.

### Model to support small manufacturers

Under these circumstances, we propose a model to support small producers, a model that will put into practice will solve most of the problems of small producers.

In our model, small producers will deliver the products to a collection centre, with the products being paid on time or on time, depending on the choice of each manufacturer.

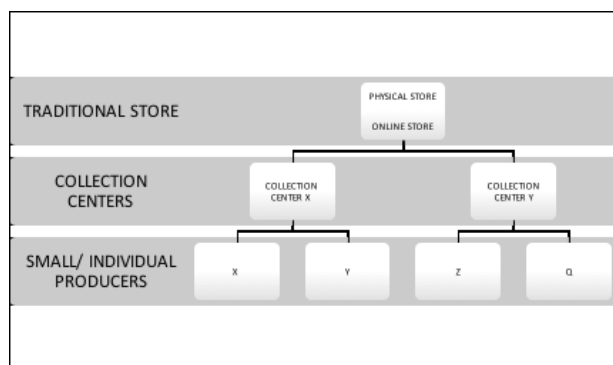


Fig. 7. Model to support small manufacturers  
 Source: Own design

From the collection centre, the products will be delivered directly to the physical store / stores in the urban agglomerations where they will be redeemed.

Product capitalization will be done through both "traditional trade" and an online store.

Advantages for manufacturers:

- Reliability of recovery;
- greater profit, not having to pay for transportation or rental of a stall;
- Time savings due to the fact that they are no longer travelling to tens of kilometers away, nor are they staying with the products for sale;
- efficiency.

Benefits for consumers:

- safety. The products will be marked with the date of production and the name or the manufacturer's name. At the same time, they will be checked in the collection centres.
- convenience. The products can be ordered on an on-line platform, to be received at home or picked up directly from the physical store.

In the realization of the model it must be taken into account that the third part, which makes possible the realization of the logistic chain, can be a cooperative / agricultural association or a trading company, and by

quantitative research we will find out which variant is viable.

### **The limits of research**

The first limit of research is given by the scale of the research, which was done only on a certain area and on a small but representative sample.

In the future, this research will need to be developed at national level, knowing that the problems faced by small producers differ from one geographic area to another.

The conditions for qualitative research were not the best, intending in the future to generate superior interview and observation conditions.

[4] Ordinului Ministerul Agriculturii și Dezvoltării Rurale Nr. 724 din 29 iulie 2013 privind atestarea produselor tradiționale.

## **CONCLUSIONS**

In conclusion, based on the two researches initiated and carried out in the South-Muntenia area, small traditional producers have many problems in the distribution. The state does not support him enough, they are divided into subsistence peasant households and do not want to associate. Mayors in their communes may only engage in electoral use. Under these circumstances, the creation of a logistical supply and distribution logistics is vital.

Research has found that small producers would agree to renounce the old model to sell their products and sell them to collection centers and urban consumers would be willing to buy traditional products from traditional stores, physically and online.

This model would come in both the producers 'and consumers' support, being an ecological, equitable social model and, last but not least, economically viable.

## **REFERENCES**

- [1] Bonetti, S., 2009, Développement durable: concept, mesures. Application aux filières fruits, légumes et vin, SBC Bureau d'étude, Janvier, [www.sival-angers.com](http://www.sival-angers.com), Accessed February 10, 2018.
- [2] Cetină I., 2009, Marketingul serviciilor. Fundamente și domenii de specializare, Editura Uranus, București.
- [3] Goldbach, D., 2014, Potențialul agriculturii biologice din România din perspectiva paradigmei S.C.P. în condițiile dezvoltării durabile, Ed. Pro Universitaria, București, pp.58.





## THE SOCIO-ECONOMIC DEVELOPMENT LEVEL OF THE ROMANIAN RURAL SPACE

Lorena CHÎȚEA<sup>1</sup>, Ion DONA<sup>2</sup>, Mihai CHÎȚEA<sup>3</sup>

<sup>1,3</sup>Institute of Agricultural Economics, INCE, Romanian Academy, 13 Calea 13 Septembrie, District 5, Bucharest, Phone/Fax:021/3182411; E-mail: chitu\_lorena@yahoo.com, mihai\_chitea@yahoo.com

<sup>2</sup>University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Email: iondona@yahoo.com

**Corresponding author:** chitu\_lorena@yahoo.com

### *Abstract*

*In the present paper, the authors propose the elaboration and application of a theoretical model to assess the degree of socio-economic development of the Romanian rural space in view of giving a counties' hierarchy and setting some temporal tendencies having as a reference year- the year 2007, that of the European Union accessing . In order to accomplish these goals the specialty literature regarding the theoretical model was reviewed and a set of relevant and available indicators in the national database (NSI) was proposed, on basis of which a composite indicator was calculated.*

**Key words:** *theoretical analysis model, durable development region, composite indicator*

### INTRODUCTION

The EU rural development policy, for the period 2014-2020, is oriented by the Europe 2020 Strategy and the Common Agricultural Policy, following the achievement of three strategic goals on long term: agriculture competitiveness' stimulation; the guarantee for a durable management of the natural resources and the fight with the climate changes; supporting a balanced territorial development of rural communities, mainly, by sustaining the local economies, the creation and maintaining of jobs.

The Rural Development National Plan 2014-2020 [7] is following the present needs of the inhabitants in the rural, having the following major priorities: the maintaining of traditional agricultural and non-agricultural activities.

In the last years, the concerns for a balanced social and economic development in territorial profile were expanded.

The assessment of the socio-economic development degree must be regarded from two perspectives, one positive linked to the development potential and a negative one which takes account of the needs and

problems with which a certain territory is confronting itself [5].

For a clear image regarding the degree of socio-economic development of the Romanian rural space, at national, regional and county level, in the European and national specialty literature it is met the tendency to utilize aggregated indicators, even if the individual indicators are not at all neglected, either [3].

There is, within the specialty literature, a series of pro and con arguments for the utilization of the composite indicators [11]. Specialists, supporting their utilization, are evidencing the following advantages: the easy identification of a common tendency, and in some territorial comparisons [12].

The specialists, contesting the utility of the composite indicators have in view the possibility of sending wrong messages, when these indicators are badly constructed or wrongly interpreted [9].

In the Romanian specialty literature there is a series of composite indicators used in the socio-economic diagnosis analysis of the rural space (Durable development index [6], Aggregated indicator regarding the present stage of economic and social development [3],

The global index of the present stage of economic and social development [14], The rural development index [10]; The index of communes' development IDC [13]; Aggregated indicator necessary for the assessment of the development potential of a locality [1]; The synthetic development index of rural households [2] etc.

Table 1. The main pro's and con's for the utilization of composite indicators

Pro's	Con's
The composite indicators can be utilized in order to sum up complex problems or multi-dimensional ones, in view of supporting the decision factors.	The composite indicators can transmit wrong policy messages in case these are wrongly constructed or wrongly interpreted.
The composite indicators are supplying the overall image.	The composite indicators under the form of an 'overall image' can invite the politicians to make simplistic political conclusions.
The composite indicators are making the tendency interpretation easy, than this thing would be followed separately by the indicators. They are facilitating the understanding of some complex problems at national, regional, county level.	The composite indicators must be utilized in combination with the sub-indicators in order to make sophisticated political conclusions.
The composite indicators could contribute to the reduction of the dimension of a list of indicators or to include more information within the existent dimension limit	The construction of the composite indicators implies the following stages: selection of sub-indicators, choosing the model, the weighing of the indicators and the treatment of the lacking values. These stages must be transparent and based on solid statistical principles.
	The sub-indicators' selection and their weighing could be the target for the political challenge.
	The composite indicators are increasing the quantity of necessary data, because the data are necessary for all sub-indicators and for a significant analysis, statistically speaking.

Source: Saisana M and Tarantola S. (2002), State-of-the-art report on current methodologies and practices for composite indicator development, EUR 20408En, European Commission-JRC: Italy [11]

## MATERIALS AND METHODS

Starting with the multi-dimensional character of the rural space, of rural development, a theoretical model is proposed to analyze the socio-economic development degree of the rural space under the form of a matrix within which it is taken into account a series of criteria and sub-criteria for which a set of relevant indicators was proposed.

The result of the model will be a composite indicator regarding the socio-economic development degree of the Romanian rural space, at county level, which can be useful both for the researchers, and for the local political decedents, of the county, region or national ones.

The composite indicator is supplying useful information for complex comparisons between regions, but also punctual aspects regarding the demographical, social and economic criterion. When the analysis is made at regular intervals an indicator can indicate the change tendency within each criterion, as well as in time.

The selection of the indicators necessary for the construction of the theoretical model to assess the socio-economic development degree of the rural space is based on available statistical indicators, relevant for the goal followed.

In the present paper, the analysis will have in view the measuring of the development level or of the socio-economic discrepancies between certain territorial units (between counties), in different periods (There were chosen the years 2000, 2005, 2007, 2010 and 2015 in order to see the influence of the EU accession also, upon the Romanian rural space development degree).

Following the utilized aggregation methods, in the specialty literature, abroad and national, there is a certain phasing, generally accepted, overtaken also for the calculation of the composite indicator regarding the socio-economic development degree of the rural space, such as:

(a)Development of the theoretical analysis model [4] – The theoretical analysis model is the starting point in the construction of the composite indicators.

-*Concept Definition* – the frame should define, clearly, the phenomenon which must be measured and the sub-components, the selection of individual indicators and weights which should reflect their relative importance and the dimensions of composite ensemble

-*Determination of sub-groups* – the multi-criteria concepts can be divided. Such a tree like structure improves the understanding by the user of the drivers from behind the composite indicator.

-*Identification of selection criteria* – the selection criteria should function as a guide to establish if it should be included an indicator or not in the global composite index.

(b) Selection of variables (primary indicators) – ideally, the primary indicators should be selected on basis of their relevance, analytical solidity, promptitude, accessibility, etc

(c) The multi-variant analysis – once established, the structure of the composite indicator and the set of individual indicators, which are describing clearly the phenomenon followed, also the econometric method of data analysis will be established

(d) Normalization or standardization of primary indicators (1. Ordination 2. Standardization 3. Min-Max 4. Relative distance 5. the categorial scale 6. Indicators around average)

(e) Indicators' aggregation and the formation of the composite indicator;

(f) The sensibility analysis.

## RESULTS AND DISCUSSIONS

The first step in the construction of the theoretical analysis model was the definition of the concept of rural socio-economic development, and in the case of the present paper, rural development must ensure at the same time the economic development and the social welfare, these, at their turn being directly linked to the demographical resources and natural anthropic ones able to potentiate the other two.

In the elaboration of the theoretical analysis model for the socio-economic development degree in the rural space there are held in view the following analysis criteria: The natural and anthropic capital, the

demographical capital, the social capital, the economic capital.

Table 2. Composite index regarding the socio-economic development degree of the rural space

Criteria	Sub-criteria	Basic indicators
	<i>Land fund 50 %</i>	<i>Agricultural area per capita</i>
	<i>Infrastructure 50%</i>	-Modernized public roads at county level -Share of localities with edible water distribution net work -Share of localities with public sewerage network - Share of localities in which natural gases are distributed
<b>Demographic criterion 30 %</b>	<b>Population increase factors 100</b>	- Birth rate / mortality rate /natural increase -Balance of internal/external migration -Average life expectancy
<b>Social criterion 30%</b>	<b>-Education 50 %</b>	The average pupils' number per one teacher
	<b>-Health 50 %</b>	-The average inhabitants' number per one family physician /dentist
<b>Economic criterion 30%</b>	<b>Employment 100%</b>	-Population employment ratee

Source: Chițea Lorena, 2017, Households in the Romanian Rural Area - Theoretical Model, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development [4]

Each criterion and sub-criterion has received a specific share, the indicators having equal shares within the sub-criterion it makes part of.

The indicators were selected based on availability (some indicators which were relevant for the paper's goal were not available at county level for the rural

environment) and comparability with other indicators following the rural development and based on their relevance in defining the socio-economic development degree of the rural space.

The data processing for the Composite Index for the rural socio-economic development degree was performed with the help of the Excel Program and SPSS. Indicators were grouped by criteria (natural-anthropoc, demographical criterion, the social criterion, the economic criterion), each criterion receiving a specific share. To the sub-criteria were given equal shares within the criterion, the same the indicators within the sub-criterion.

It was realized the indicators' normalization, the national average being consider as reference, and the formula used was the following:

$X = 100 \times (x_i / X_i) / (p_i / P_i)$ , where  $x_i$  and  $X_i$  represent the values registered at county and national level, and  $p_i$  and  $P_i$  – population at county and national level. For the indicators already expressed in ratio to the population, the calculation formula was:  $X = 100 \times (x_i / X_i)$ .

Aggregation of the indicators into sub-criteria and criteria was realized according to the theoretical model.

The composite index of the rural socio-economic development degree resulted after the methodology presented before put into evidence the following situation:

- In top of the 2015 index there are the counties: Ilfov, Cluj, Timiș, Brașov, Sibiu, Constanța. These were in the top, even if in other hierarchy, in the whole analyzed period (2000-2015), except for Ilfov county, which in the year 2000 was under the national average and its evolution was a-typical for the rural environment, the polarizing effect of Bucharest being very strong.

- At the opposed end of the interval there are the counties: Călărași, Botoșani, Vaslui, Giurgiu, Ialomița, which from the point of view of the general index, their situation deteriorated in the analyzed period.

- Out of 41 counties, the value of the 2015 general index of rural development is over the national average only in case of 31.70% of the country's counties, in year 2000, these

represented 41.46%. This is reflecting the real situation with which the Romanian rural space is confronting namely: the differential development between the counties based the development poles and a certain concentration of the developed zones and a higher and higher discrepancy towards the under-developed ones. If the analysis had been realized at locality level, the discrepancy between the developed ones and those less developed would have been bigger.

Ilfov county is in a net advantage towards the other counties due to its position towards the strongest pole of Romania, the capital, which is imprinting a strong urbanization from occupational point of view, of the living standard, with a continuous populating of the zone.



Fig.1. The map of Global index of rural development in Romania

Source: Own calculations after data in tempo online NSI [8]

From point of view of the time evolution of the rural space socio-economic development degree, counties are divided into more categories:

- Strong counties, which preserved their top position: Brașov, Sibiu, Constanța, Hunedoara;

- Strong counties which evolved in a positive way: Timiș, Cluj;

- Less developed counties, which registered involutions: Vaslui, Botoșani, Călărași, Galați, Telorman, Neamț, Dâmbovița;

- Less developed counties, which preserved their position: Giurgiu, Ialomița, Buzău, Olt.

In the natural-anthropoc criterion the following indicators were included: the share of modernized public roads at county and commune level; the share of localities with

network of edible water distribution; the share of localities with public network of public sewerage; the share of localities in which natural gases are distributed. This indicators have equal share within the sub-criterion – the index of the natural-anthropic index.

Table 3. Distribution of counties by the index of natural-anthropic criterion, year 2015

Braila, Sibiu, Caras-Severin, Tulcea, Cluj, Ilfov, Mures, Arad, Harghita, Brasov, Timis, Hunedoara, Alba	Very high
Constanta, Teleorman, Covasna	High
Ialomita, Calarasi, Satu Mare, Mehedinti, Maramures, Gorj	Medium
Bistrita-Nasaud, Bihor, Galati, Dolj, Olt, Valcea, Vaslui, Giurgiu, Salaj, Bacau, Dambovita	Low
Buzau, Suceava, Prahova, Arges, Botosani, Vrancea, Iasi, Neamt	Very low

Source: processing after NIS, tempo online [8]

In case of the natural-anthropic criterion, 53.65% of counties are in the favorable category, over the national average, and the index values are varying between 58.17 and 156.78.

Within the demographical criterion the following indicators were included: natural increase, balance of internal/external migration, average life expectancy.

By the index of demographical criterion, county Ilfov is detaching itself from the others, being by 164.64% higher than the national average.

The followings, at a considerable distance from the Ilfov county, are the counties: Timiș, Cluj, Brașov, Sibiu, Constanța. The counties at the end of the hierarchy are: Teleorman, Olt, Vaslui, Botoșani, Tulcea.

Table 4. Distribution of counties by the index of demographical criterion, year 2015

Ilfov, Timis, Cluj	Very high
Brasov, Sibiu, Constanta	High
Iasi, Suceava, Mures, Harghita	Medium
Bihor, Satu Mare, Arad, Maramures, Covasna, Giurgiu, Galati, Dambovita, Vrancea, Neamt, Bacau, Arges, Hunedoara, Dolj, Salaj, Prahova, Bistrita-Nasaud, Alba, Valcea	Low
Gorj, Mehedinti, Buzau, Braila, Calarasi, Ialomita, Caras-Severin, Tulcea, Botosani, Vaslui, Olt, Teleorman	Very low

Source: processing after NIS, tempo online [8]

In case of the social criterion the following indicators were included: the average number of pupils per one teacher, the average number of inhabitants per one family physician/dentist.

Table 5. Distribution of counties by the index of the social criterion, year 2015

Hunedoara, Brasov	Very high
Cluj, Timis, Sibiu, Alba, Constanta, Dolj	High
Arad, Caras-Severin, Valcea, Bihor, Mures, Maramures	Medium
Gorj, Mehedinti, Braila, Arges, Olt, Satu Mare, Harghita, Covasna, Salaj, Galati	Low
Teleorman, Prahova, Iasi, Tulcea, Buzau, Bistrita-Nasaud, Bacau, Neamt, Ialomita, Dambovita, Suceava, Vaslui, Vrancea, Botosani, Giurgiu, Ilfov, Calarasi	Very low

Source: processing after NIS, tempo online [8]

The top counties from the point of view of the social criterion are: Hunedoara, Brașov, Cluj, Timiș, Alba, and at the end of the classification are: Călărași, Ilfov, Giurgiu, Botoșani, Vrancea, Vaslui. The share of less socially developed counties represent 60,98%. It is to be remarked that county Ilfov is on the penultimate place from the point of view of social development, which can be explained through the rapid expanding of the Ilfov rural zone (area limitrophe to Bucharest) without being expanded, at the same time, the social infrastructure. This thing does not mean a weak instruction of the pupils or a limited access to the medical services, as these are using the Capital’s resources.

Table 6. Distribution of counties by the economic criterion index, year 2015

Arad, Alba, Cluj, Sibiu, Salaj, Bistrita-Nasaud, Timis, Bihor, Valcea	Very high
Brasov, Hunedoara, Vrancea, Harghita, Arges, Satu Mare, Mures	High
Constanta, Teleorman, Maramures, Neamt, Covasna, Tulcea, Braila, Caras-Severin, Prahova, Buzau, Mehedinti, Gorj, Ilfov, Dolj	Medium
Olt, Suceava, Dambovita, Botosani, Ialomita, Vaslui, Bacau, Iasi, Galati	Low
Calarasi, Giurgiu	Very low

Source: processing after NIS, tempo online [8]

In case of the economic criterion it was taken into account only the indicator: population employment rate.

The top counties from point of view of the economic criterion are: Arad, Alba, Cluj, and at the end of the classification there are the counties: Giurgiu, Călărași, Galați. The share of less developed counties from economic point of view represent 73.17%.

## CONCLUSIONS

The composite index regarding the socio economic development level of the rural space highlights an unbalanced territorial development dominated by under developed counties (68,29% of them being under the national average), characterized by an important agricultural potential, a significant demographic decline, limited access to utilities and social services and financially rewarding jobs (the majority of rural population being employed and underemployed in agriculture – a sector generating lower income levels compared to others).

The criteria analysis reveals that there is no correlation between the development level and the natural potential of the area, the intensity of development being imprinted by the urban development poles.

The percentage of counties with recorded values higher than the national average, based on the reporting criterion is:

- 53.66% for the natural – anthropic criterion;
- 31.70% for the demographic criterion;
- 39.03% for the social criterion;
- 26.83 for the economic criterion.

## REFERENCES

- [1]AES, 2015, Studiu privind stabilitatea potențialului socio-economic al zonelor rurale, draft, Contractul în cadrul căruia s-a realizat studiu "Asistență tehnică pentru pregătirea perioadei de programare în domeniul dezvoltării rurale 2014 - 2020"  
<http://www.madr.ro/docs/dezvoltare-rurala/programare-2014-2020/studiu-potential-socio-economic-de-dezvoltare-zone-rurale-ver-10.04.2015.pdf>, Accessed January 10, 2018.
- [2]Bădescu, I., Buruiană Claudia, Șerban Adela, 2006, Puterea economică și spirituală a gospodăriei rurale în

România la sfârșit de mileniu, Revista Română de Sociologie, seria nouă, anul XVII, nr. 3-4, p. 187-198, București.

[3]CEROPE, 2003, Evaluarea stadiului de dezvoltare economico-socială a României comparativ cu alte țări.

[4]Chițea Lorena, 2017, Households in the Romanian Rural Area - Theoretical Model, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.17(1)/2017, [http://managementjournal.usamv.ro/pdf/vol.17\\_1/volume\\_17\\_1\\_2017.pdf](http://managementjournal.usamv.ro/pdf/vol.17_1/volume_17_1_2017.pdf), Accessed January 10, 2018.

[5]Institutul Tavistock, 2003, Manual pentru evaluarea dezvoltării socio-economice, Institutul Tavistock în colaborare cu GHK, IRS.

[6]Mocanu-Perdichi Ruxandra, 2009, Indexul dezvoltării durabile în România la nivel județean și regional, Revista Inovația Socială, Nr. 1/ 2009.

[7]National Rural Development Program for the period 2014 - 2020

[8]NIS, 2016, Tempo-online

[9]OECD (Organisation for Economic Co-operation and Development), European Commission, Joint Research Centre, 2008, Handbook on Constructing Composite Indicators: Methodology and User Guide, OECD Publishing.

[10]Oțiman, P.I. et al, 2006, Dezvoltarea rurală și regională durabilă a satului românesc, Editura Academiei, București, pp.28..

[11]Saisana, M., Tarantola, S., 2002, State-of-the-art report on current methodologies and practices for composite indicator development, EUR 20408En, European Commission-JRC: Italy.

[12]Saltelli, A., 2007, Composite indicators between analysis and advocacy, Social Indicators Research, 81:65-77.

<http://www.andreasaltelli.eu/file/repository/SIR2007.pdf>, Accessed January 10, 2018.

[13]Sandu, D. (coord.), 2006, Locuirea temporară în străinătate. Migrația economică a românilor: 1990-2006, Fundația pentru o Societate Deschisă, București, pp.13.

[14]Tache, A., 2012, Ierarhizarea multicriterială pe baza indicelui global al nivelului actual de dezvoltare economico-socială a unităților administrativ-teritoriale din România. Urbanism. Arhitectură. Construcții, Vol. 1, nr. 2.

## RESEARCH ON THE EUROPEAN FLOWER MARKET AND MAIN SYMBOLIC VALUES OF THE MOST TRADED SPECIES

Irina-Adriana CHIURCIU<sup>1</sup>, Iuliana ZAHARIA<sup>1</sup>, Elena SOARE<sup>1</sup>, Carina DOBRE<sup>1</sup>, Anamaria-Aurelia MORNA<sup>2</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40744 6474 10, Emails: irina.chiurciu@yahoo.ro; iulia\_zaharia@yahoo.com; soare.elenausamv@gmail.com; dobrearina@yahoo.com

<sup>2</sup>Oradea University, 1 Universităţii Street, Oradea, Bihor County, Romania, 410087, Phone: +40 259 432830, Email: amorna@uoradea.ro

**Corresponding author:** irina.chiurciu@yahoo.ro

### Abstract

*Cultivated by passion or as part of a business, flowers are present at any event in people's lives, either joyful or sad. As the European flower market is a large and varied one, the aims of this article are: to present the evolution of European flower market between 2008-2016 using as main indicators: the areas cultivated and the total production obtained in the European Union; the import and export values; to sketch the cultural role of the most traded species. The economic data taken from the European Commission - Agriculture and rural Development, Eurostat and International Association of Horticultural Producers (AIPH) sites, were processed and interpreted statistically; while for the symbolic values of Roses, Carnations, Lilies, Chrysanthemums, Orchids and Gladioli we used documentation on various, eclectic, formal sources related mainly to religion, art, florigraphy. Results highlight that the European Union represents 10% of the world's floral area and 31% of the value of flower and ornamental plants production in 2016; the Netherlands, France and Italy are the main producing and cultivating countries; the European Union is an exporter of cut flowers and foliage, potted plants, conifers, perennials, bulbs and corms, and, first of all, an importer of cut flowers and foliage. The trade balance is in favor of exports.*

**Key words:** cut flowers, productions, surfaces, symbolic value.

### INTRODUCTION

The flower market is a large one and due to the variety of floral species it consists of fresh or dried cut flowers, foliage - present in the composition of bouquets, potted plants - for interior decoration, saplings, tree saplings, shrubs and other types of planting material for landscaping, bulbs, seeds, etc. In addition, the flowers can also be grown to serve as raw materials in the pharmaceutical industry (teas, medicines, and oils), cosmetics, alternative therapies, even for culinary use and others.

The production and commercialization of flowers is an important segment of the EU's horticultural activity and worldwide. With cultivation peculiarities and marketing specifics, flowers are not an indispensable asset in everyday life but they are influenced by the incomes of the population [12].

The analysis of the statistical data shows that the European Union accounts for 10% of the world's floral area and 31% of the production value of flowers and potted plants for the year 2016. The Netherlands, France and Italy are the main producing and cultivating countries. Also, the European Union is an exporter of cut flowers and foliage, potted plants, conifers, perennials, bulbs and corms and mainly an importer of cut flowers and foliage.

Lately, experts in the field have stepped up their research into finding new varieties to meet the needs of the lovers of beauty.

The aims of this paper are the analysis of the flower market and to highlight that a flower, on market or outside it, bears symbolic values, besides the aesthetic and social ones. Nowadays, new trends and the afferent technology driven by financial interests but also in close connection with past and present



values, ideals and human symbols, allow us to offer or receive a cryogenic flower which lasts years; such “immortal” flower “talks” about the same ancient, ceaseless and transcultural human effort to preserve beauty, life, positive feelings and memories. The option for a syncretic and trans-disciplinary work nevertheless poses great risks, impossible to avoid in the narrow context of this work, but we have estimated it deserves to give it a try as flower market trades the object with probably the most subtle and significant cultural meanings comparing with the other agricultural products.

## MATERIALS AND METHODS

Flowers were given symbolic meanings in religion, heraldry, arts (especially painting and literature), folklore and everyday life. Medieval gardens were created to reflect the symbolism of the flowers - a practice continued in the Renaissance [26].

For the cultural role of the most traded species on the European market (*Roses, Carnations, Lilies, Chrysanthemums, Orchids and Gladioli*) we used documentation and further selection, analysis, synthesis, also comparison and generalization where necessary on various, eclectic, formal sources related mainly to religion, art, florigraphy within the European frame and values.

Along with the presentation of the main symbolic meanings of the flowers in various fields of activity, the paper followed the evolution of the flower market at EU level. For this purpose, the following indicators were analyzed: area cultivated in the EU; total flower production; the selling price of the most sold floral species, imports and exports

of floral products, as well as cut flowers. Also, the work has referred to the cultural role of the most traded species. The analyzed indicators were surprised by their dynamics for the period 2008-2016. The data used for this research was taken from sites such as: European Commission - Agriculture and Rural Development, Eurostat and the International Association of Horticultural Producers (AIPH). The statistical data has been processed, interpreted and presented largely in tables and graphics.

## RESULTS AND DISCUSSIONS

The main trends in the production and marketing of flowers at EU level will be presented below:

Today, when everything is reduced to money, the flower market is an important source of income for those who produce and commercialize these products. It is important to specify that the Netherlands is the most representative country in producing and marketing flowers. There is even a Flower Market at Aalsmeer, where flowers can be purchased through the clock system and there are on average about 60,000 transactions a day [1].

Table 1 shows the evolution of the areas planted with flowers and ornamental plants (except nurseries) in the main cultivating states of the European Union.

The analysis of the data presented in the table shows, in general, the increased surfaces, except for Hungary and Italy. In the case of the other countries, the highest increase is registered by Belgium, from 0.9 thousand ha (2009) to 5.28 thousand ha (2016).

Table 1. Areas cultivated in the EU with flowers and ornamental plants in the period 2009-2016 (1,000 ha)

Specification	2009	2010	2011	2012	2013	2014	2015	2016	2016/2009%
Belgium	0.90	5.00	4.88	5.30	5.24	5.11	5.35	5.28	586.7
Germany	6.20	8.38	8.40	7.60	7.70	7.30	7.50	7.30	117.7
Spain	4.20	6.68	6.49	7.01	6.98	7.06	6.30	6.44	153.3
France	8.80	8.08	8.52	9.13	9.01	8.80	8.83	8.88	100.9
Hungary	0.90	0.52	0.56	0.69	0.54	0.60	0.58	0.54	90
Italy*	-	-	-	-	-	9.42	8.85	8.78	-
Netherlands	27.40	26.23	27.06	26.20	26.20	26.30	27.64	32.63	119.1
Poland	2.60	3.80	3.30	3.30	3.40	3.50	3.50	4.90	188.5
Portugal	1.79	2.06	2.32	2.59	2.85	2.85	2.85	3.45	192.7
United Kingdom	5.00	5.00	5.00	6.00	6.00	6.00	7.00	6.00	120

Source: Eurostat [14], own calculation. Note: \*lack of data for 2009-2013

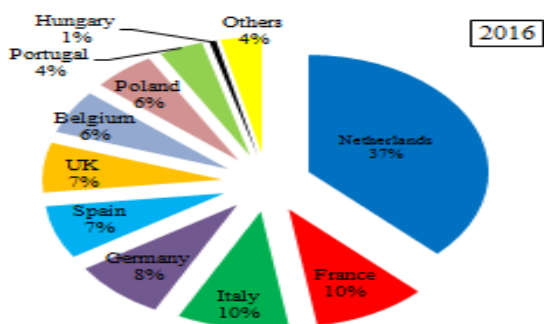


Fig. 1. The share of areas planted with flowers and ornamental plants in the European Union (%)

Source: Eurostat [14], own calculation.

The largest area cultivated with flowers and ornamental plants is registered in the Netherlands, which clearly stands out from the other states. In 2016, 32.63 thousand ha of

flowers and ornamental plants were grown in this country. It is followed by France (8.88 thousand ha in 2016) and Italy (8.78 thousand ha in 2016).

The area cultivated in the Netherlands with flowers and ornamental plants accounts for 37% of the total European Union surface area in 2016 (Figure 1), and the surface area in France and Italy accounts for 10%.

The main countries producing ornamental flowers and ornamental plants in the European Union are the Netherlands - a detached and undisputed leader on the flower market, France, Italy, Germany and Spain (Table 2).

Table 2. The production value in the main EU countries producing ornamental flowers and ornamental plants (producer prices) in 2008-2016 (Million Euro)

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016	2016/2008 %
European Union	20,605.19	19,786.74	21,005.08	20,783.70	20,538.23	20,350.58	20,673.21	20,848.20	21,055.34	102.2
Austria	280.96	289.40	291.08	301.75	298.11	293.19	315.01	335.50	356.50	126.9
Belgium	530.85	557.55	569.28	564.75	582.54	513.77	512.94	497.35	477.45	89.9
Denmark	504.72	473.53	478.68	511.44	487.37	472.56	431.92	434.19	436.22	86.4
Germany	2,673.00	2,580.00	2,807.94	2,826.67	2,601.96	2,461.54	2,308.86	2,244.64	2,202.13	82.4
Spain	2,144.51	2,164.80	2,219.06	1,981.36	1,789.17	1,955.27	2,078.91	2,133.40	2,203.86	102.8
France	2,176.10	2,175.60	2,254.80	2,440.60	2,556.40	2,470.20	2,852.20	2,900.10	2,948.13	135.5
Italy	3,206.48	2,932.25	2,906.73	2,813.68	2,731.29	2,613.18	2,585.88	2,487.48	2,449.89	76.4
Netherlands	6,065.20	5,881.01	6,264.76	6,195.79	6,174.64	6,401.84	6,486.70	6,558.66	6,781.40	111.8
Portugal	493.88	507.23	495.02	493.73	463.49	468.82	443.21	474.03	506.72	102.6
United Kingdom	1,028.36	986.42	1,162.23	1,283.48	1,408.95	1,401.89	1,446.25	1,582.47	1,466.89	142.6

Source: Eurostat [14], own calculation.

For the analyzed period, increases in the value of flowers and ornamental plants are recorded in 2016 compared to 2008 in the following countries: Austria (+26.9%), Spain (+2.8%), France (+35.5%), The Netherlands (+11.8%), Portugal (+2.6%) and the UK (+ 42.6%).

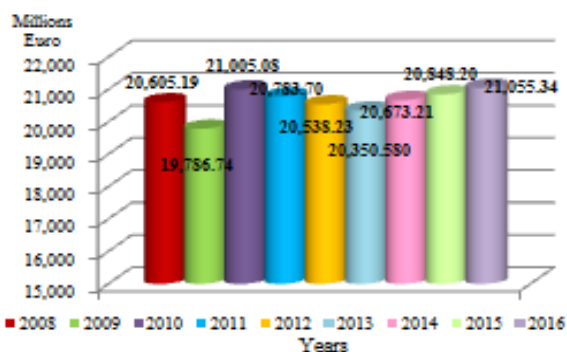


Fig. 2. The dynamics of the production value for flowers and ornamental plants in the period 2008-2016, in the EU, at producer prices

Source: [13]

In the European Union, the production value increased by 2.2% in 2016 compared to 2008 (Table 2, Figure 2).

It is noticed that this increase is starting from 2013. The highest value was recorded in 2016 (21,055.34 million Euros), and the lowest in 2009 (19,786.74 million Euros).

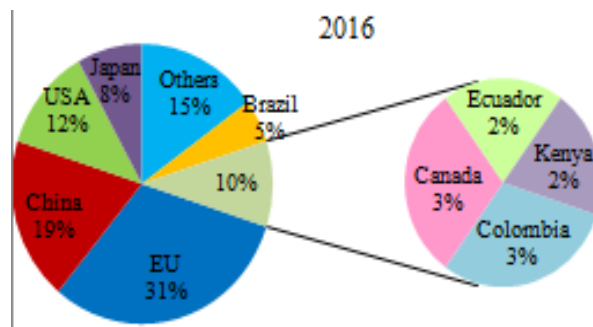


Fig. 3. The share of the value of production of flowers and plants worldwide (%)

Source: AIPH [16]

The European Union is the largest producer of flowers and ornamental plants in 2016, with a share of 31% of the total world production value (Figure 3).

In this ranking of production values are also ranked on the first positions: China (19%) and the USA (12%).

Selling prices of flowers during 2015-2016 varied from country to country depending on the species (Table 3). Overall, there was an increase in prices in 2016 compared to 2015.

For *Roses*, the highest selling price was recorded in France (72.80 Euro / 100 pcs, in 2015) and the lowest price was registered in Portugal (23.96 Euro / 100 pcs, in 2015). For the second category of flowers analyzed,

*Carnations*, Latvia recorded the highest selling price (56.88 Euro / 100 pcs, in 2016) and the lowest price in Portugal (9.25 Euro / 100 pcs, in 2016).

For the *Chrysanthemums* category, the highest selling price was recorded in Latvia (72.93 Euro / 100 units, in 2016) and the lowest in Holland (27.00 Euro / 100 units, in 2015).

The *Gladioli* category recorded the highest selling price in France (88.30 Euro / 100 pcs, in 2016) and the lowest price in Hungary (15.11 Euro / 100 pcs, in 2015) and for the *Tulips* the highest price was recorded in France (112.70 Euro / 100 pcs, in 2016) and the lowest in Holland (14.01 Euro / 100 pcs, in 2016).

Table 3. The selling price of some floral species in some European Union countries (Euro/100 pcs)

Specification	2015					2016				
	<i>Roses</i>	<i>Carnations</i>	<i>Chrysanthemums</i>	<i>Gladioli</i>	<i>Tulips</i>	<i>Roses</i>	<i>Carnations</i>	<i>Chrysanthemums</i>	<i>Gladioli</i>	<i>Tulips</i>
Belgium	29.04	21.47	36.59	28.39	18.83	31.19	21.17	33.98	29.65	16.82
France	72.80	39.30	29.80	73.60	89.40	72.60	47.20	33.40	88.30	112.70
Latvia	59.59	55.42	72.61	31.78	31.78	65.12	56.88	72.93	32.83	35.38
Hungary	42.05	13.07	46.52	15.11	24.13	44.83	13.92	49.31	15.14	18.54
Netherlands	38.23	19.00	27.00	16.00	15.65	39.47	20.00	28.00	17.00	14.01
Portugal	23.96	9.52	34.43	34.40	29.62	27.89	9.25	33.77	44.74	31.04
Romania	41.17	32.39	51.51	40.72	41.84	49.22	35.41	49.88	39.64	42.76

Source: Eurostat [14]

For more transparency, in order to boost trade and reduce bureaucracy, the EU has eliminated the marketing standard for live plants.

Under the Single Market Organization (CMO) Regulation, the Commission is authorized to establish, before the marketing period, the minimum prices for exports to third party countries of bulbs, tubers, corms, rhizomes (code NC060110). These products may subsequently be exported at a price greater than or equal to the price originally established [13].

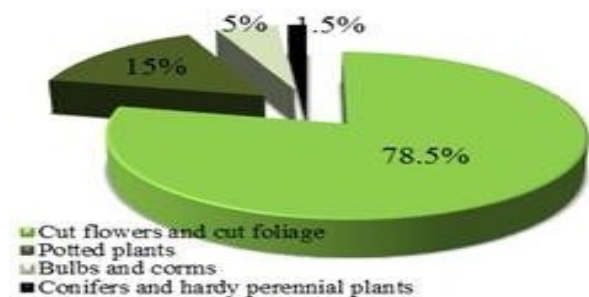


Fig. 4. Imports of EU floriculture products in 2016 (%)

Source: [13]

In 2016 the value of imports of floriculture products at EU level was 1,689,506 thousand Euro (Figure 4).

According to some studies, in 2016 there was a 0.3% increase in the value of imports of EU floral products compared to 2015. It was observed that the largest increase was registered in the category *Cut flowers and cut foliage* imports (5.3%) [13]. At the level of 2016 the largest share in the imports of floral products was *Cut flowers and cut foliage* (78.5%). In terms of value, imports of *Cut flowers and foliage* in 2016 were 1,325,222,000 Euros. Also in 2016, the other categories of floral products recorded the following values: *Potted plants* 15% (254,169 thousand Euro); *Bulbs and corms* 5% (84,515 thousand Euro) and *Conifers and hardy perennial plants* 1.5% (25,599 thousand Euro).

The main countries where the EU imports floriculture products are: Kenya (27.5%); Ethiopia (11.1%) and Ecuador (11.1%) (Figure 5). For the period 2008-2016, there is an increase in imports (especially *Cut flowers*)

from: Kenya; Ethiopia; Ecuador; Colombia and the USA. From the data presented, there is also a decrease in imports from Israel, Costa Rica and China [13].

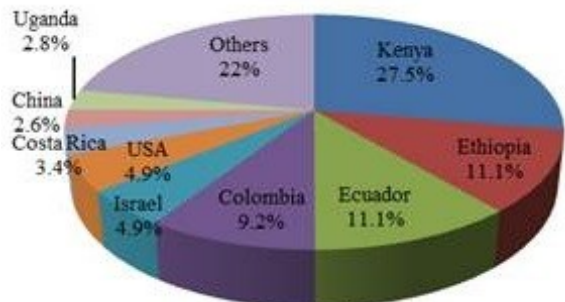


Fig. 5. Provenance of EU imports of floriculture products (%)  
Source: [13]

The imports of *Cut flowers* of the EU in 2016 are made up of: 84% *Roses* (5,593,591,629 pieces); 14% *Carnations* (902,620,188 pieces) and 2% other floral species: *Orchids*, *Chrysanthemums*, *Lilies*, *Gladioli* (156,996,408 pieces) (Figure 6).

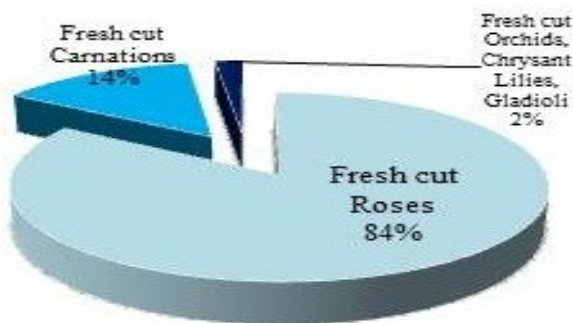


Fig. 6. The main floral species imported by the EU in 2016 (%)  
Source: [13]

The main countries importing floriculture products from the EU are Germany (29.7%), UK (12.7%) and France (13%) [13].

As far as the EU exports of floriculture products are concerned, in 2016 they reached the value of 2,025,486 thousand Euro. The category *Cut flowers and cut foliage* accounted for 33.4% of the total exports, namely 677,114 thousand Euro. Also in 2016, the other categories recorded the following values: *Potted plants* 552,066 thousand Euro (27.3%); *Bulbs and corms* 538,990 thousand

Euro (26.6%) and the lowest value of exports was recorded for the category *Conifers and perennial plants* 257,316 thousand Euros, having a weight of 12.7% (Figure 7).

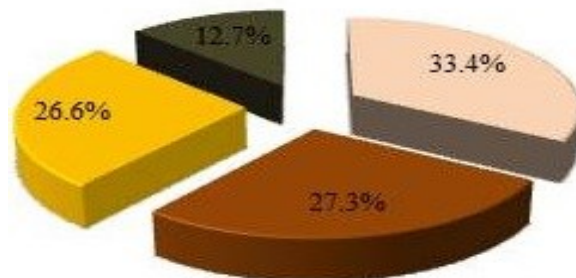


Fig. 7. Exports of EU floriculture products in 2016 (%)  
Source: [13]

The official statistical data showed that in 2016 there was a 2.1% increase in exports of floricultural products compared to 2015. This increase was registered for all categories of exported floral products except for the *Cut flowers and cut foliage* category where exports remain at the same level as in 2015 [13].

The main EU partners in 2016 for exports of floriculture products are Switzerland (21.7% of total exports), Russian Federation (18.5% of total exports) and USA (12.3% of total exports) (Figure 8).

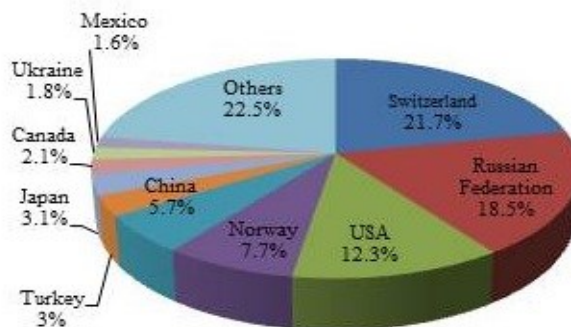


Fig. 8. Destination of EU exports of floriculture products (%)  
Source: [13]

In general, value exports increased to most partner countries, but there were two exceptions: the Russian Federation (-8%) and Ukraine (-11%). For the *Cut flowers and cut foliage* category there was an increase in exports to the USA and a decrease to: Ukraine, Russia and China [13].



The main flowers exported by the EU in 2016 belong to the following categories: *Chrysanthemums* 49% (291,315,825 pieces), *Roses* 40% (235,661,803 pieces), *Carnations* 7% (43,215,754 pieces), *Lilies* 3% (16,687,900 pieces) and 1% *Orchid* (5,271,501) (Figure 9).

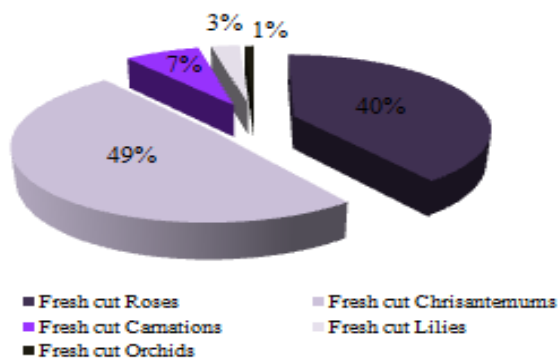


Fig. 9. Main floral species exported by the EU in 2016 (%)

Source: [13]

Analyzing the collected data, we notice that the floral species mentioned above recorded increases during the period 2009-2014, the highest share for this period being for *Roses*. Since 2014 there have been decreases for all the floral species, the most pronounced being for *Roses* (which have lost their first position in the list of the most exported flowers) and *Chrysanthemums* [13].

The exports of cut flowers between EU member states are dominated by *Fresh Cut Roses*, which represents 66% of the exports, that means 3,232,896,356 pieces (Figure 10).

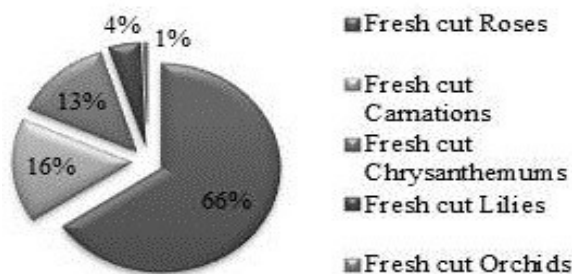


Fig. 10. Main floral species exported in the EU in 2016 (%)

Source: [13]

Followed by *Fresh Cut Carnations* 16% (794,960,290 pieces), *Fresh cut Chrysanthemums* 13% (659,780,051 pieces),

*Fresh cut Lilies* 4% (207,208,927 pcs) and *Fresh cut Orchids* 1% (33,048,998 pcs.). The main countries exporting floriculture products in the EU are the Netherlands (67.1%), Germany (8.4%) and Italy (6.6%) [13].

The EU trade balance for flowers and floriculture products is positive from 2002 until now. From the balance analysis it is revealed a net trade surplus for live plants and for floriculture products.

**Sketch on the symbolic values of the most traded species: *Roses*, *Carnations*, *Lilies*, *Chrysanthemums*, *Orchids* and *Gladioli***

#### Etymology

**Rose** comes from Latin *rosa* and means pink or red in some European languages. The Romanian word *trandafir* comes from ngr. *Triandáfyllon* (Scriban) [23] and etimologically mean *thirty-leaves*.

**Carnation** probably comes from Italian dialectal *carnagione* (flesh color) from Late Latin *carnationem* [3]. Carnations were mentioned in Greek literature 2,000 years ago. *Dianthus* was coined by Greek botanist Theophrastus, and is derived from the Greek words for divine *dio* and for flower *anthos*. Some scholars believe that the name carnation comes from coronation or corone (flower garlands), as it was one of the flowers used in Greek ceremonial crowns. Others think the name stems from the Latin *carnis* (flesh), which refers to the original color of the flower, or incarnation of God made flesh.

In Romanian, the word for carnation is *garioafa* and one of its roots is ngr. *garófalon*, it is also surnamed “flower of royalty”.

**Lily** - Old English *lilie*, from Latin *lilia*, plural of *lilium*, cognate with Greek *leirion*. In Romanian, the word for lily is *crin* from ngr. *κρίνον* (DER 1958-1966)[6].

**Chrysanthemum** - Latin *chrysanthemum*, Greek *khrysanthemon*, literally golden (*khrysos*) flower (*anthemon*) [4], has similar word in Romanian *crizantemă*.

**Orchid** gets its name from the Greek *orkhis* (genitive *orkheos*) literally *testicle* [21], from the appearance of subterranean tuberosities of the genus *Orchis*. The word *orchis* was first used by Theophrastus in his *The natural history of*

*plants* [20]. It has a similar word and etymology in Romanian, *orhidee*.

***Gladiolus*** comes from Latin *gladiolus wild iris, sword-lily*, literally *small sword*, diminutive of *gladius sword* (see *gladiator*); the plant as called so by Pliny in reference to its sword-shaped leaves. It has a similar word and etymology in Romanian, *gladiola* [15].

#### **Symbolism in mythology and religion**

The ***rose*** has long been used as symbol: in the classical civilization and the ancient Middle East, roses were synonymous with beauty, fertility, purity, and were dedicated to Aphrodite (Roman Venus), Muses, Aurora and Dionysus [26]. Following the Christianization of Rome, the Rose symbolized the Virgin Mary and eventually led to the creation of the rosary and other devotional prayers in Christianity [8].

According to a Christian legend, "***Carnations*** first appeared on Earth as Jesus carried the Cross. The Virgin Mary shed tears at Jesus' plight, and Carnations sprang up from where her tears fell" pink Carnation becoming the symbol of a mother's undying love [18].

***Lily*** is mentioned in the Song of Songs (within the biblical Old Testament), which, both in Jewish and Christian tradition, is attributed to have hidden meanings behind the first, literal, meaning: "As the lily among thorns, so is my love among the daughters" (Song of Songs, 2:2). "The words, which apparently speak of the love between Groom and Bride, lead the reader to the mystical meanings of the union between Jahve and his people on the one hand, or between Christ and the Church, on the other hand" [7].

In Greek mythology, the lily was associated with Hera's milk and meant purity and chastity. For Roman Catholics lily symbolizes purity medieval depictions of the Blessed Virgin Mary, especially at the Annunciation, often show her holding these flowers or show them nearby. Meaning purity, the Lily is the symbol of Virgin Mary. Also, the archangel Gabriel and St. Joseph are frequently depicted with lilies [17].

Like in their native countries (China, Japan, Korea) where white ***Chrysanthemums*** symbolizes adversity, lamentation and/or grief, in some European countries

(e.g. France, Belgium, Italy, Spain, Poland, Hungary, Croatia) incurve *Chrysanthemums* symbolize death and are used only for funerals or on graves, while other types carry no such symbolism [5].

#### **Symbolism and / or aesthetic role in art (references in popular art and culture, literature and picture)**

Flowers are a popular subject/ theme/ motive in art, where their natural traits and beauty can get a second, symbolic meaning and their frequency in art makes our next selections extremely poor, risky and unjustly reported to the multitude of masterpieces and artists who had them as muses.

#### ***Literature***

Folklore from European countries gather manifold proverbs relative to flower, rose especially, from which we can selected further few but eloquent. English proverbs: "The rose has its thorn, the peach its worm." "He that plants thorns must never expect to gather roses". French proverbs: "A sow prefers bran to roses." "It is the belief in roses that makes them flourish". German Proverbs: "Love sees roses without thorns." "Not every one may pluck roses." Danish Proverb: "Beauty without virtue is like a rose without scent." Italian Proverb: "Roses fall and thorns remain." Spanish Proverb: "Truths and roses have thorns." Russian Proverb: "If your heart is a rose, then your mouth will speak perfumed words." Hungarian Proverb: "Even the white lily casts a shadow." Romanian Proverbs: "If you lie upon roses when you're young, you'll lie upon thorns when you're old." / "The fairest rose at last is withered."

Flowers are a perennial theme of poetry within a wide range of poems (romantic, comic, celebratory, *carpe diem* etc.) from ancient times up to the present. We quote few lines from "Song of the Rose" by Sappho (640-570 BC), the most prolific lyrical poet of Greek antiquity: "If Zeus chose us a King of the flowers in his mirth, / He would call to the Rose, and would royally crown it; / For the Rose, ho, the Rose! Is the grace of the earth, / is the light of the plants that are growing upon it! [...]"

The greatest writer in the English language and the world's pre-eminent

dramatist, William **Shakespeare** (1564 – 1616), English poet, playwright and actor, is the author of Sonnet 54, which according to Wordsworth, for its merits of thought and language is one of Shakespeare's greatest poems [24], where youth is compared with the rose: “O how much more doth beauty beauteous seem, / By that sweet ornament which truth doth give! / The rose looks fair, but fairer we it deem / for that sweet odour which doth in it live. / The canker-blooms have full as deep a dye / As the perfumed tincture of the roses, / Hang on such thorns and play as wantonly / When summer's breath their masked buds discloses: / But, for their virtue only is their show, / They live unwoo'd and unrespected fade, / Die to themselves. Sweet Roses do not so; / Of their sweet deaths are sweetest odours made: / And so of you, beauteous and lovely youth, / When that shall fade, my verse distills your truth.” Another sonnet which appeal to lilies for the final antithesis is Sonnet 94, approached as the type and model of a detached observation on human nature or as portrait of the youth - potentially fickle and ready to abandon the pledges he has made, a beauteous flower, but corrupted at the core: “For sweetest things turn sourest by their deeds; / Lilies that fester, smell far worse than weeds.” [25]

Our last quote keeps *The Lover Tells of the Rose in His Heart* of W.B. Yeats (1865 – 1939), Irish poet and playwright, Nobel Prize laureate in 1923: “All things uncomely and broken, all things worn out and old, / The cry of a child by the roadway, the creak of a lumbering cart, / The heavy steps of the ploughman, splashing the wintry mould, / Are wronging your image that blossoms a rose in the deeps of my heart. / The wrong of unshapely things is a wrong too great to be told; / I hunger to build them anew and sit on a green knoll apart, / With the earth and the sky and the water, re-made, like a casket of gold / For my dreams of your image that blossoms a rose in the deeps of my heart” [27].

### **Painting**

Flowers are a favourite subject in still life (that type of painting or drawing of an arrangement of objects that do not move, such as flowers, fruit, bowls etc.) and also they can

belong to another types of compositions. We can mention here only the famous tradition of the Flemish and Dutch flower painters Brueghel, Ruysch, van Huysum, de Heem and their heir Pierre-Joseph Redouté (1759 – 1840, the painter and famous botanical illustrator of all time [22]), most valued European painters in various traditions with remarkable flowers-paintings (Monet, Renoir, Van Gogh) and also the Romanian Stefan Luchian (1868-1916, who developed his studies in universities from Bucharest, München and Paris), surnamed “the painter of flowers”.

Still, due to our topic, we focus only on one representative work: *Bunch of flower* by Jan Brueghel the Old, painting belonging to the Romanian National Art Museum, also the biggest and most complex bunch of this painter and a model for still nature for the disciples – as it has a symbolic meaning according to the art critics from this museum while being a true visual encyclopedia.



Photo 1. Bouchet of flowers, Jan Brueghel the Old (Bruxelles, 1568 - Anvers, 1625).

Flemish School, oil on wood, 162 x 132 cm

Source: [2]

Critics note that among the dozens of species and varieties of flowers there are hiding about 20 types of insects. The blooming or died-up flowers and the caterpillars that metamorphose in chrysalides and then in butterflies measure the passage of time and suggest the cyclical character of life, the painting thus becoming a meditation on the

fragility and ephemeral character of beauty and life, but also on the divine nature of art. Only the buzz of the fly from the edge of the bowl seems to interrupt this meditation [2].

**Floriography**

Flower language is a mean of communication achieved by the cryptologic use of a flower or floral arrangement. For hundreds of years, the method has been practiced in traditional cultures in Europe, Asia and the Middle East. Flowers have been given secret meanings, inspired by mythology, folklore, religion and historical events. Over time, the study of the significance of flowers has become a true science, called, in the Victorian era, floriography. Lady Mary Wortley Montagu (1689-1762) introduced floriography in British culture and it was popularized in France during 1810-1850, in Britain during the Victorian era (ca. 1820-1880) and in the United States between 1830 - 1850. Thus, messages could also be transmitted by offering a small floral bouquet called *nosegay* worn in an accessory (tussie-mussie holder), attached with a chain to the wrist. Carrying the bouquet meant the acceptance of the message or of the sentiment thus transmitted [19] (selective synthesis by the cited reference).

Each flower had its own significance, dictated by its variety, color, location, as a self-standing flower / nosegay / bouquet, and the arrangement and order added details (see the angles in which the flowers were placed), including their wearing in the hair, or on the corset transmitted decodable signals. The one who sent them could court, reject a candidate, and express positive or negative feelings [9]. “A bunch tied with a ribbon to the right indicates that the flowers were saying something about the sender, and the ribbon on the left said the meaning was valid for the receiver. A reversed strain suggested that the opposite meaning was intended. The elimination of the thorns said *Hope to all*, the removal of the leaves meant *Fear of all*” [10]. Due to many European thematic dictionaries published in that period, the symbolism attributed to each flower was not perfectly unitary, but there were interpretations and associations that conveyed the same idea: lily

- purity; chrysanthemum - joy, wealth, wonderful friend; carnation - love, affection, fascination, health; gladiolus - love at first glance; strength of character; generosity; orchids - love, beauty, refinement [11].

Table 4. The romantic language of flowers (Davies Gill, Saunders Gill, 2013)

COLOR/ FLOWER	LILY	CHRYSAN- THEMUM	CARNA- TION	ROSE
white	virginity, purity, greatness, “it is heavenly to be with you	truth	sweet and cute; innocence; pure love; lucky-gift for a woman	eternal love; innocence; heavenly; secret and silence white and red rose: together, unity
yellow	“Floating with happiness”; false; joyful	fugacious love, neglected love	„you disappointed me”; rejection, despise	friendship; jealousy
orange	Hate	-	-	-
pink	-	-	„I shall never forget you”	perfect happiness: “please, believe me”
red	-	„I love you”	“you make my feelings to suffer”; admiration capricious mood, fantasy	„I love you”
purple	-	-	-	-
dark color	-	-	„yes”	Black rose- death, black magic

Source: own processing based on reference [19]

**CONCLUSIONS**

Generally, when a person gives flowers to another, the gesture itself indicates affection, attention, sympathy, friendship or love. Moreover, the flowers also means color, perfume and, for the initiates, symbols. The initiation in the cultural meaning of flowers (within a particular culture) allows extra value to the floral gift and / or allows inter-human dialogue to be richer in meaning, although possibly lacking in words -“say it with flowers”: „There is no colour, no flower... that has not a verse belonging to it; and you may quarrel, reproach, or send letters of passion, friendship, or civility, or even of news, without ever inking your fingers.” (Lady Mary Wortley, 1817) [19].

Following the analysis of the flower market at the EU level for the 2008-2016 period, the following were noted:

The European Union is the world's largest producer of flowers and ornamental plants in 2016 (31% of total value), followed by China (19%) and the USA (12%);



The value of production increased by 2.2% in 2016 compared to 2008. The highest value was registered in 2016 (21,055.34 million Euros) and the lowest in 2009 (19,786.74 million Euros);

The main flower and ornamental plants producing countries in the European Union are: The Netherlands, France, Italy, Germany and Spain;

The largest area cultivated with flowers and ornamental plants in the EU is in the Netherlands and in 2016 accounted for 37% of the total EU surface area. In 2016, the Netherlands cultivated 32.63 thousand ha with flowers and ornamental plants. Other cultivating countries are France (8.88 thousand ha in 2016) and Italy (8.78 thousand ha in 2016), representing each 10% of the total EU;

Flower prices varied over the analyzed period for all flower categories;

The highest price was recorded in France for the categories *Roses*, *Gladioli* and *Tulips* and in Latvia *Carnations* and *Chrysanthemums*;

The biggest share in the imports of floral products have the *Cut flowers and foliage* 78.5% (1,325,222 thousand Euro) in 2016;

The main countries from where the EU imports floriculture products are: Kenya (27.5%); Ethiopia (11.1%) and Ecuador (11.1%);

For the analyzed period there is an increase in imports (especially *Cut flowers*) from: Kenya, Ethiopia, Ecuador, Colombia and the USA;

Mainly, in 2016, the EU imported floriculture products from the *Cut flowers* category: *Roses* (84%, 5,593,591,629 pieces);

The exports of floriculture products in 2016 amounted to 2,025,486,000 Euro;

*Cut flowers and foliage* represented 33.4% of the EU exports of floriculture products, meaning 677,114,000 Euro, in 2016;

EU partners for export of floriculture products are: Switzerland (21.7% of exports), Russian Federation (18.5%) and USA (12.3%). Recorded export values in 2016 increased, except for the exports to Russia (-8%) and Ukraine (-11%);

*Chrysanthemums* represent 47% of the EU's "cut flowers" exports in 2016;

From 2002 until now the commercial balance for floriculture products is positive.

## REFERENCES

- [1]Aalsmeer's Flower market/Piata de flori din Aalsmeer (original title in Romanian language), <https://www.gazetadeagricultura.info/flori/2253-piata-de-flori-din-aalsmeer.html>
- [2]Brueghel, Jan the Old, Bunch of Flowers / Buchet de flori (original text in Romanian language), [http://www.mnar.arts.ro/index.php?option=com\\_content&view=article&id=76&catid=76&Itemid=181](http://www.mnar.arts.ro/index.php?option=com_content&view=article&id=76&catid=76&Itemid=181), Accessed on March 12, 2018
- [3]Carnation, Online Etymology Dictionary, <https://www.etymonline.com/word/carnation>, accessed on March 10, 2018
- [4]Chrysanthemum, Online Etymology Dictionary, <https://www.etymonline.com/word/chrysanthemum>, Accessed on March 10, 2018;
- [5]Chrysanthemum, Wikipedia, <https://en.wikipedia.org/wiki/Chrysanthemum>, Accessed on March 10, 2018
- [6]Ciorănescu, A., 1958-1966, The Romanian etymological dictionary / Dicționarul etimologic român(original title in Romanian language), Publishig House: Universidad de la Laguna, Tenerife
- [7] Carstoiu, J, 2014, Allegorical Interpretation of Song of Songs in Jewish Tradition and Christian Tradition/ Interpretarea alegorica a Cantarii Cantarilor in traditia iudaica si in traditia crestina(original title in Romanian language), <https://www.crestinortodox.ro/religie/interpretarea-alegorica-cantarii-cantarilor-traditia-iudaica-in-traditia-crestina-69436.html>, accessed on March 11, 2018
- [8]Cucciniello, Lisa, 2008, Rose to Rosary: The Flower of Venus in Catholicism, in *Rose Lore: Essays in Semiotics and Cultural History*, ed. Frankie Hutton: Lexington Books, 2008, pp. 64-67 from [https://en.wikipedia.org/wiki/Rose\(symbolism\)](https://en.wikipedia.org/wiki/Rose(symbolism)), Accessed on March 11, 2018
- [9]Davies Gill, Saunders Gill, 2013, The romantic language of flowers / Limbajul romantic al florilor (for this paper we used the Romanian version of the book), București, Publishing House: Rao, p.7.
- [10]Davies Gill, Saunders Gill, 2013, The romantic language of flowers / Limbajul romantic al florilor (for this paper we used the Romanian version of the book), București, Publishing House: Rao, p.8
- [11] Davies Gill, Saunders Gill, 2013, The romantic language of flowers / Limbajul romantic al florilor (for this paper we used the Romanian version of the book), București, Publishing House: Rao, p.124-127.
- [12]Dinu Toma Adrian, Vlad Ionela Mituko and Stoian Elena, 2015, Selling flowers in Romania, *Journal of Eastern Europe Research in Business & Economics*, Vol. 2015 (2015), 11 p.
- [13]European Commission / Agriculture and rural development,[https://ec.europa.eu/agriculture/index\\_en](https://ec.europa.eu/agriculture/index_en), Accessed on 15.03.2018

[14]Eurostat Data explorer, <http://ec.europa.eu/eurostat/data/database>, Accessed on 16.03.2018

[15] Gladiolus, Wiktionary, <https://en.wiktionary.org/wiki/gladiolus>, Accessed on March 10, 2018

[16]International Association of Horticultural Producers (AIPH), [www.aiph.org](http://www.aiph.org), Accessed on 15.03.2018

[17]Lilium, Wikipedia, <https://en.wikipedia.org/wiki/Lilium>, Accessed on March 10, 2018

[18]Mercatante, A.S., 1976, The magic garden: the myth and folklore of flowers, plants, trees, and herbs, Harper & Row, p. 9, ISBN 0-06-065562-3 and The legend of the carnation, Library notes, Alabama Public Library Service, 1965, p. 6 at [https://en.wikipedia.org/wiki/Dianthus\\_caryophyllus](https://en.wikipedia.org/wiki/Dianthus_caryophyllus), accessed on March 11, 2018

[19]Neagu, C.A., Flower language in the Victorian era / Limbajul florilor in epoca victoriana (original title in Romanian language), <https://www.artantik.info/limbajul-florilor-in-epoca-victoriana/>, Accessed on March 13, 2018

[20]Orchid, New World Encyclopedia, <http://web.newworldencyclopedia.org/entry/Orchid>, Accessed on March 10, 2018

[21]Orchid, Online Etymology Dictionary, <https://www.etymonline.com/word/orchid>, Accessed on March 10, 2018

[22]Redouté Pierre-Joseph, Wikipedia, [https://en.wikipedia.org/wiki/Pierre-Joseph\\_Redout%C3%A9](https://en.wikipedia.org/wiki/Pierre-Joseph_Redout%C3%A9), Accessed on March 12, 2018

[23]Scriban, A., 1939, Dictionary of Romanian Language / Dicționarul limbii românești (original title in Romanian language), Publishig House: Institutul de Arte Grafice „Presa Bună”.

[24]Shakespeare, W., Sonnet 54, <http://www.shakespeare-online.com/sonnets/54.html>, Accessed on March 12, 2018

[25]Shakespeare, W., Sonnet 94, <http://www.shakespeares-sonnets.com/sonnet/94>, Accessed on March 12, 2018

[26]Shepherd, Rowena & Rupert, 2007, 1,000 symbols. The significance of forms in art and mythology / 1000 de simboluri. Semnificația formelor în artă și mitologie (for this paper we used the Romanian version of the book), Oradea, Publishig House: Aquila '93, p.7, 261.

[27]Yeats William Butler, The Lover Tells Of The Rose In His Heart, <http://www.online-literature.com/yeats/787/>, Accessed on March 12, 2018.



## THE POTENTIAL OF MOLDOVA'S PRODUCTS ON GLOBAL AGRI-FOOD MARKETS

Liliana CIMPOIES, Cornel COSER

State Agrarian University of Moldova, 44 Mircesti St, Chisinau, Republic of Moldova, Phone: +37322432387 Mobile:+37379295721, Email: l.cimpoies@uasm.md, c.coser@uasm.md

**Corresponding author:** l.cimpoies@uasm.md

### **Abstract**

*Competitiveness is regarded as the main source of export development on international markets. For Moldova, agri-food products are main exports commodities and represent about 45% in total amount of exported merchandises. In this paper we analyze the Moldova's agri-food sector. The goal is to analyze the potential of Moldavian commodities on global agri-food markets and to assess the level of trade specialization. For research analysis data from the National Bureau of Statistics was used. The data analyzes the four sections of products and the 24 groups of commodities HS 2012 (belonging to agri-food products). The period researched is referred to the years 2001-2016. The assessment of trade advantages is carried out through the index of international specialization (RTA index). The results will allow to reveal the commodities with highest advantages for exports, to consolidate and improve Moldova's situation on global agri-food markets.*

**Key words:** agri-food products; specialization; trade.

### **INTRODUCTION**

The intensity of global trade flows had increased during the last decades. Still, the position of important exporters and producers belong to developed countries. Often they are also net exporters/producers. In the same time, the economies in developing countries had improved and allowed many of them to specialize and to gain important position among the main exporters of agri-food products [7]. For best profitability, buyers/importers tend to buy from the markets with best price for products on the marketplace. The exporters also will consider the market that offers the most advantageous price for products [1].

Competitiveness is regarded as a key issue on global markets and the main source for country's export development. The ability for a country to use the most efficient its resources in the agricultural sector allows it to fully benefit from comparative advantage on global agricultural markets [9].

The specialization of exports focuses primarily on important dynamic chapters in global markets. In order to take advantage from specialization and avoid some

vulnerabilities that may arise and cause the loss of market share is important to increase the customers of domestic products and to diversify on markets with potential for exports [5].

The goal of the given research is to appreciate Moldova's situation with agricultural and food products on global markets, considering the foreign trade activity as the main indicator. This research focuses on the assessment of relative trade advantages through an international specialization index. The tendencies and changes that took place in agricultural and food trade structure and their territorial distribution is appreciated.

### **MATERIALS AND METHODS**

The research is based on secondary data from the National Bureau of Statistics. The paper examines the changes in Moldova's agricultural and food trade commodities both in their structure and territorial distribution. The period considered for analysis belongs to 2001-2016. For the structural changes analysis of agricultural and food trade commodities the international nomenclature for the classification of products Harmonized

Sections (HS) in two digits (4 sections and 24 chapters referred to agricultural and food products). The agri-food products are separated into two parts: agricultural products (01-15) and foodstuffs (16-24).

The given research analysis appreciates Moldova's specialization in agricultural and food products in relation to main trade partners: European Union (EU) and the Commonwealth of Independent States (CIS) countries. The analysis is based on the results of Relative Trade Advantages (RTA) index.

Relative Trade Advantage (RTA) index was developed and introduced by Vollrath (1991) and is calculated as "the difference between relative export advantage (RXA) and relative import advantage (RMA)" [5]:

$$RTA = RXA - RMA \quad (1)$$

where,

$$RXA = B = (X_{ij}/X_{it})/(X_{nj}/X_{nt}); \quad (2)$$

$$RMA = (M_{ij}/M_{it})/(M_{nj}/M_{nt}); \quad (3)$$

Where M represents import,  $i$  – a country;  $j$  – a commodity;  $t$  – a set of commodities;  $n$  – a set of countries [8].

The values over zero of the RTA index refers to country's comparative trade advantages, while negative values indicates the existence of comparative trade disadvantages. When the RTA index registers values over zero, then for the sector a comparative advantage is revealed, which suppose that this sector is relatively more specialized and competitive in terms of trade.

## RESULTS AND DISCUSSIONS

In Moldova, agriculture and food industry has a particular importance in national economy. This fact is determined by the high share that the agricultural sector and food industry maintain in the Gross Domestic Product (GDP) (about 35%). Also, agricultural products and foodstuffs represent Moldova's major export commodities in total amount of exported goods (about 45%). According to the data from the National Bureau of Statistics, over 30% of active population is employed in the agricultural sector and almost 50% lives in rural areas (NBS, 2016).

Considering that agri-food commodities still have a large share in exports over the 2001-2016, a decreasing trend is observed. This diminishing tendency had influenced also the agri-food trade balance, so far maintained positive (Figure 1). Analyzing the dynamics in Moldova's foreign trade activity, during 2001-2016, an increasing tendency in both exports and imports is observed. The value of exports and both had increased, but the overall trade balance persist negative (mainly due to high imports of energy and gas resources).

Analyzing the trend and changes in agri-food trade flows dynamics is observed an increasing

tendency in agri-food exports value from 356,857 thousand USD in 2001 to 2,044,611 thousands USD in 2016. During 2006-2007 a more remarkable decrease in agri-food exports occurred. This decrease was the result of Russia's applied sanctions on Moldavian alcoholic drinks. Until 2007 C.I.S. countries were the main trading partners for Moldova's exports and the Russian market was the main destination for many Moldavian agricultural products. The first interdiction applied as well as the following embargoes determined the reorientation to other markets, particularly the European Union countries [2]. Thus the territorial distribution of agri-food trade flows experienced serious changes after 2006. (Figure 2, 3).

Due to the above mentioned facts, since 2007 changes in the global distribution of Moldova's trade flows occurred. Thus closer collaboration with E.U. market prevails among other trade partners. Some precondition for this accentuated increase in trade flows with E.U. market was generated by several trade facilities negotiated. First facilities in 2006 were obtained with E.U. market under General System of Preferences (GSP) and General System of Preferences plus (GSP+), followed by the Autonomous Trade Preferences (ATP) in 2008. Under these facilities were allowed preferences for some agricultural and food commodities.

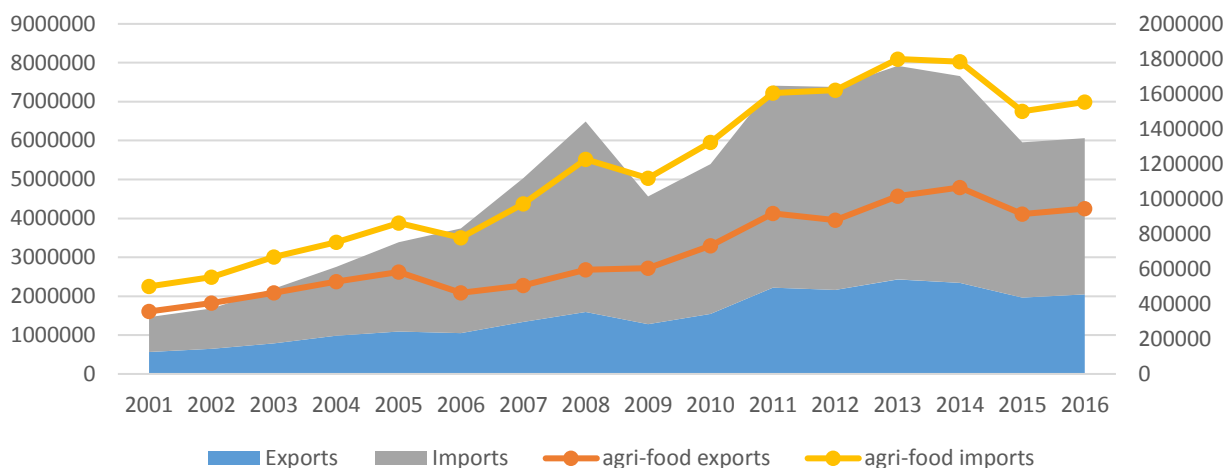


Fig. 1. Dynamics of Moldova's foreign trade, 2001-2016  
 Source: own calculations based on the data from [6].

Among them were the alcoholic drinks, sugar and some agricultural products [4]. The decision of Moldova to sign the Deep and Comprehensive Free Trade Agreement (DCFTA) with E.U. in 2013 generated more interdictions from Russian Federation on wine exports. Nevertheless, since 2014 Moldova signed the DCFTA with E.U. that suppose a higher degree of mutual trade liberalization and benefit local exporters with the possibilities to access a large and developed market [3].

Nevertheless the access to this developed and competitive market imposes serious barriers to trade for local producers. This is particularly affecting trade due to quality and food safety requirements on the E.U. market. Thus, for fully benefitting from the obtained facilities is required a boost in the competitiveness of the traded agri-food commodities.

The agri-food commodities exports on the European market increased considerably by eight times during the referred time series (from 62,425 thousands USD in 2001 to 537,857 thousands USD in 2016). In the same time, the agri-food exports to CIS countries decreased during 2011-2016 with 40% (from 276,255 thousands USD to 173,891 thousands USD). The agri-food trade flows related to other countries (particularly OECD) also increased (Figure 2).

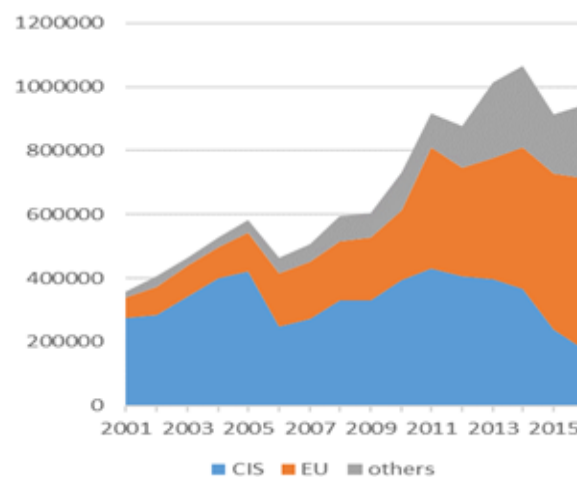


Fig. 2. Structure of agri-food exports territorial distribution, 2001-2016  
 Source: own calculation.

Close trade relations are maintained with Romania on the European market, also being the main trade partner among E.U. countries. Other important trade partners on the E.U. market are Italy, United Kingdom, Germany, Poland, France, Greece and Austria. These countries concentrate the majority of agri-food exports flows (over 80%).

The situation of agri-food products trade flows also registered a boost during the analyzed time series. In 2001-2016 the imports of agri-food commodities from European markets increased from 69,980 to 249,848 thousands USD. From C.I.S. markets the imports of agricultural and food products also increased from 27,698 to 247,842 thousands USD (Figure 3).

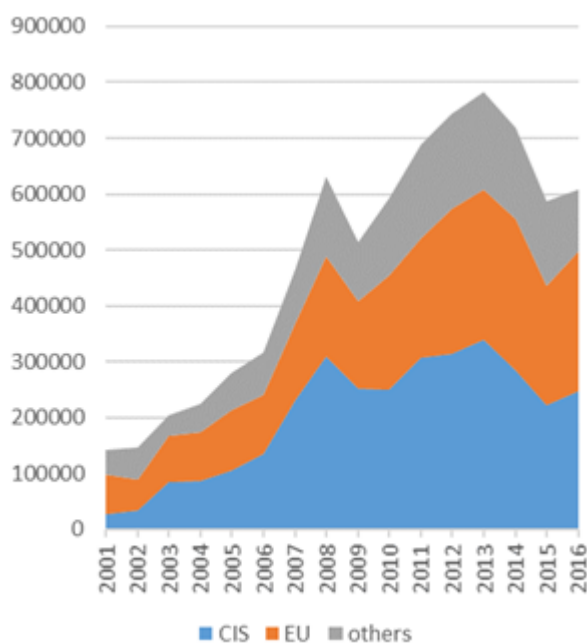


Fig. 3. Structure of agri-food imports territorial distribution, 2001-2016  
 Source: own calculations.

From the structure of traded agri-food sections, both for exports and imports, the largest share belongs to prepared foodstuffs, beverages, spirits and tobacco (more than half in the share of agri-food exports but also a considerable large share in imports). A smaller but still considerable share is maintained by the section of vegetable products (particularly at export). Smaller shares belong to animal or vegetable fats and oils and live animals (Figure 4).

Among the main exported agricultural and food commodities on the leader position are situated HS22 – Beverages, spirits and vinegar, followed by HS08 – Edible fruits and nuts; HS12-Oil seeds and oleaginous fruits and HS10 - Cereals (Figure 5). Together they have a share on 68% in Moldova’s agri-food exports.

Concerning the structure of Moldova’s agri-food imports, it includes a diverse number of commodities but with smaller shares. The top eight imported agri-food commodities concentrate a share of over 50 percent in total agri-food imports. The leader position belongs to HS24 – Tobacco (12%), followed by HS22 – Beverages (9%) and HS21 – miscellaneous edible preparations (8%) (Figure 6).

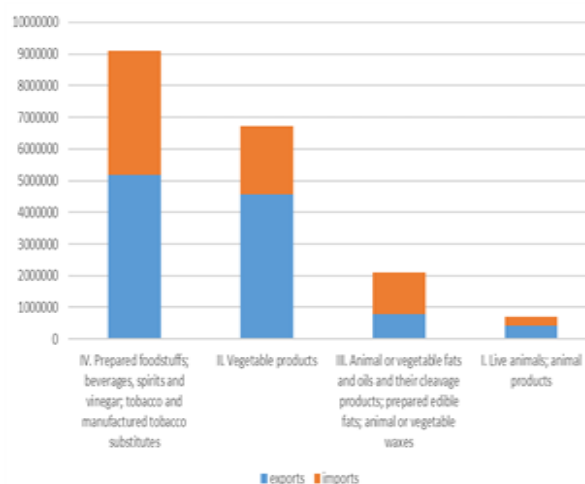


Fig. 4. Structure of agri-food trade, 2001-2016 (average)  
 Source: own calculations

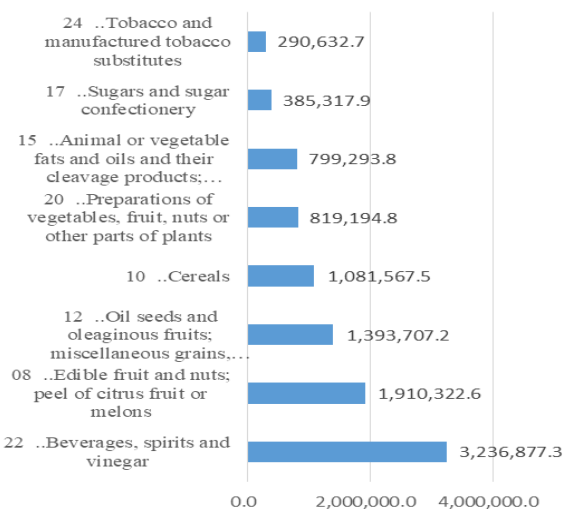


Fig. 5. Structure of the main exported commodities, average 2011-2016  
 Source: own calculations

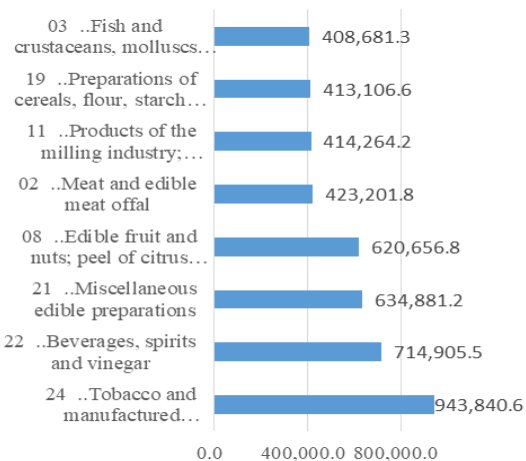


Fig. 6. Structure of the main imported commodities, average 2011-2016  
 Source: own calculations

Specialization of Moldova's trade in agricultural and food commodities was assessed over the long run based on the index of international specialization results (RTA). The results were calculated in relation to European market (E.U. countries) and traditional market (C.I.S. countries) (Figure 7).

Despite the fact that in relation to European markets most groups of products register advantages, a decreasing tendency is persistent after 2010. In 2016 disadvantages for beverages and animal or vegetable fats and oils are observed (Figure 7). The negative values refers to the absence of trade advantages related to the group of beverages and prepared foodstuffs and vegetable or animal fats and oils in the last two years was caused by the increased amounts in imports of these two groups of products.

Concerning the trade relations with traditional markets (C.I.S. countries), for all groups of agri-food products decreasing values and disadvantages are noticed after 2006 (Figure 8). It was mainly due to the restrictions applied to some agri-food commodities since the first Russian embargo. It continued under a period of recession until 2010-2011 when an increase in the RTA index is observed. Particularly after 2011 high trade advantages for the groups of prepared foodstuffs, beverages and tobacco, animal and vegetable fats and oils is observed. The tendency is opposed to the trade relation with European markets.

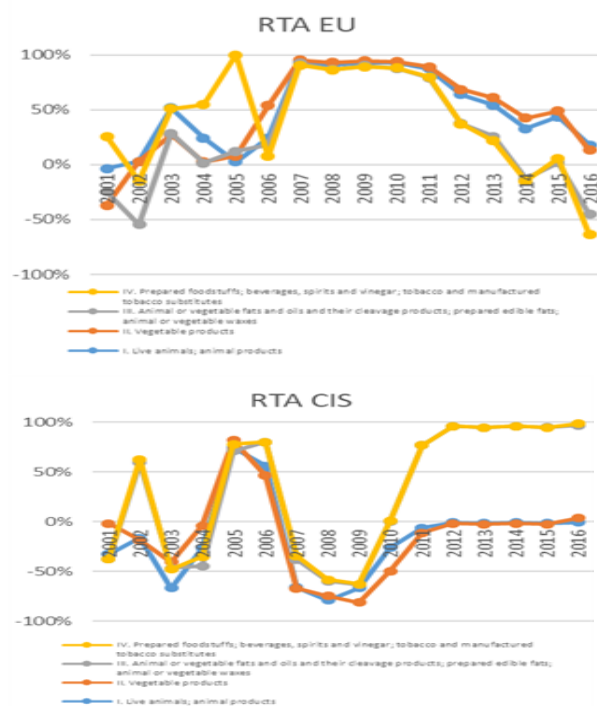


Fig. 7. Results of international specialization index for groups of agricultural and food products in relation to European and CIS market  
Source: own calculations

The results of the index of international specialization on the two markets (EU, CIS) for agricultural products (HS 01-15) and food products (HS 16-24) present contradictory results (Figure 8). The same disadvantages are characteristic for both E.U. and C.I.S. market regarding agricultural products (HS 01-15). For European market total advantages are maintained for food products, while CIS countries present low values and disadvantages, particularly in the recent years.

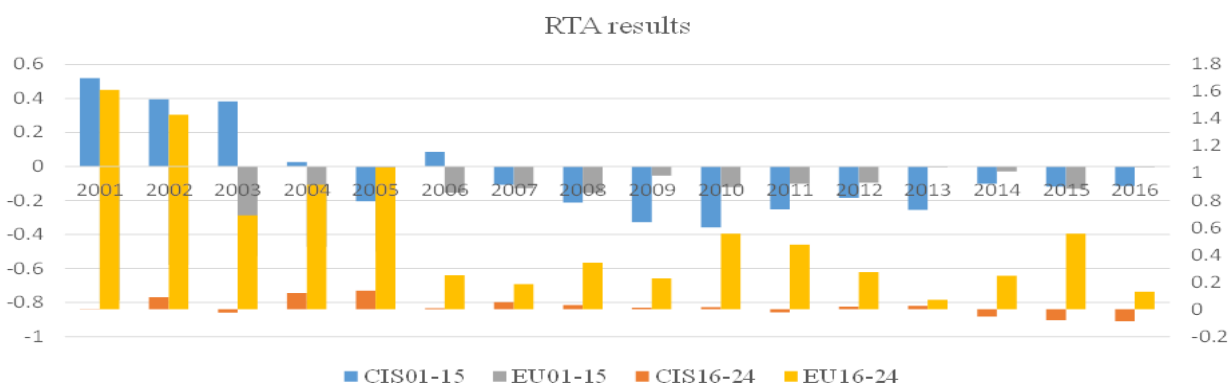


Fig. 8. Results of international specialization index for agricultural and food products in relation to European and CIS market.  
Source: own calculations



## CONCLUSIONS

Important changes regarding the dynamics of the agri-food trade flows were observed during the researched time series. Increasing trade flows for both exports and imports are registered. Also during 2001-2016 important changes are noticed in the structure of traded commodities and territorial distribution on the main trading global markets. In both agri-food exports and imports the leading position is maintained by prepared foodstuffs, beverages, spirits and tobacco. The top exported agri-food products are beverages, edible fruits and nuts, oil seeds and oleaginous fruits and cereals. The imports are more diverse, the largest share belongs to tobacco and beverages.

For both European and C.I.S. market disadvantages are characteristic in relation to agricultural products (HS 01-15). For European market total advantages are maintained for food products, while C.I.S. countries present low values and disadvantages, particularly in the recent years.

In relation to European market most groups of products register advantages, a decreasing tendency is persistent after 2010. In 2016 disadvantages for beverages and animal or vegetable fats and oils are observed.

On the C.I.S. market, for all groups of agri-food products decreasing values and disadvantages are observed. Recent years high trade advantages for the groups of prepared foodstuffs, beverages and tobacco, animal and vegetable fats and oils is observed.

## REFERENCES

- [1] Dinu, T. A., Arghiroiu, G. A., Stoian, E., Darie, O. D., Pătrașcu, G., 2012, The Romanian external trade in sugar and confectionary products. *AgroLife Scientific Journal*, Vol.12(1): pp 202-206.
- [2] Cimpoiș, L., Coser, C., 2017, Intra-industry trade in agricultural and food products: the case of Moldova. *Scientific Papers Series "Management, Economic Engineering in Agriculture and rural development"*, Vol. 17(2): pp 43-50.
- [3] Cimpoiș, L., Sarbu O., 2017, The competitiveness of agricultural and food products of Moldova on the foreign markets: aspects and tendencies. *Agrofor International Journal* vol. 2(3): pp 132-139
- [4] Cimpoiș, L., 2013, Agri-food trade a path to agricultural development of Moldova. *Scientific Papers Series "Management, Economic Engineering in Agriculture and rural development"*, Vol. 13(2): pp 49-56.
- [5] Grande Garcia, M. J., Morales Lopez, J. M., 2015, The agri-food trade in Spain: specialization and international competition. 55th Congress of the European Regional Science Association: "World Renaissance: Changing roles for people and places", Lisbon.
- [6] National Bureau of Statistics, 2016, *Statistical Yearbook of the Republic of Moldova 2016*.
- [7] Popescu, A., 2015, Some considerations on the world agri-food trade and the positions of the EU-28. *Scientific Papers Series "Management, Economic Engineering in Agriculture and rural development"*, Vol. 15(4): pp 247-256.
- [8] Vollrath, T.L., 1991, A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage, *Weltwirtschaftliches Archiv*, Volume 127(2): p.265-280
- [9] Yercan, M., Isikli, E., 2006, International competitiveness of Turkish agriculture: a case for horticultural products. EAAE seminar "Marketing dynamics within the global trading system: new perspectives", Chania, Crete, Greece.

## DETERMINANTS OF THE GROWTH OF EXPORT OF AGRICULTURAL PRODUCTS IN THE REPUBLIC OF MOLDOVA

Maria COJOCARU, Tatiana DIACONU

Moldova State University, 60 Alexe Mateevici, Chisinau, MD 2009, Republic of Moldova,  
 Email: cojocaruum@gmail.com

*Corresponding author:* cojocaruum@gmail.com

### Abstract

*The aim of the research is to identify the determinants of the evolution of the export of agri-food products from the Republic of Moldova. The study has led to the development of a multifactorial econometric model, which can be a useful tool for managers and decision-makers in governmental structures. The various tests performed to assess the quality (validity) of the econometric model obtained lead to important conclusions. Firstly, exports are very vulnerable to exchange rate fluctuations and inflation, uncontrollable factors by business managers. It follows that the state must come with policies to support and protect agricultural producers and food industry.*

**Key words:** export, agri-food products, econometric model, determinative, ANOVA analysis

### INTRODUCTION

Export growth is one of the determinants of a country's economic growth. Export has

become a key factor for generating growth and jobs in agriculture and the food industry [7].

Table 1. Evolution of exports of goods and services from the Republic of Moldova, 1997 – 2016

The year	Total		CIS countries		Russian Federation		European Union countries (EU-28)	
	Thousand USD	Annual % change	Thousand USD	Annual % change	Thousand USD	Annual % change	Thousand USD	Annual % change
1997	8,740,56.5	-	608,307	-	508,778.9	-	185,499.7	-
1998	631,817.3	72.78	428,904.3	70.50	336,827.2	66.20	163,272.8	88.02
1999	463,432.4	73.35	253,640.2	52.14	191,448.4	56.84	177,175.8	108.51
2000	471,465.6	101.73	276,088.2	108.85	209,950.3	109.66	165,280.2	93.28
2001	565,494.9	119.94	344,377.1	124.73	246,971.1	117.63	182,435.3	110.38
2002	643,791.6	113.84	350,421.7	101.75	238,862.8	96.72	231,348	126.81
2003	789,933.6	122.70	423,564.7	120.87	308,413.4	129.12	307,450.6	132.89
2004	985,173.6	124.72	502,422.3	118.62	353,344.2	114.56	400,687	130.32
2005	1,090,919	110.73	55,1227	109.71	347,361	98.31	443,184.4	110.61
2006	1,050,362	96.28	423,646.8	76.85	181,931.8	52.37	536,909.6	121.15
2007	1,340,050	127.58	548,888.6	129.56	232,706.7	127.91	678,929.7	126.45
2008	1,591,113	118.73	622,993.7	113.50	313,691.7	134.80	820,072.1	120.79
2009	1,282,981	80.63	490,415.2	78.72	286,491.6	91.33	667,338.5	81.37
2010	1,541,487	120.15	624,003.2	127.24	403,978.4	141.0	728,938.9	109.23
2011	2,216,815	143.81	919,265	147.32	625,509.4	154.84	1,083,006	148.57
2012	2,161,880	97.52	928,119.5	100.96	655,132	104.73	1,013,418	93.57
2013	2,428,303	112.32	923,219.8	99.47	631,931.5	96.46	1,137,286	112.22
2014	2,339,530	96.34	735,647.7	79.68	423,717.6	67.05	1,245,980	109.56
2015	1,966,837	84.07	492,294.6	66.92	240,648.6	56.79	1,217,587	97.72
2016	2,044,611	103.95	414,185.2	84.13	233,177.4	96.89	1,331,898.5	109.32
Annual Average Index,%	<b>104.61</b>		<b>97.35</b>		<b>95.97</b>		<b>110.93</b>	

Source: Data bank of the National Bureau of Statistics of the Republic of Moldova. [2]

At microeconomic level, this indicator is a criterion for assessing the effectiveness of commercial management.

It is important for the decision-makers in the economic entities, but also for the representatives of the governmental institutions, to have an upward trend.

The implementation of a new model of qualitative economic development in the Republic of Moldova, based on export, investment and innovation is the strategic vision of the National Development Strategy: 8 solutions for economic growth and poverty reduction [5].

Annual reports of the National Bureau of Statistics of the Republic of Moldova on Foreign Trade for the period 1997 - 2016 mention that the exports of goods and services from the Republic have registered a steady annual growth (Table 1).

The average annual increase in exports of goods and services in the Republic of Moldova is 4.61%. An upward trend in exports of agri-food products is also recorded in the European Union. In 2016, exports of agri-food products were estimated at 130.7 billion euro, an increase of 1.7 billion euro (1.3%) compared to 2015 levels. The main agri-food products exported from EU countries, which saw significant increases in 2016, are pork and olive oil. The main markets for the sale of agri-food products produced in the EU are the USA, China, Switzerland, Japan and the Russian Federation. (European Commission, 2015) [3].

EU agricultural exports exhibited a compound annual growth rate of 3.6 %, compared to 2.7 % for the USA (Study, 2016) [6].

Over the analyzed period the geographical area of Moldovan exports underwent major changes (Fig.1). In 1997, most of the exports (about 70%) were directed to the CIS countries, mostly in the Russian Federation (58.21%), and in the EU countries - only 21.2%. By 2016, the situation has reversed: exports to EU countries exceed the share of exports to CIS countries more than 3 times (65.14%). The Russian Federation market is already the main market for export of goods and services. The share of exports to this

country constituted only 11.4% in 2016, decreasing by 46.81 percentage points compared to 1997. Thus, exports to the Russian Federation have a downward trend of about 4% annually.

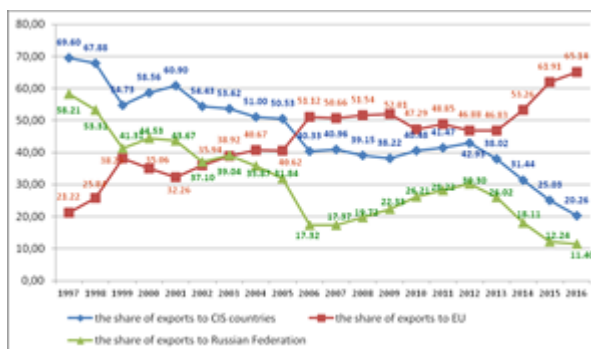


Fig. 1. Main foreign trade partners of Republic of Moldova, %

Source: authors' calculations

The trend of "Europeanization" of the Moldovan export is manifested by an average annual increase of 10.93 %. At the same time there is an average annual decrease of exports in the CIS countries by 2.65%.

Agri-food products have always been the main elements in the structure of exported goods.

In total EU goods exports in 2016, the agri-food sector accounted for 7.5%. (European Commission, 2016) [4].

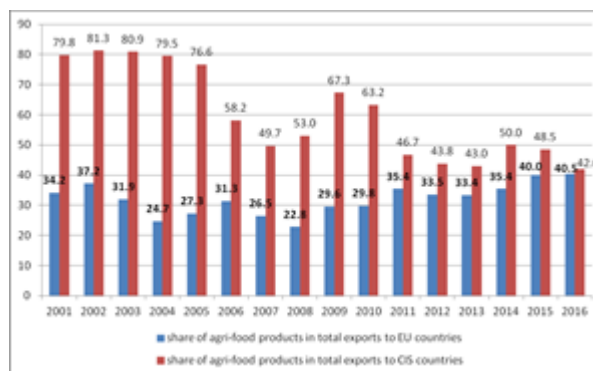


Fig. 2. The share of agri-food products in total exports to EU and CIS countries, %

Source: authors' calculations are in base of data from the National Bureau of Statistics

In the Republic of Moldova, the share of agri-food products in total exports directed to EU countries in the period 2001 - 2016 was between 22.8 - 40.5% (Fig.2).

The highest level was registered in 2016 .

## MATERIALS AND METHODS

The evolution of the export of agri-food products is influenced by a series of internal and external factors, such as: economic, political, financial, climate, etc. In order to give an appreciation to the evolution trend of the export of agri-food products from the Republic of Moldova, data on exports of agri-food products for 2005 - 2016 were collected. The evolution of the export of agri-food products between 2005 and 2016 in the Republic of Moldova has a variable character with a specific tendency which can be expressed using the statistical models. The applied methodology was based on the multifactor linear regression model. By econometric estimations the correlations between the different factors and the dependent variable - the export of agri-food products – is considered to be the representative feature of Moldovan foreign trade. In the given context, we considered it necessary to identify the factors of influence on the evolution of the exports of agri-food products and to make the calculations necessary to justify their inclusion in a multifactorial econometric model for the prognosis of their evolution. Of the many factors considered relevant for the research of the evolution of the export of agri-food products, expressed in Moldovan lei, 9 economic and financial factors were selected at the initial stage. The scientific approach was directed to the following independent factors:

- (a)The value of obtained agricultural production.
- (b)The value of manufactured food production.
- (c)The value of investments in fixed assets (long-term) in the agri-food sector.
- (d)The staff employed in the agri-food sector.
- (e)Price indices of goods and services purchased by agricultural enterprises.
- (f)Consumer food price indices in the domestic market.
- (g)Agricultural sales price indices.
- (h)The exchange rate of the Moldovan leu against the US dollar.
- (i)Annual inflation rate.

The parameters of the econometric model of the evolution of the export of agri-food products were estimated based on the least squares method, using the Regression application in Excel. After processing the 9 factors mentioned above with the corresponding statistical methods and testing them according to a series of criteria (error of approximation ( $\bar{A}$ ), coefficient of elasticity (E) and coefficient of determination ( $R^2$ ), autocorrelation, t-student, test F) only 4 factors have been selected, which determine the given model, which is confirmed by the model quality evaluation tests.

The values of the factors selected and those of the resultant factor (exports of agri-food products) are presented in Table 2.

Table 2. Initial data for the elaboration of the multifactorial econometric model, 2005 - 2016

The year	Export of agri-food products, thousand lei	Consumer food price indices, %	Agricultural sales price indices, in % as compared to the previous year	The exchange rate of the Moldovan leu against the US dollar	Annual inflation rate, %
<i>n</i>	<i>Y</i>	<i>X1</i>	<i>X2</i>	<i>X3</i>	<i>X4</i>
2005	6,506,682	113.7	106	12.6003	11.8
2006	7,652,157	109.1	103	13.1319	12.9
2007	5,622,614	111	139	12.1362	12.1
2008	5,259,276	115.6	86	10.3895	12.9
2009	6,612,428	94.4	82	11.1134	-0.1
2010	7,478,466	105.7	143	12.3663	7.4
2011	8,593,960	108.4	110	11.737	7.6
2012	11,108,136	103.8	118	12.1122	4.6
2013	11,065,728	106.6	78	12.5907	4.6
2014	14,257,047	106.5	107	14.0388	5.1
2015	20,045,882	109.8	123	18.8161	9.7
2016	18,220,321	107.4	97	19.9238	6.4

Source: elaborated by the authors: data from the National Bureau of Statistics ([www.statistica.md](http://www.statistica.md)) and the National Bank of Moldova ([www.bnm.md](http://www.bnm.md)) [2]

The assumptions underlying this model are as follows:

- (i)The export of agri-food products is influenced and depends on the indices of selling prices of agricultural products.
- (ii)The export of agri-food products is influenced and depends on the indices of consumer food prices in the domestic market.
- (iii)The export of agri-food products is influenced and depends on the dollar / leu exchange rate.

(iv) The export of agri-food products is influenced and depends on the annual inflation rate.

To test the four hypotheses of the model, the authors used the statistical analysis tool and the application of the *Data Analysis module in Excel* allowed the elaboration of the multifactorial linear regression model, where the resultant factor is the value of the export of agri-food products ( $Y$ ) and factors ( $x_i$ ) are the four nominees below:

- food consumer price indices ( $x_1$ );
- agricultural sales price indices ( $x_2$ );
- exchange rate MDL / USD ( $x_3$ );
- annual inflation rate ( $x_4$ )

The general form of the multifactor linear regression model is the following:

$$Y = f(\beta, X) + \varepsilon \quad (1)$$

where:  $X = X(X_1, X_2, \dots, X_m)$  - vector of independent variables;

$\beta$  - parameter vector of the regression equation;

$\varepsilon$  - random error (deviation);

$Y$  - dependent factor (variable).

The theoretical model of the multiple regression equation has the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m + \varepsilon \quad (2)$$

$\beta_0$  - the free term, which determines the value of  $Y$ , when the values of all factors (independent variables) are equal to 0.

## RESULTS AND DISCUSSIONS

The results of the statistical regression analysis led to the identification of the multifactorial econometric model expressed by the regression equation (3):

$$Y = -47.809 + 0.403X_1 + 0.01189 X_2 + 1.4526 X_3 - 0.7765 X_4 \quad (3)$$

This model will allow the estimation of the influence of some determinants of the foreign trade dynamics of the agri-food sector as well as the empirical verification framework of the four hypotheses mentioned above. Free model term  $\beta_0 = -47,809$  has a negative value and demonstrates the existence of additional factors that influence the export of agri-food products and whose global impact is negative. Analyzing the coefficients of the estimated regression model (3), we note that three of the four factorial variables exert a positive

influence on the export of agri-food products. In the order of significance level of influence, the most important factor is the exchange rate of the Moldovan leu against the US dollar: an increase with its monetary unit generates an increase of over 1,452.48 million lei of the independent variable. The increase by one percent of the consumer food price index determines an increase in the export of agri-food products by over 403.12 million lei. The increase of the agricultural sales price index leads to a sub-unitary increase of the export, namely to a percentage point in addition to the sales price index we get an increase of 11.83 million lei in the value of the export of agri-food products. At the same time, inflation exerts a negative influence on the dependent variable: the increase in inflation by one percentage point, the value of the export of agri-food products decreases by 776.53 million lei.

Correlation matrix analysis of the export of agri-food products (dependent variable) by the factors included in the model (independent variables -  $x_i$ ) shows that between the factor  $x_3$  (the exchange rate of the Moldovan leu against the US dollar) and export is a direct and very close link (90.5%). A direct connection is also evidenced by the factor  $x_2$  (indices of selling prices of agricultural production), but its intensity is very weak - only 1.8 percent. An indirect link is between the resultant factor and the factors  $x_1$  and  $x_4$ .

The multiple correlation coefficient (*Multiple R*) of 0.9522 indicates that there is a strong link between the export of agri-food products and the analyzed factors of influence.

$$R = \sqrt{1 - \frac{s_e^2}{\sum(y_i - \bar{y})^2}} = \sqrt{1 - \frac{24.95}{267.65}} = 0.9522 \quad (4)$$

$$R^2 = 0.95222 = 0.9068$$

The determinant coefficient (*R-Square*) has a value of 0.907 and expresses that 90.7% of the variation in the export of agri-food products from the Republic of Moldova can be explained by the variables included in the model.

A more objective appraisal provides the adjusted determinant coefficient (*Adjusted R-Square*), the value of which is closer to 1, the more the regression model explains the

behavior of the resultant variable (Y). Its calculation formula is as follows:

$$\bar{R}^2 = 1 - (1 - R^2) \frac{n-1}{n-m-1} \quad (5)$$

$$\bar{R}^2 = 1 - (1 - 0.9068) \frac{12-1}{12-4-1} = 0.854$$

The adjusted value of the determination coefficient shows that 0.854 of the total variation is due to the influence of the independent variables. The value of the approximation error is 1.887993 estimated econometric models, which is an indication that it can be used to make predictions. A model is considered to adjust the time series analyzed if the approximate error of the model is between 5-7% [1]

Analysis of the values of the coefficients of elasticity expresses the percentage change of the value of the export of agri-food products to the 1% change of the independent variable.

$$E_i = b_i \frac{\bar{x}_i}{\bar{y}} \quad (6)$$

Table 3. Elasticity coefficients of the econometric model

Calculation		Description
$E_1 = 0.403 \frac{107.667}{10.2} = 4.253$	$ E_1  > 1$	significant influence
$E_2 = 0.0119 \frac{107.667}{10.2} = 0.125$	$ E_2  < 1$	insignificant influence
$E_3 = 1.453 \frac{13.413}{10.2} = 1.91$	$ E_3  > 1$	significant influence
$E_4 = -0.776 \frac{7.917}{10.2} = -0.603$	$ E_4  < 1$	insignificant influence

Source: Authors' calculations

The data presented in Table 3 shows that the import value is sensitive to the 1% variation in the consumer price index and the exchange rate of the domestic currency against the US dollar. A criterion for assessing the quality of an econometric model is the coefficient of autocorrelation. A model is considered relevant to the forecast in the absence of autocorrelation. Such a situation shows whether the value of the coefficient of autocorrelation ( $r_{ei}$ ) is less than 0.5. The calculation of the autocorrelation coefficient demonstrated the lack of first-order autocorrelation. The value of the autocorrelation coefficient is -0.191, so autocorrelation is missing, which again demonstrates the validity of the econometric model.

Respectively, this value falls within the range:

$$-0.683 < r_l = -0.191 < 0.683.$$

The validity of the model is also confirmed by the Fisher test, which shows the role of influence factors in explaining the evolution of the export of agri-food products. The value of the F test is 17.022 and the significance threshold is 0.001032. The inequality ratio ( $0.001032 < 0.05$ ) shows that the econometric model is valid.

The Durbin-Watson Criterion (DW) was calculated based on Formula 9 and has a value of 2.01. According to Durbin-Watson's statistical value table, we find that for  $n = 12$  and  $k = 4$  (significance level 5%) the values were determined:  $d_1 = 0.69$ ;  $d_2 = 1.97$ , therefore, autocorrelation is missing.

The residue study shows that the value of the RS criterion is 3,134 and falls within the range (2.7-3.7), so the condition of the normal residue distribution of the model is respected. In this way, the model is appropriate according to the principle of the normal distribution of the residual component.

## CONCLUSIONS

The presented results confirm that the assumptions underlying this model are valid and the tests performed confirm the quality of the model, so the export of agri-food products is determined by the variation of the four factors: the consumer food price index, agricultural sales price indices, the Moldovan leu exchange rate against the US dollar and the annual inflation rate.

The interpretation of multifactor regression model parameters has highlighted the extent to which each of the factorial variables included in the model can be considered determinants of the export of agri-food products, giving managers the opportunity to choose the optimal option they want to use in analyzing the evolution and evolving of exports of agri-food products.

The authorities of the Republic of Moldova, through its institutions, must create transparent mechanisms for the management of international markets and prices. As the value of exports of agri-food products greatly depends on international market prices and producers are informed post-factum, the



creation of such a mechanism would allow producers to predict and monetize their long-term income. However, the efficiency of commercial management in the agri-food sector can not be enough to lead to the development of foreign trade without implementing other mechanisms and strategies to increase the competitiveness of products and promote exports of agri-food products.

## REFERENCES

- [1]Cohen. J., Cohen, P., West, S.G., Aiken, L.S., , 2003, Applied multiple regression/ correlation analysis for the behaviour sciences. – 3<sup>rd</sup> ed., New Jersey.
- [2]Data bank of the National Bureau of Statistics of the Republic of Moldova, 2017. <http://statbank.statistica.md/pxweb/pxweb/ro/40%20Statistica%20economica/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>, Accessed January 20, 2018.
- [3]European Commission, 2015. Agricultural and food trade. <https://ec.europa.eu/agriculture/sites/agriculture/files/statistics/facts-figures/agricultural-food-trade.pdf>, 6, Accessed January 10, 2018.
- [4]European Commission, 2016. Impacts of EU trade agreements on the agricultural sector. Luxembourg: Publications Office of the European Union, 10.
- [5]Law No. 166 of 11.07.2012. <http://lex.justice.md/index.php?action=view&view=doc&id=345635>, Accessed January 15, 2018.
- [6]Study on the impact of EU agriculture and agricultural trade of EU concluded bilateral trade agreements, Copenhagen Economics, 2016. [https://ec.europa.eu/agriculture/external-studies/2016-bilateral-trade-agreements\\_en](https://ec.europa.eu/agriculture/external-studies/2016-bilateral-trade-agreements_en), Accessed January 10, 2018.
- [7]Xinshen, D., 2010, Economic Importance of Agriculture for Sustainable Development and Poverty Reduction: Findings from a Case Study of Ghana.OECD. <http://www.oecd.org/agriculture/agricultural-policies/46341169.pdf>, Accessed January 12, 2018.

## ASPECTS REGARDING REQUIREMENTS OF THE RAPESEED CULTURE TOWARDS THE CLIMATIC CONDITIONS. CASE STUDY: THE IALOMIȚA COUNTY, ROMANIA

Dana Maria CONSTANTIN (OPREA), Elena GRIGORE, Elena BOGAN,  
Marina Aurelia ANTONESCU

The University of Bucharest, The Faculty of Geography, 1 Nicolae Bălcescu Avenue, 010041, District 1, Bucharest, Romania, Emails: danamartines@yahoo.com, elazigzag@gmail.com, elana.bogan@yahoo.com, marina\_antonescu@yahoo.com.

**Corresponding author:** danamartines@yahoo.com

### **Abstract**

*Being a plant specific to the temperate climate with mild winters, cool and humid summers, the rapeseed is currently one of the world's most important oil plant species, being cultivated for its oil rich seeds. The main purpose of this study is to analyze the relationship between climatic conditions and the rapeseed culture for the time interval 1990 – 2013, in the context of the climate changes. The analysis was based on the climate data collected from the meteorological stations from Urziceni, Grivița and Slobozia, on the data regarding the rape cultivated area and production in the territory of the Ialomița County. The research was carried out in the Southern Romania, in the second favorability degree area for the rapeseed culture. With the help of the analyzed data, the variability in time and space of the rapeseed culture in relation with the climatic conditions has been highlighted.*

**Key words:** climatic conditions, productions, rapeseed, Ialomița

### **INTRODUCTION**

Rape is one of the most important plants grown in Europe, with an average area of 6.6 million hectares cultivated and an average production of 21.6 million tonnes [8]. This is due to increased demand for vegetable oil and agronomic advances that make production more efficient and more profitable. It is a plant that prefers a temperate ocean climate with mild winters and an average annual temperature of 7–10°C [10]. Big rapeseed or autumn rapeseed is currently one of the most important oil species in the world due to the oil content of 42–48% [12]. Rapeseed has a multiple use in the textile, leather, plastic industries or as a feed or melliferous plant. In autumn, the rapeseed culture has two important stages, namely: first, from sowing to starting of winter and the second one at the winter outing, when the cycle of vegetation is resumed to maturity and harvest. In achieving the maximum production, it is necessary that soil, plant, soil or hybrid, lack of pests and pathogens, but especially climatic conditions to be optimal. The autumn rapeseed may have

low productions due to drought at sowing, weaker winter resistance, especially when there is no snow cover and higher susceptibility to brumishes during blooming so that knowing the climatic factors plays a major role in the agricultural management of the culture [4].

In Romania, the rapeseed has been cultivated since the 19<sup>th</sup> century, disappearing from culture in the middle of the last century, but in the early 2000s, it was reintroduced and expanded into culture. The degree of favorability of the rapeseed is higher in the Eastern, Centre and Western Romania, because the conditions for springing and wintering without loss of culture are ensured comparing to the Southern Romania with lower rainfall, where cultivation with irrigations is recommended. Due to the high demand on the Romanian agricultural market, the use of rapeseed hybrids has become a necessity due the higher productions than those of the rapeseed varieties. The main purpose of this study is to analyze the requirements of autumn rapeseed crops towards the climatic conditions in the Ialomița



County area in the context of the global climate changes. At both global and national levels, there has been observed, over the last decades, a progressive warming of the atmosphere, an increase in the frequency of extreme weather events and a rapid alternation between high drought and abundant floods [3; 10]. All of these have direct implications in agriculture, and implicitly in the supply of water to the soil. The Ialomița County is located in the South-Eastern Romania, occupying 1.9% of the country's surface. In 2014, the county's agricultural area was 374,495 ha [11], representing 84.1% of its area. The Ialomița County overlaps most of its part over the Central Bărăgan Plain, a plain of fluvial-lake origin and with altitudes falling from West to East, from 150 m to 20 m [7] (Fig. 1).

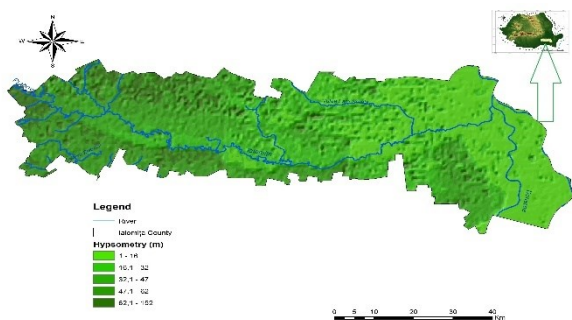


Fig. 1. The hypsometric map of the Ialomița County  
 Source: own processing from open source GIS

## MATERIALS AND METHODS

For this study, there were used the climatic data from the meteorological stations: Urziceni, Grivița and Slobozia, which belong administratively to the Ialomița County (Fig. 2). The three stations are considered to be representative for the study area [6]. In order to highlight the climatic requirements of the autumn rapeseed, there have been used the areas and productions data from the National Institute of Statistics (NIS). Besides the analysis of the climatic data, the surfaces and productions, the Angot report (mm) was also calculated as the ratio between the sum of the warm semester precipitation (April–September) and the sum of the cold semester precipitation (November–March).

The methods used in the data analysis are the classic statistical ones, but also the modern ones in the GIS environment and the graphic

representations are based on the Microsoft Office Excel software.

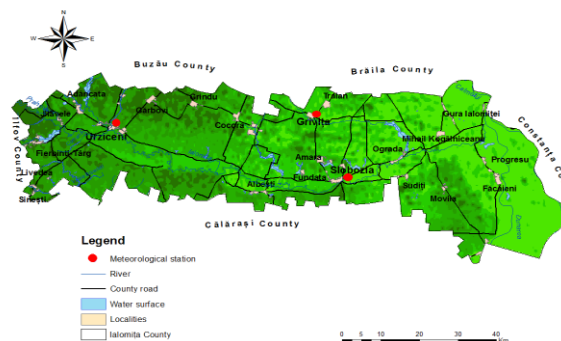


Fig. 2. The geographic localization of the meteorological stations: Urziceni, Grivița and Slobozia in the study area

Source: own processing from open source GIS

## RESULTS AND DISCUSSIONS

The autumn rapeseed is a plant with moderate demands on the soil and air temperature, being sensitive to the temperature oscillations. The amount of temperatures required during autumn vegetation is about  $800^{\circ}\text{C}$  ( $\sum t > 0^{\circ}\text{C}$ ) [12]. The recommended sowing period for rapeseed is from August 15<sup>th</sup> to September 15<sup>th</sup>. In terms of humidity, it is a crop with high water requirements and with a low drought resistance, especially after the emergence and formation of the leaf rosette. This aspect is the result of the small sowing depth of 2–3 cm, so the root system grows poorly during this period. The rapeseed is a light-loving plant, especially towards the end of the growing season. It is also a plant that economically capitalizes the deep, permeable, rich in humus and calcium soils, with neutral Ph, of the chernozem type, present in the Ialomița County. The climate data analysis provides information on the main climatic factors with optimal or restrictive character on the rapeseed culture. In the analysis of the air temperature, the surface temperature and atmospheric precipitation, there have been used the monthly, annual and seasonal data for the time interval 1990–2013, highlighting four years: 2007 and 2012 as drought years and 2005 and 2013 as rainy years. These years indicate the rapid change between the dry

years and the rainy years as a consequence of the global climate changes.

**The air temperature** has a major role in the cycle of vegetation of the autumn rapeseed [9]. Each phase of vegetation has upper and lower temperature limits, besides which the culture is the subject of heat stress. For the studied area, from 1990 to 2013, one can see from Figure 3, a thermic regime with values close for all the three stations, which varies between -1.4°C for January at Grivița and Urziceni stations and 23.7°C at Slobozia in July. The multiannual average for the time interval 1990–2013, at the level of the Ialomița County is of 11.4°C, being 0.4°C higher than the normal climatic values, 1961–2000 [1]. There are remarkable for this period, the years 2007 and 2012, with annual average temperatures higher or close to 12°C. The year 2007 holds the thermic record, oscillating between 12.7°C at Grivița station and 12.8°C at Slobozia and Urziceni stations. The thermic deviation from the multiannual average is +1.4°C.

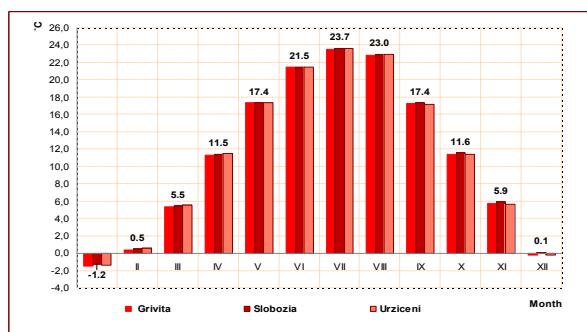


Fig. 3. The annual air temperature regime (°C) in the Ialomița County, 1990–2013

Source: processed data after NMA

**The surface soil temperature** influences all the plant physiological processes. Their intensity increases with temperature, up to a limit threshold considered critical to plants. From the analysis of the monthly and annual average of the soil surface temperature, one can notice that: at the Grivița station, the temperature registers values between -1.5°C in January and 29.5°C in July, with a multiannual average of 13.6°C; at the Slobozia station, the values are between -1.4°C for January and 29.5°C in July, with a multiannual average of 13.7°C and at the Urziceni meteorological station, the value

difference is between -1.6°C and 28.9°C and with a multiannual average of 13.7°C (Fig. 4). At all the meteorological stations in the Ialomița County, the climatological normal was exceeded, from 1961 to 2000, with 0.6–0.7°C [1].

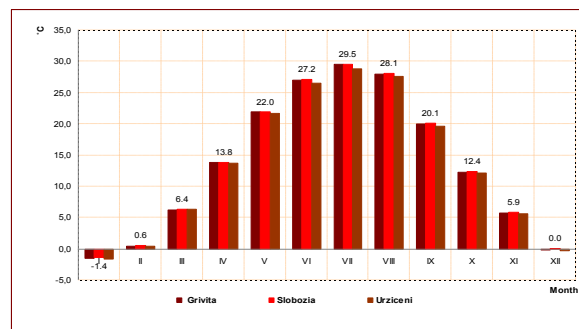


Fig. 4. The annual soil temperature regime (°C) in the Ialomița County, 1990–2013

Source: processed data after NMA

The thermic factor, both the air and surface temperature, plays a very important role for the autumn rapeseed in properly preparing the plants for the wintering and restarting in vegetation.

**The atmospheric precipitation** is the main source of the soil water, and the crop requirements are different during the vegetative cycle. The critical periods for water are in August and September, when the rosette leaves (6–8 leaves) and the phases of flowering and fructification are rising and forming. There are good productions in the areas where the annual rainfall value is 450–650 mm. In the Ialomița County, for the time interval 1990–2013, there were recorded multiannual quantities of rainfall of 469.3 mm at Grivița, 475.9 mm at Slobozia and 526.0 mm at Urziceni. These values are within the specified range, but closer to the lower limit of the water demand throughout the growing cycle, that being the reason the irrigation is required. At the level of the county, the multiannual average precipitation value is 490.4 mm, 50.4 mm more than the lower limit of 450 mm of the optimal rainfall requirement. There is a decrease in the amount of precipitation from West to East, as shown in Figure 5.

During the study period, the years 2005 and 2013 are recorded as rainy years, the record being in 2005, 900.9 mm at Urziceni, 713.7 mm at Grivița and 734.1 mm at Slobozia.

These amounts of excess rainfall have caused depreciation and production losses.

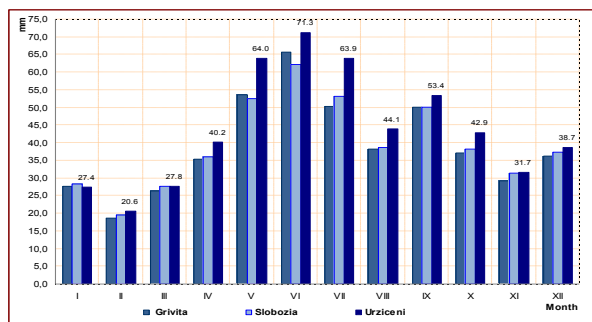


Fig. 5. The annual precipitation regime (mm) in the Ialomița County, 1990–2013

Source: processed data after NMA

For the study period, the *Angot ratio* (mm), has been calculated, indicating the degree of climatic continentalism [5]. The values of this index varies from 1.8 mm at Urziceni to 1.6 mm at Slobozia, while for Grivița, the Angot ratio value is 1.5 mm. The values over 1 of the index indicate a decrease in precipitation in the warm semester (April–September), due to the continentalisation of the ocean air masses reaching the area. The years 2007 and 2012 with severe droughts, and the years 2005 and 2013 with abundant periods of rainfall, confirm the intensification of the climatic variability after 2000 [2]. The average productions of rapeseed fluctuate within fairly high limits, from 364 kg/ha, in 2007, on a cultivated area of 71,116 ha to 2732 kg/ha, in 2013, on an area of 38,950 ha [11] as a consequence of the great variability in time and space of each meteorological element in relation to the cultivated soil or hybrid, the soil conditions and the applied crop technology. The average production for the Ialomița County, for the time interval 1990–2013, is 1,408.1 kg/ha.

## CONCLUSIONS

The autumn rapeseed is an agricultural crop for which the cultivated area is growing, this being the result not only of the high oil content, but also of the good trading price. The rapeseed is a culture plant with moderate temperature requirements, but demanding for moisture. For the Ialomița County, in the time interval 1990–

2013, there was an increase in the average productions of the rapeseed and cultivated areas. In the context of the global climate changes, the agricultural production will be affected by the climate variability, especially in the areas with a high-risk drought, such as the Ialomița County. As a result, knowing the climatic factors is absolutely necessary in a decision-making system for a sustainable agricultural management.

## REFERENCES

- [1]Administrația Națională de Meteorologie (NMA), 2008. Clima României. Editura Academiei Române, București.
- [2]Administrația Națională de Meteorologie (NMA), 2014. Cod de bune practici agricole, în contextul schimbărilor climatice actuale și previzibile. Agricultură și Dezvoltare Rurală-Orizont PAC 2020.
- [3]Busuioc Aristița, Caian Mihaela, Cheval, Sorin, Bojariu Roxana, Boroneanț Constanța, 2010, Variabilitatea și schimbarea climei în România. Editura Pro Universitaria, București, pp. 40-42.
- [4]Cofas Elena, Constantin (Oprea) Dana Maria, Zaharia Iuliana, 2014, General aspects of the agro-climatologic potential in Muntenia Region. Scientific Papers Series „Management, Economic Engineering in Agriculture and Rural Development”, Vol. 14(2):67-70.
- [5]Constantin (Oprea) Dana Maria, Vătămanu, V.V., 2015, Considerations upon the dryness and drought phenomena in the Caracal Plain, Romania. Scientific Papers Series „Management, Economic Engineering in Agriculture and Rural Development”, Vol. 15(1):119-122.
- [6]Constantin (Oprea) Dana Maria, Bogan Elena, Grigore Elena, Antonescu Aurelia Marina, 2017. Considerations on the climate characterization of the agricultural year 2011 – 2012 for the maize crop in the Central Bărăgan Plain. Scientific Papers Series „Management, Economic Engineering in Agriculture and Rural Development”, Vol. 17(2):51-55.
- [7]Geografia României, 2005, Volumul V. Editura Academiei Române, București, pp. 382-383.
- [8]Oilseeds and protein crops market situation. <https://ec.europa.eu/agriculture>, Accessed on January 27<sup>th</sup> 2018.
- [9]Povară Rodica, 2000, Riscul meteorologic în agricultură. Grâul de toamnă. Editura Economică, București. pp. 23.
- [10]Sandu, I., Mateescu Elena, Vătămanu, V.V., 2010. Schimbări climatice în România și efectele asupra agriculturii. Editura Sitech, Craiova, pp. 18; 41; 183.
- [11]Suprafața și producția agricolă vegetală. <http://www.insse.ro/cms>, Accessed on December 12<sup>th</sup> 2017.
- [12]Ștefan, M., 2009, Fitotehnica florii soarelui și rapiței. Editura Universitară, Craiova, pp. 27.

## THE ROLE OF EFFICIENT MICROORGANISMS IN THE PROCESS OF OBTAINING THE BIOCOMPOST

Larisa CREMENEAC, Tatiana BOCLACI

Scientific and Practical Institute of Biotechnologies in Zootechny and Veterinary Medicine, 6525, v. Maximovca, District Anenii Noi, Republic of Moldova, Emails: kremeneak@yandex.ru

**Corresponding author:** kremeneak@yandex.ru

### **Abstract**

*In the article are exposed the results of the study of biochemical quality of biocompost obtained by using the effective microorganisms from microbial preparations „Baikal ЭM-1” and „EM-1”, in the process of bioconversion of the organic wastes unfermented. Material for research served unfermented cattle manure and the object of investigation - two preparations of efficient microorganisms „Baikal ЭM-1” and „EM-1”. Analyzing the results obtained in the experiment it was found that in biocompost obtained from the unfermented manure of cattle, subjected to the bioconversion process using preparations „Baikal ЭM-1” and „EM-1” diminished essentially the content of ammonia, respectively with 79.68% - 70.91% and 85.09% - 70,03%, and increased the total nitrogen, respectively with 147.33% - 105.33% and 162.67% - 128.00% in comparison with the same indicators in manure samples at the initial stage. Consequently, it has been found that use „Baikal ЭM-1” and „EM-1” preparations has led to substantial changes in content ammonia and total nitrogen, thus improving the quality of the biocompost.*

**Key words:** biocompost, effective microorganisms, preparations „Baikal ЭM-1” and „EM-1”, unfermented manure

### **INTRODUCTION**

Obtaining organic agricultural production is a matter of global importance for society. The global environmental situation, including the regional, has worsened in the last century due to the industrialization and chemicalization of agriculture, the storage, preservation and unreasonable use of organic waste, etc. These have resulted in pollution of the environment and its components. A special role in the improvement of the environmental situation belongs to the technology of bioconversion of organic waste using biological methods (worm cultivation technology) [2, 3] and microbiological (efficient micro-organisms technology - EM). Efficient microorganisms were discovered by Teruo Higa, PhD in agronomy and horticulture professor at Ryukyus University in Okinawa (Japan) in 1980 [12].

According to literary sources, efficient microorganisms live in balance over 80 of different species of aerobic and anaerobic microorganisms, where some live with the metabolites of others [12, 14].

Yeast, acido-lactic bacteria, photosynthetic bacteria, nitrogen fixators, actinomycetes form the largest groups of efficient microorganisms that are not genetically modified. What makes efficient microorganisms to be so important are their particular features of regeneration, structuring and antioxidation, which gives them extraordinary effects and a wide and varied range of applications almost unlimited in various fields.

The cycle of nutrition on the earth is a circular chain: earth - plants - animals - man - earth. In the vital processes of this cycle, microorganisms are of great help, turning substances of different origins into nutrients for plants, animals and humans. Efficient (beneficial) microorganisms are also the basis of all forms of life on earth [12, 13].

It is known that microorganisms are divided into three main categories:

-microorganisms of degradation and degeneration, the metabolites of which are oxidants responsible for putrefaction, decomposition and degeneration. In these processes the free radicals (aggressive

oxygen) are formed which are at the origin of most diseases;

-microorganisms for structuring, regeneration and fermentation, the metabolites of which are antioxidants, which are the basis of soil, water, plant, animal and human health;

- neutral microorganisms, which are the most quantitatively represented. These microorganisms are the followers who behave in the structuring or decomposition elements, following the preponderance of the other two groups.

Efficient microorganisms are used to improve soil quality and produce ecological production [1, 8].

In zootechny, the use of efficient microorganisms allowed remarkable diminution of unpleasant odors, almost complete disappearance of flies, suppression of some diseases, obvious increase of fertility through artificial sowing, increase of meat, milk and eggs quality [7].

Technology of efficient microorganisms opens new perspectives and opportunities for sustainable agriculture. It can become the basis for efficient production of organic production of plant and animal origin.

The purpose of the research included the determination of the role of efficient microorganisms in the process of processing of unfermented organic waste and the objective was to determine the influence of microorganisms on the process of processing of unfermented organic waste and the quality of the compost obtained.

## MATERIALS AND METHODS

For the purpose of the research, two concentrated microorganisms "Baikal ЭМ-1" and "EM-1" were purchased, from which were obtained by dilution with unchlorinated and filtered water the basic solutions and their working solutions.

From the concentrated microorganisms „Baikal ЭМ-1” and „EM-1”, diluted in a ratio of 1: 100 using unchlorinated and filtered water, having a temperature of 20-25°C and with the addition of nutrient medium (special molasses), after 7 days, according to the instructions of use, was obtained the basic

solution with efficient microorganisms. Subsequently, from the basic solution was obtained the working solution, by diluting 100 ml of the base solution with 10 liters of water. Thus, the working solution was obtained, which was subsequently used for the processing of unfermented cattle manure.

To process 0.5 tons of manure, were used 0.250 liters of base preparation or 50 liters of working solution. The process of manure processing with the preparation „Baikal ЭМ-1” was performed under anaerobic conditions and with the preparation „EM-1” under aerobic conditions. Polyethylene tubing was used to obtain anaerobic conditions. Unfermented cattle manure subjected to bioconversion with the use of efficient microorganisms contained about 30% of cellulose in order to reduce moisture to 50-60%. These requirements were followed in the experiment with both efficient microorganisms (EM) that were subjected to test.

The experiment was organized outdoors. Materials for research have served the unfermented cattle manure and compost obtained in the bioconversion process, which were subjected to biochemical analyzes (active acidity, organic substance, ammonia, total nitrogen content and object of research - two efficient microorganisms preparations „Baikal ЭМ-1” - produced by ООО „ЭМ-ЦЕХТ” (Russia, Ulan-Ude) and „EM-1”, produced by JSC "Bioem Technology" (v.Cojusna, R. Moldova).

For the purpose of testing these preparations, an experiment was carried out in which three variants were used for each of the two preparations, including two experimental and one control. In experimental variants, unfermented cattle manure has been subjected to composting with efficient microorganisms of the „Baikal ЭМ-1” and „EM-1” preparations under anaerobic and aerobic conditions. In the control variants unfermented cattle manure was subjected to traditional composting.

The biochemical investigations of unfermented cattle manure and compost obtained after 2 months of microorganism processing have been performed according to

the methods set forth in the Standards [5, 6] and specialized textbooks [9,10,11].

## RESULTS AND DISCUSSIONS

According to the results obtained (Table 1) it was found that in the samples of unfermented cattle manure used as a substrate for the production experiment (initial stage) the moisture, dry matter, active acidity and total nitrogen showed non-essential differences between the three variants of the experiment. During the experiment, observations were made over the processes that took place in the experimental variants. It was found that because of the high temperatures as a result of

the manure processing process with preparation „Baikal ЭM-1” (under anaerobic conditions) and „EM-1” (under aerobic conditions), only a few indicators of the quality of organic waste have changed. At the end of the experiment, the values of unfermented manure did not change essentially, except for the value of ammonia, total nitrogen and ash.

Thus, as demonstrated by the results outlined in Table 1, changes in some of indicators of processed manure using both types of ME preparations took place in relation to the initial stage in both the first and second months of the experiment.

Table 1. The biochemical composition of the nutrient substrate and of the compost obtained in the result of the use of efficient microorganisms of preparation "Baikal- ЭM -1"

Indicators	Period and variants of the experiment; conditions of fermentation		
	Initial	After a month	After 2 months
	Control	Experiment	Experiment
	Traditional composting (aerobic)	ME „Baikal - ЭM-1” (anaerobic)	ME „Baikal - ЭM-1” (anaerobic)
Humidity, %	79.34 ± 1.71	80.40 ± 0.76*	80.63 ± 0.71
Dry substance, %	20.67 ± 1.71	19.60 ± 0.76*	19.37 ± 0.71
Active acidity, u.c	8.52 ± 0,21	6.20 ± 0.00	7.33 ± 0.053
Ammonia,mg/kg	403.00±44.25	81.89 ± 6.83	60.08 ± 19.25
Total nitrogen, %	1.50 ± .0.14	3.71 ± 0.22	3.94 ± 0.13
Ash content, %	14.52 ± 0.88	17.73 ± 1.07	22.00 ± 0.58*
Organic substance, %	42.74 ± 0.44	41.14 ± 0.53	39.00 ± 0.29*

Note: Authenticity: 80.40\* - P ≤ 0.001

After a month of fermentation of the unfermented manure in the samples of the manure subjected to fermentation with the preparation „Baikal EM-1”, the amount of moisture, active acidity (pH), total nitrogen and ash increased by 1.36%, 27.23%, 147.33% and 22.11% in comparison to these values in control samples. The quantity of dry substance, active acid (pH), ammonia, and organic substance decreased in comparison to the control variant by 5.18%, 27.23%, 79.68% and 3.74%.

At the end of the experiment, after two months of experimentation, the values of humidity, active acidity, total nitrogen and ash from unfermented manure treated with EM of preparation „Baikal ЭM-1” increased respectively by 1.63% 97%, 162.67% and 51.52% and those of dry matter, ammonia and organic matter decreased respectively by

6.29%, 85.09% and 8.75%, compared to the initial period (control variant).

Thus, in the process of bioconversion of organic wastes during the various periods (one month and two months), using the preparation with EM „Baikal ЭM-1”, under anaerobic conditions, the total amount of nitrogen, the acidic active and the ashes essentially increased and the amount of ammonia was reduced, thus improving the quality of the obtained compost.

The same legality was also found in the biochemical indicators of unfermented cattle manure subjected to bioconversion using the preparation „EM-1”(Table 2).

According to the results shown in the table it was found that after one month of aerobic experiment, the total nitrogen, active acid and ash increased respectively by 105.33%, 14.67 and 173.21% and essentially diminished



ammonia and organic substance respectively by 70.91% and 29.34%, compared to the

initial period. The other indicators did not undergo any non-essential changes.

Table 2. The biochemical composition of the nutrient substrate and of the compost obtained in the result of the use of efficient microorganisms of preparation "EM -1"

Indicators	Period and variants of the experiment; conditions of fermentation		
	Initial	After a month	After 2 months
	Control	Experiment	Experiment
	Traditional composting (aerobic)	EM „EM - 1” (anaerobic)	EM EM-1” (anaerobic)
Humidity, %	79.34 ± 1.71	77.97 ± 0.35*	76.97 ± 2.65
Dry substance, %	20.67 ± 1.71	22.03 ± 0.35*	23.03 ± 2.65
Active acidity, u.c	8.52 ± 0.21	7.27 ± 0.12	7.60 ± 0.00
Ammonia, mg/kg	403.00 ± 44.25	117.25 ± 11.41	120.78 ± 11.89
Total nitrogen, %	1.50 ± 0.14	3.08 ± 0.44	3.42 ± 0.73
Ash content, %	14.52 ± 0.88	39.67 ± 1.43*	33.65 ± 2.01
Organic substance, %	42.74 ± 0.44	30.20 ± 0.72*	33.18 ± 1,14

Note: Authenticity: 77.97\*- P ≤ 0.001

From the exposed ones it was found that after one month from the beginning of the experiment, under the influence of efficient microorganisms, there were changes in the quality of the obtained compost.

By comparing the values of the biochemical indicators of the unfermented manure treated with EM of the preparation „EM-1” at the end of the experiment (after two months), with those of the control variant, that the dry substance, the active acidity, the total nitrogen and the ash increased respectively by 11.42% and 10.80%, 128.00% and 124.86%, and the amount of ammonia and organic substance decreased by 70, 03% and 22.37%. The other indicators have undergone minor changes.

Analyzing the obtained results, it has been found that the use in the process of bioconversion of unfermented cattle manure of preparations with EM „Baikal EM -1” and „EM-1”, over two months, have a beneficial effect on the quality of the obtained compost.

## CONCLUSIONS

The use of unfermented cattle manure in the bioconversion process of preparations with efficient microorganisms „Baikal EM -1” and „EM-1”, over two months, contributed to the increase of acidity, total nitrogen and as hand to the diminution of ammonia and organic substance.

Both preparations with efficient microorganism shave a beneficial effect on

the obtained compost substantially increasing the total nitrogen content and diminishing that of ammonia of ammonia and organic substance have essentially changed so improving the quality of the obtained compost.

The technology of using the efficient microorganisms in the process of bioconversion of the organic waste is proposed for the sustainable development of the agriculture and the obtaining of the fertilizers and the ecological agricultural production in the households with different forms of the ownership.

## REFERENCES

- [1]Blinov, V.A., 2004, Treatment of plant diseases with effective microorganisms. Achievements of EM technology in Russia. Moscow, 50-53.
- [2]Cremeneac, L., Boclaci, T., Chiruneț, Z., 2012, Technology of bioconversion of organic wastes and the use of the obtained products. Recommendations. Typography „Print-Caro”, Chisinau, 60-62.
- [3]Cremeneac, L., Boclaci, T., 2013, General aspect of management of organic waste in sustenable development of agriculture, Scientific bulletin. Series F. Biotechnologies, Volume XVII, Bucharest, 43-49.
- [4]Cremeneac, L., Boclaci, T., 2015, The role of worm compost in improving the quality and increasing the productivity of maize. Magazine Moldovan agriculture, No. 1, 26-28.
- [5]ГОСТ 26204-84 - 262013-84, 1984, Soils. Methods of analysis, Moscow, 1984.
- [6]ГОСТ 26712-94, 1988, Organic fertilizers. Methods of analysis, Moscow, 1988.

[7]Levchenko, I.A., 2002, EM technology and the cultivation of pigs. Journal "The Hope of the Planet", №10, 9-12.

[8]Pakulova, O.K., 2001, Practical recommendations on the use of ЭМ technology in crop production. The journal "The Hope of the Planet", № 3, 8-10.

[9]Petukhova, E.A., et al., 1989, Zootechnical analysis of feeds, Moscow, VO "Agropromizdat", p.240.

[10]Popov, A.V. et al., 1973. Fundamentals of Biological Chemistry and geotechnical analysis, Publisher „Kolos”, Moscow, 256-266.

[11]Razumov, V., 1986, Reference of the chemist lab assistant on analysis of feed „Rosselkhozizdat”, Moscow, 89-92; 144-148.

[12]Sidorov, Z.N., 2001, Experience in the use of ЭМ technology in pig production. Journal "The Hope of the Planet", №1, 12-17.

[13]Suhammera, S.A., 2006, ЭМ technology - biotechnology of the XXI century. The collection of materials on the practical application of „Baikal ЭМ - 1.” Almaty, 78.

[14]Shablin, P.A., 2000, Effective microorganisms - the hope of the planet. Moscow, 70.

[15]Yurchenko, V.A., 2001, Microbiological technologies - an ecological alternative to the chemicalization of agriculture. Journal "The Hope of the Planet", 2001, №3, 3-5.





## ANALYSIS OF THE TOURISTS' OPINION CONCERNING THE INVESTMENTS IN THE DANUBE DELTA

Romeo Cătălin CREȚU, Petrică ȘTEFAN, Ioan Iulian ALECU, Silviu Viorel ANDREI

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Emails: cretumeocatalin@yahoo.com, stefanmarian2004@yahoo.com, iulian\_alecu\_2000@yahoo.com

*Corresponding author:* stefanmarian2004@yahoo.com

### Abstract

*The Danube Delta is a poorly developed area, but it has tremendous potential. The European Union will allocate the Danube Delta by 2020, with the possibility of extending for an additional three years the amount of 1.3 billion euros for infrastructure, tourism and jobs. In this paper we analysed, based on the questionnaire, the opinion of the tourists who visited the Danube Delta regarding the future investments aimed at developing the Danube Delta reservation. The questionnaire was applied on a sample of 1,067 tourists, from 1 March 2017 to 31 January 2018, in the following localities: Crișan, Murighiol, Sulina, Mila 23, Sfântu Gheorghe, Caraorman, Periprava, Maliuc, Gorgova and Dunăvățu de jos. The tourists' opinion on the investments that should be made for the development of this area, 55% think that investments in road infrastructure should be made, 23% in actions to promote the tourist potential of this area, 15% consider it necessary investment in utility infrastructure, and 5% of them consider the number of tourist units to be insufficient.*

**Key words:** Danube Delta, infrastructure, investments, questionnaire, tourists

### INTRODUCTION

The territory of the Danube Delta Biosphere Reserve, delineated according to the law, has a total area of about 580,000 hectares and it is located in south-eastern part of Romania, including the Danube Delta itself, Razim-Sinoie Lake Complex, the Danube Marine to Cotul Pisicii including the floodplain area Somova-Parcheș, Lake Sărături-Murighiol and the marine area between the seaside and the isobata of 20 m. The geographical position of the Reserve is defined by the following geographical coordinates: 28 ° 10'50 " (Cotul Pisicii) and 29°42'45" (Sulina) eastern longitude; 45°27' (Chilia branch, km 43) and 44°20'40 " (Cape Midia) north latitude (Honțuș, 2015) [3].

Of the total area of the Reserve, more than half (312,440 ha) are the natural aquatic and terrestrial ecosystems included in the list of UNESCO World Heritage Sites as well as those for ecological reconstruction, which are the public domain of national interest. The territory of the Reservation is located in the administrative territories of 3 counties: Tulcea (87.73%), Constanța (12.23%) and Galati

(0.14%). The Government of Romania has decided that the largest investments will be made here at the national level. The European Union will allocate 1.3 billion Euros to infrastructure, tourism and jobs by 2020, with the possibility of extending for a further three years. Approximately 70% of the amount will be given to public units that will spend the money from infrastructure to biodiversity, with the rest of the money being attracted to the locals (Crețu et al., 2017) [2]. The Managing Authority for the Operational Program for Fisheries and Maritime Affairs 2014-2020 announced the launch of 12 calls for applications for financing dedicated to the development of the fisheries sector in the ITI Danube Delta. On all 12 lines of funding, about 27 million Euros is currently available to the potential beneficiaries. The Strategy for the 2014-2020 Operational Program for Fisheries and Maritime Affairs (POPAM) aims primarily to increase production in aquaculture and processing as well as to increase operator profitability, biodiversity conservation and environmental protection, maintaining and creating jobs, especially in fisheries areas (Popescu et al., 2017) [4]

(Toma, 2014) [5]. The Ministry of Regional Development, Public Administration and European Funds has recently launched calls for proposals POR/165/2 (2.1.B - Business Incubators) and POR/179/2 (2.1.B.ITI - Business Incubators - ITI Danube Delta) related to Priority Axis 2 - Improving the Competitiveness of Small and Medium Sized Enterprises, Investment Priority 2.1 - Promoting Entrepreneurship, in particular by facilitating the economic exploitation of new ideas and by encouraging the creation of new

businesses, including business incubators. For the ITI Danube Delta, the financial allocation is more than generous, almost 12 million euro, the novelty of this appeal being that among the potential applicants were also the territorial administrative units. Recently, the contract for one of Romania's most important infrastructure projects - the design and execution of the *Suspended Bridge on Danube* project was signed. The value of the project is about 500 million Euros.

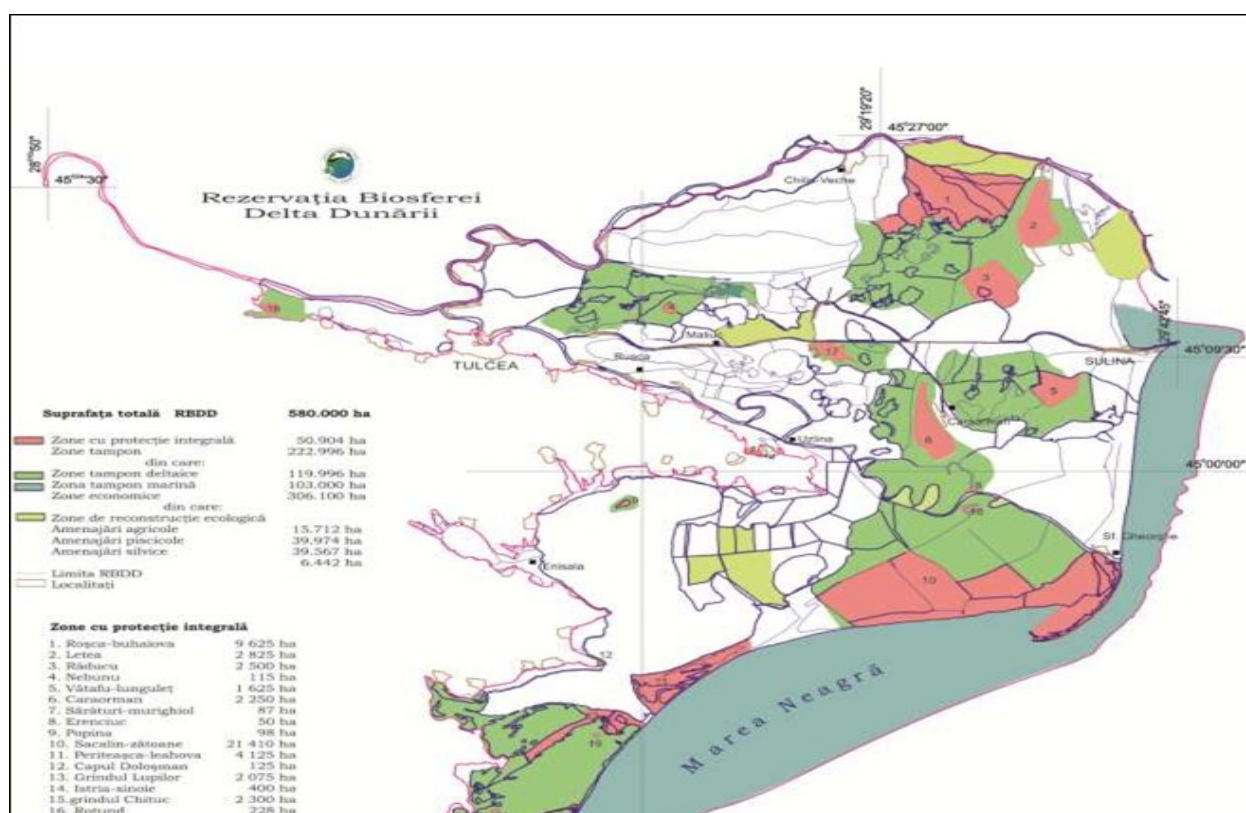


Fig. 1. Danube Delta Biosphere Reserve-functional areas with differential protection scheme  
 Source: (ARBDD, 2015) [1]

## MATERIALS AND METHODS

The questionnaire was applied to a sample of 1,067 tourists from 1 March 2017 to 31 January 2018 in the following localities: Crișan, Murighiol, Sulina, Mila 23, Sfântu Gheorghe, Caraorman, Periprava, Maliuc, Gorgova and Dunavățu de jos. Of the total respondents interviewed, 41.58% are between 41 and 60 years of age, followed by those aged between 26 and 40, with a 37.62% share, and at the opposite aged over 60 (11.88%) and those aged between 18 and 25 years (8.91%).

## RESULTS AND DISCUSSIONS

### Tourists' opinion on future investments destined to be developed in the Danube Delta's reservation according to their age.

The tourists' opinion on the investments that should be made for the development of this area, 55% think that investments in road infrastructure should be made, 23% in actions to promote and disseminate the tourist potential of this area, 15% consider that there is a need for investment in utility infrastructure and 5% of them consider the

number of agritourism units to be insufficient (Table 1).

Table 1. Structure of tourists' opinion on future investments aimed to developing the Danube Delta's reservation according to their age

Where do you think should be made the future investments in the Danube Delta natural reserve?								
The tourist's age								
Age (years)	U.M.	In capacity of agritourism accommodation	In the road infrastructure	In the utility infrastructure	Actions of promotion and broadcasting	Other	Total	
		No.	No.	No.	No.	No.	No.	%
18 – 25	No.	0	3	0	5	1	9	9%
26 – 40	No.	3	23	8	4	0	38	38%
41 – 60	No.	2	23	6	10	1	42	42%
> 60	No.	0	7	1	4	0	12	12%
Total	No.	5	56	15	23	2	101	-
	%	5%	55%	15%	23%	2%	-	100%
Standard Residue								
18 – 25	No.	-0.67	-0.89	-1.16	1.96	1.95		
26 – 40	No.	0.82	0.42	0.99	-1.58	-0.87		
41 – 60	No.	-0.05	-0.06	-0.10	0.14	0.18		
> 60	No.	-0.77	0.13	-0.59	0.77	-0.49		
Chi-Square Calculated =	17.54	Critical value (theoretical)=				18.55	p > 0.1(*)	
Degrees of freedom (df) =	12					21.03	p > 0.05(**)	
Cramer's V =	0.24					26.22	p > 0.01(***)	
Pearson's C =						0.38		

Source: Data processing from the questionnaire

The category of tourists aged between 26 and 40 and those aged starting with 41 to 60 believe that future investments should be channelled especially in road infrastructure, so that these two categories representing a share of over 45% of all interviewed. Also, in the category of tourists aged between 41 and 60 years, 9.9% of the total respondents consider that should have investments in actions to promote and disseminate the

tourism potential of the Danube Delta (Table 1). **Tourists' opinion on future investments destined to be developed in the Danube Delta's reservation depending on how they get used to go in holiday.**

Among the tourists who choose to go on holiday with their friends, over 29% of the total respondents believe that the investments to be made in the Danube Delta should aim especially the road infrastructure.

Table 2. Structure of the tourists' opinion on future investments aimed at developing the Danube Delta reservation depending on how tourists get used to go in holiday

Where do you think should be made the future investments in the Danube Delta natural reserve?								
The way they like to go on holiday								
Specificare	U.M.	In capacity of agritourism accommodation	In the road infrastructure	In the utility infrastructure	Actions by promotion and broadcasting	Other	Total	
		No.	No.	No.	No.	No.	No.	%
With friends	No.	2	30	4	10	0	46	46%
In the couple	No.	1	5	3	6	1	16	16%
In family	No.	2	21	8	7	1	39	39%
Total	No.	5	56	15	23	2	101	-
	%	5%	55%	15%	23%	2%	-	100%
Standard Residue								
With friends	No.	-0.18	0.89	-1.08	-0.15	-0.95		
In the couple	No.	0.23	-1.30	0.40	1.23	1.21		
In family	No.	0.05	-0.13	0.92	-0.63	0.26		
Chi-Square Calculated =	9.16	Critical value (theoretical)=				13.36		
Degrees of freedom (df) =	8					15.51	p > 0.05(**)	
Cramer's V =	0.21					20.09	p > 0.01(***)	
Pearson's C =						0.29		

Source: Data processing from the questionnaire.

But 9.9% of the respondents consider that it is a need to invest in actions to promote and

disseminate the Danube Delta's tourism potential.

More than 20% of all respondents, but those in the category of tourists who choose to go on holiday in the family are of the same opinion and believe that investments should focus on road infrastructure (Table 2).

**Tourists' opinion on future investments destined to be developed in the Danube Delta's reservation depending on the budget allocated for the holiday.**

Both tourists allocating for a holiday a budget of between 501 and 1,500 lei for one person,

and those who allocate over 1,500 lei/person, say that the investments should mainly target the road infrastructure. Also, most of these tourists consider that the Danube Delta needs actions to promote and disseminate this region, accounting for over 12% of all respondents, those in the category of tourists who allocate on average between 501 and 1,500 lei/ person for a holiday (Table 3).

Table 3. Structure of the tourists' opinion regarding the future investments aimed at developing the Danube Delta reservation according to the budget allocated for the holiday

Where do you think should be made the future investments in the Danube Delta natural reserve?									
The budget allocated to the holiday									
Allocated budget	U.M.	In capacity of agritourism accommodation	In the road infrastructure	In the utility infrastructure	Actions by promotion and broadcasting	Other	Total		
		No.	No.	No.	No.	No.	No.	%	
< 500 lei	No.	2	11	2	7	0	22	22%	
501 – 1,500 lei	No.	2	33	12	13	1	61	60%	
> 1,500 lei	No.	1	12	1	3	1	18	18%	
Total	No.	5	56	15	23	2	101	-	
	%	5%	55%	15%	23%	2%	-	100%	
Standard Residue									
< 500 lei	No.	0.87	-0.34	-0.70	0.89	-0.66			
501 – 1,500 lei	No.	-0.59	-0.14	0.98	-0.24	-0.19			
> 1,500 lei	No.	0.12	0.64	-1.02	-0.54	1.08			
Chi-Square Calculated =	6.94	Critical value (theoretical)=					13.36	p > 0.1(*)	
							15.51	p > 0.05(**)	
Degrees of freedom (df) =	8						20.09	p > 0.01(***)	
Cramer's V =	0.19	Pearson's C =						0.25	

Source: Data processing from the questionnaire

**Tourists' opinion on future investments destined to be developed in the Danube Delta's reservation depending on the frequency of holidays.**

By statistical testing of the tourists' opinion (Chi-Square = 20.91 \* Critical Value = 18.55 at a probability of  $p > 0.01$ ), regarding the future investments related to the development of the Danube Delta according to the frequency of holidays, there is a slight significance between the tourists' opinion on the future investments related to the development of the Danube Delta reservation and the frequency of holidays on the analysed problem.

Also, from the analysis of R (Standardized Residue), there are somewhat significant differences with regard to tourists who believe that investments should be made in other objectives than those mentioned above,

namely road infrastructure, utilities infrastructure or promotional and broadcasting actions, and those who leave on vacation every three months, allowing us to conclude that the opinion of tourists on future investments aimed at developing the Danube Delta reservation is (Table 4).

Also by Pearson's C and Cramer's V interpretations, in the present case it can be said that between the opinion of the tourists on the future investments aimed at the development of the Danube Delta reservation and the frequency of holidays (Pearson's C = 0.26; Cramer's V = 0.41), there is an association between the analysed aspects, the tourists' opinion on the future investments related to the development of the Danube Delta reservation is influenced by the holiday frequencies of the surveyed tourists (Table 4).

Table 4. Structure of tourists' opinion on future development investments of the Danube Delta Reserve according to the frequency of holiday

Where do you think should be made the future investments in the Danube Delta natural reserve?								
Holiday frequencies								
Specification	U.M	In capacity of agritourism accommodation	In the road infrastructure	In the utility infrastructure	Actions by promotion and broadcasting	Other	Total	
		Nr.	Nr.	Nr.	Nr.	Nr.	Nr.	%
At weekends	No.	1	3	0	0	0	4	4%
Monthly	No.	0	5	2	1	0	8	8%
Once every 3 months	No.	1	5	3	3	2	14	14%
On vacation	No.	3	43	10	19	0	75	74%
Total	No.	5	56	15	23	2	101	-
	%	5%	55%	15%	23%	2%	-	100%
Standard Residue								
At weekends	No.	1.80	0.53	-0.77	-0.95	-0.28		
Monthly	No.	-0.63	0.27	0.74	-0.61	-0.40		
Once every 3 months	No.	0.37	-0.99	0.64	-0.11	3.27		
On vacation	No.	-0.37	0.22	-0.34	0.46	-1.22		
Chi-Square Calculated =	20.91*	Critical value (theoretical)=				18.55	p > 0.1(*)	
Degrees of freedom (df) =	12					21.03	p > 0.05(**)	
Cramer's V =	0.26	Pearson's C =				26.22	p > 0.01(***)	
						0.41		

Source: Data processing from the questionnaire.

**Tourists' opinion on the main asset of the Danube Delta's reservation depending on their age.**

From the point of view of the tourists who participated at this questionnaire, 61% of

them consider that the main asset of the Danube Delta reservation is the possibility to participate in various activities and fishing.

Table 5. Structure of tourists' opinion on the main asset of the Danube Delta reservation depending on their age

What is the main asset of an agritouristic pension in the Danube Delta natural reserve?								
The tourist's age								
Age	U.M.	Traditional cuisine of Lipova	Accommodation conditions offered	Participating in various activities and fishing	I do not know / I was not	Total		
		No.	No.	No.	No.	No.	%	
18 – 25 years	No.	1	0	6	2	9	9%	
26 – 40 years	No.	4	1	21	12	38	38%	
41 – 60 years	No.	8	1	27	6	42	42%	
> 60 years	No.	1	2	8	1	12	12%	
Total	No.	14	4	62	21	101	-	
	%	14%	4%	61%	21%	-	100%	
Standard Residue								
18 – 25 years	No.	-0.22	-0.60	0.20	0.09			
26 – 40 years	No.	-0.55	-0.41	-0.48	1.46			
41 – 60 years	No.	0.90	-0.51	0.24	-0.92			
> 60 years	No.	-0.51	2.21	0.23	-0.95			
Chi-Square Calculated =	11.39	Critical value (theoretical)=				14.68	p > 0.1(*)	
Degrees of freedom (df) =	9					16.92	p > 0.05(**)	
Cramer's V =	0.19	Pearson's C =				21.67	p > 0.01(***)	
						0.32		

Source: Data processing from the questionnaire.

Also, 14% of tourists consider the main advantage, the traditional Lipova cuisine and 4% consider that the accommodation conditions offered by the accommodation units in this region are an important advantage of the reservation (Table 5).

Tourists aged between 41 and 60 think most of them, accounting for about 27% of all interviewed, that the main asset of this area is the possibility of participating in various activities and fishing. Similarly, there are tourists aged between 26 and 40, but which

account for less than 20% of the total number of tourists surveyed (Table 5).

**Tourists' opinion on the main asset of the Danube Delta's reservation depending on how they get used to go on holidays.**

Tourists who choose to spend their holidays with friends are of the opinion in the

proportion of over 32% of all interviewed, that the main advantage of this area is the possibility of participation in various fishing activities. Similarly, there are tourists who choose to go on family vacations and represent 18% of the total respondents (Table 6).

Table 6. Structure of tourists' opinion on the main asset of the Danube Delta reservation depending on how they get used to go holiday

What is the main asset of an agritouristic pension in the Danube Delta natural reserve?							
The way the tourist likes to go on vacation							
Specification	U.M.	Traditional cuisine of Lipova	Accommodation conditions offered	Participating in various activities and fishing	I do not know / I was not	Total	
		No.	No.	No.	No.	No.	%
With friends	No.	6	1	33	6	46	46%
In the couple	No.	2	1	10	3	16	16%
In family	No.	6	2	19	12	39	39%
Total	No.	14	4	62	21	101	-
	%	14%	4%	61%	21%	-	100%
Standard Residue							
With friends	No.	-0.15	-0.61	0.90	-1.15		
In the couple	No.	-0.15	0.46	0.06	-0.18		
In family	No.	0.26	0.37	-1.01	1.37		
Chi-Square Calculated =	5.88	Critical value (theoretical)=			10.64	p > 0.1(*)	
Degrees of freedom (df) =	9				12.59	p > 0.05(**)	
Cramer's V =	0.17	Pearson's C =			16.81	p > 0.01(***)	
					0.23		

Source: Data processing from the questionnaire.

**Tourists' opinion on the main asset of the Danube Delta's reservation depending on the frequency of holidays.**

By statistically testing the opinion of the tourists (Chi-Square = 21.05 \*\* Critical Value = 16.92 at a probability of p > 0.05), regarding the main advantage of the Danube Delta

reservation according to the frequency of holidays, it is noted that there is a significant association between the opinion tourists on the main asset of the Danube Delta reservation and the frequency of holidays on the analysed problem.

Table 7. Structure of tourists' opinion on the main asset of the Danube Delta reservation depending on the frequency of holidays

What is the main asset of an agritouristic pension in the Danube Delta natural reserve?							
After holiday frequencies							
Specification	U.M.	Traditional cuisine of Lipova	Accommodation conditions offered	Participating in various activities and fishing	I do not know / I was not	Total	
		No.	No.	No.	No.	No.	%
At weekends	No.	1	1	0	2	4	4%
Monthly	No.	1	0	4	3	8	8%
Once every 3 months	No.	3	1	4	6	14	14%
On vacation	No.	9	2	54	10	75	74%
Total	No.	14	4	62	21	101	-
	%	14%	4%	61%	21%	-	100%
Standard Residue							
At weekends	No.	0.60	2.11	-1.57	1.28		
Monthly	No.	-0.10	-0.56	-0.41	1.04		
Once every 3 months	No.	0.76	0.60	-1.57	1.81		
On vacation	No.	-0.43	-0.56	1.17	-1.42		
Chi-Square Calculated =	21.05**	Critical value (theoretical)=			14.68	p > 0.1(*)	
Degrees of freedom (df) =	9				16.92	p > 0.05(***)	
Cramer's V =	0.26	Pearson's C =			21.67	p > 0.01(***)	
					0.42		

Source: Data processing from the questionnaire.

From the analysis of R (Standardized Residue), there are significant differences

regarding tourists who consider that the main asset of the Danube Delta reservation is the

accommodation conditions offered and those which leaves on holiday every weekend, allowing us to conclude that the opinion of tourists about the main asset of the Danube Delta reservation is influenced by the frequency of holidays (Table 7).

**Tourists' opinion on the main asset of the Danube Delta's reservation depending on the budget allocated for holidays.**

Among the tourists who allocate on average, for a holiday, a budget of 501 to 1,500 lei, are of the opinion of over 40.59% of the total of the interviewed, that the main advantage of this area is the possibility of participation in various activities and fishing, and 6.93% particularly appreciate the traditional cuisine of Lipova (Table 8).

Table 8. Structure of the opinion of the tourists regarding the main asset of the Danube Delta reservation depending on the budget allocated for the holiday

What is the main asset of an agritouristic pension in the Danube Delta natural reserve?							
After the budget allocated to the holiday							
Allocated budget	U.M.	Traditional cuisine of Lipova	Accommodation conditions offered	Participating in various activities and fishing	I do not know / I was not	Total	
		No.	No.	No.	No.	No.	%
< 500 lei	No.	5	0	9	8	22	22%
501 – 1,500 lei	No.	7	3	41	10	61	60%
> 1,500 lei	No.	2	1	12	3	18	18%
Total	No.	14	4	62	21	101	-
	%	14%	4%	61%	21%	-	100%
Standard Residue							
< 500 lei	No.	1.12	-0.93	-1.23	1.60		
501 – 1,500 lei	No.	-0.50	0.38	0.58	-0.75		
> 1,500 lei	No.	-0.31	0.34	0.29	-0.38		
Chi-Square Calculated =	7.93	Critical value (theoretical)=				10.64	p > 0.1(*)
Degrees of freedom (df) =	6					12.59	p > 0.05(**)
						16.81	p > 0.01(***)
Cramer's V =	0.20	Pearson's C =			0.27		

Source: Data processing from the questionnaire

**CONCLUSIONS**

The most important conclusions that come out of the questionnaire survey applied to the tourists who visited the Danube Delta are:

- 41.58% of respondents interviewed were 41-60 years of age, followed by those aged between 26 and 40, with a 37.62% share and the opposite those aged over 60 (11.88%) and those aged 18-25 (8.91%);
- the tourists' opinion regarding the investments that should be made for the development of this area, 55% think that investments in road infrastructure should be made, 23% in actions to promote and disseminate the tourist potential of this area, 15% consider that there is a need for investment in utility infrastructure and 5% of them consider the number of tourist units to be insufficient;
- from the point of view of the tourists who participated in this questionnaire, 61% of

them consider that the main asset of the Danube Delta reservation is the possibility of participation in various activities and fishing. Also, 14% of tourists consider the main advantage in the traditional Lipova cuisine and 4% consider that the accommodation conditions offered by the accommodation units in this region are an important asset of the reservation.

**REFERENCES**

[1]ARBDD, 2015, Management Plan of the Danube Delta Biosphere Reserve, Tulcea, p. 12.  
 [2]Crețu Romeo Cătălin, Crețu Raluca Florentina, Ștefan Petrică, 2017, Analysis of the effects of the economic crisis concerning the pensions from the Danube Delta, Scientific Papers Series Management Economic Engineering in Agriculture and Rural Development, Bucharest, Vol. 17 (2), p. 67.  
 [3]Honțuș Adelaida Cristina, 2015, Land Planning for tourism and agrotouristic - the Second edition revised and enlarged, Ceres Publishing, Bucharest, p. 89.



[4]Popescu Ana-Maria, Curea Ștefania-Cristina, 2017, About the health of the economy – as a living system integrated in the ecology of our world, The Success of Quality -Access Magazine, Vol. 18, S2, Bucharest, p. 348.

[5]Toma Elena, 2014, Regional scale efficiency evaluation by input-oriented Data Envelopment Analysis of tourism sector. International Journal of Academic Research in Environment and Geography, Vol.1, No.1, pp. 15–20.

## HOUSEHOLDS IN ROMANIA AND THEIR RELATION WITH THE ECONOMIC GROWTH: STUDY CASE FOR 2010-2016

**Corina CRUCERU**

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Management, Economic Engineering in Agriculture and Veterinary Medicine, 150 Strehareți St., Slatina, Olt County, Romania, Email: c.cruceru19@yahoo.com

**Corresponding author:** c.cruceru19@yahoo.com

### **Abstract**

*Household are in a manner of speaking small motors for a national economy and for the consumption in particular. In most cases, the way a household is managed and its basic characteristics can reflect the economic processes that occur in a specific moment in the financial and economic context and are a great measurement unit for the real standard of living within a country. In this paper we will present the main characteristics of the household in Romania between 2010-2016 and its relation with the given economic growth indicators.*

**Key words:** household, economy, social, consumption, budget.

### **INTRODUCTION**

In its most complex form, the household as observation unit is defined as „a group of one, two or more persons which usually live together, that are generally related, manage themselves in common, sometimes work within the household, consume and harness the obtained products together and participate integrally or partially at the formation and usage of the budget of the household” [7]. The household represents, in this matter, an atomization of the entire economy and, in particular, of the consumption branch, due to its relatedness with the general income and expenses. Also, household dynamic depends on production [1]. But the most important of all is the human resource and its importance within the household economy [4], [5]. In order for the household to be efficiently developed, a managerial plan must be made [6].

This paper presents the evolution of the main parameters that characterize households in Romania between 2010-2016. Thus, we will present both quantity and quality-related parameters, such as types of household structures, expenses within the household, credits within the household, the number of chambers in the household, type of household property, the type of building of the property.

We will then correlate it with the number of total inhabitants, the GDP per capita and the income and expenses per household.

### **MATERIALS AND METHODS**

The parameters of the household will be presented using direct observation. The correlation between the given parameters will be made using linear regression and will be analysed and interpreted using direct observation.

The data was gathered from the on-line resources of the National Institute of Statistics and was selected for 2010-2016 period, due to its closeness to the current period.

### **RESULTS AND DISCUSSIONS**

In order to establish the social context, we will present the main parameters for this study: the population dynamic and the number of residences that equals the number of households. These are the main social parameters that found the base of the research. As we can observe, the registered population decreased in this period, while the number of residences increased, which certifies the economic growth after the economic contractions on a national scale in the context

of a larger number of people which work abroad.

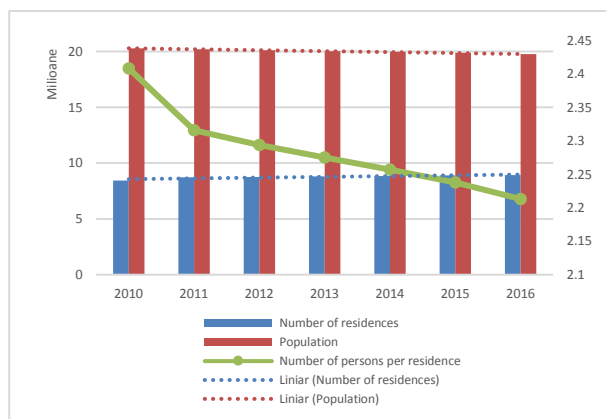


Fig. 1. The population dynamic reported to the number of residences  
 Source: <http://statistici.insse.ro>

The household dynamics within the Romanian economic and social space has been entirely related with the main social context and with the major economic discontinuities. Regarding the social part, the most obvious parameter that led to changes in the traditional household configuration is the accentuated migration phenomenon. To support this statement, Figure 2 presents the dynamics of the migration of the population and its main causes.

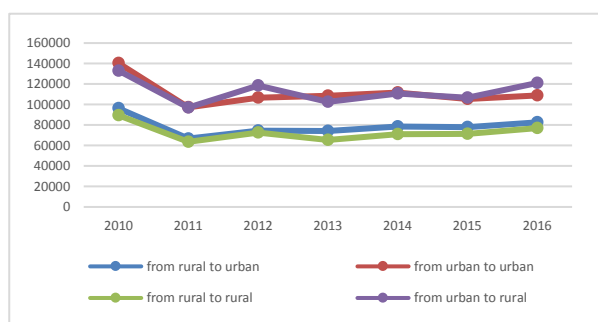


Fig. 2. Internal migration  
 Source: <http://statistici.insse.ro>

Regarding internal migration, we can observe a general trend regarding both of the residential areas, meaning that the phenomenon of internal migration varies between normal ranges. The importance of the context (residential area) is due to the quality of life, being higher in urban areas and lower in rural areas [2], and influences the dynamics of households.

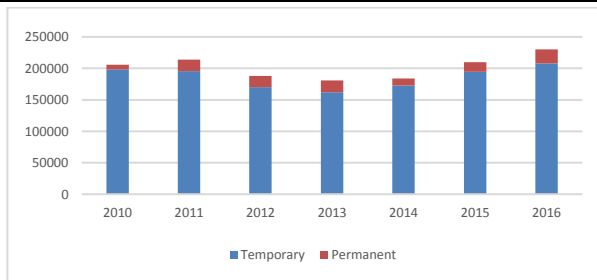


Fig. 3. Number of emigrants regarding the type of migration  
 Source: <http://statistici.insse.ro>

We can observe that the general phenomenon of migration is rapidly growing after a short fall in 2012-2013. The trend is encouraged by the temporary emigrants which leave the country for better financial stimulus of their work. The migration phenomenon influences the household dynamics in a quantitative manner, i.e., their number.

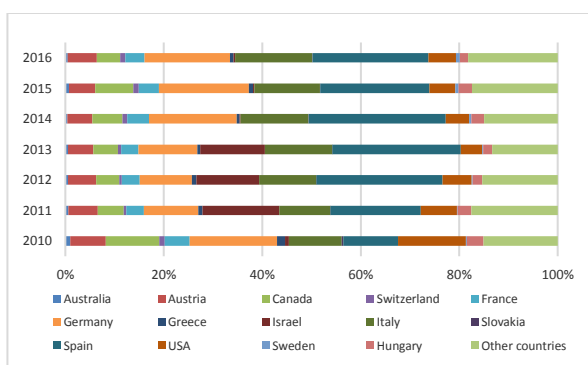


Fig. 4. The destination countries of the Romanian phenomenon of migration  
 Source: <http://statistici.insse.ro>

Figure 4 shows clearly that the migration phenomenon is related to work issues, because the most targeted countries are Austria, Germany, Italy and Spain, countries that are well-known for the fact that are the most usual destination for working purposes. Another cause of migration is due to educational and recreational purposes. The importance of figure 4 resides in the demonstration of the effects of the migration phenomenon on the quantitative side, correlated with the main trends shown in migration.

Besides social movements, the economy plays an important role within the general dynamic of the population. The main economic

indicators per capita and per household are presented in the next figure.

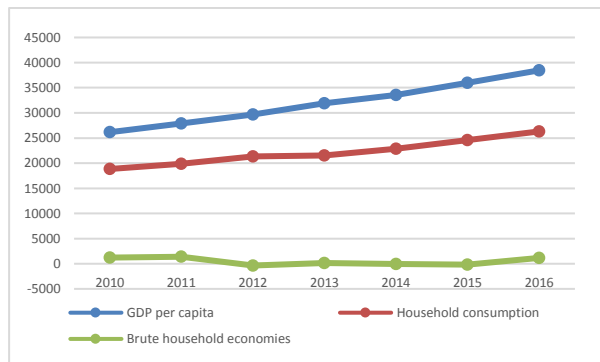


Fig. 5. Economic indicators of the households and persons  
Source: <http://statistici.insse.ro>

While the economic growth is reflected in the trendline of the GDP and the consumption per household, the weak point of this economic context is the low level of the economies per household, which is even negative during final years of 2010-2016 period.

Given these factors, some household key parameters are shown in the next figures.

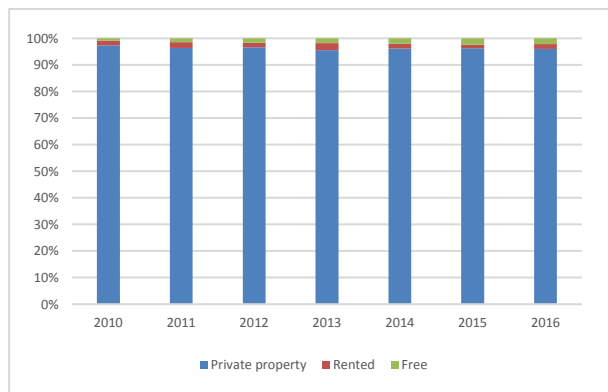


Fig. 6. Structure of households depending on the type of property  
Source: <http://statistici.insse.ro>

Figure 6 shows that the main type of property is the private one, indicating that Romanian people have a high sense of property. Figure 7 shows the proportions of the household structures depending on the number of chambers.

The proportion of the households containing below 5 chambers is sensible equal, matching with the medium level of the economic indicators.

The social and economic indicators rely on economic development and investments.

These are made with capital from banks, so the household are developing economically and socially by getting a loan.

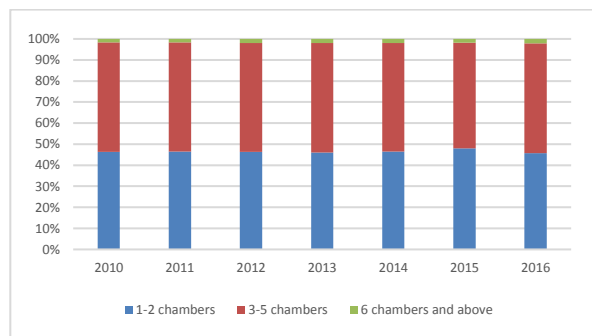


Fig. 7. Structure of households depending on the type of property  
Source: <http://statistici.insse.ro>

Figure 8 presents the proportion of the households that got a loan in the period.

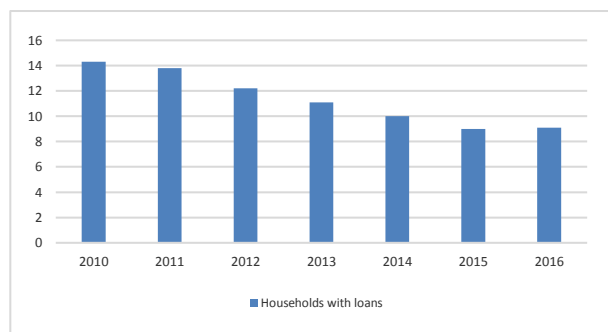


Fig. 8. Percentage of households with a loan  
Source: <http://statistici.insse.ro>

The decreasing slope of the households with loans shows that the people are still reticent to investments.

Figure 9 shows the proportions of the locations of the household in a construction. The majority of households are physically placed in a building with 10 or more flats or are individual.



Fig.9. Percentage of the households depending on the building  
Source: <http://statistici.insse.ro>

Figure 10 shows the percentage of households that can afford a type of action indicating the quality of life.

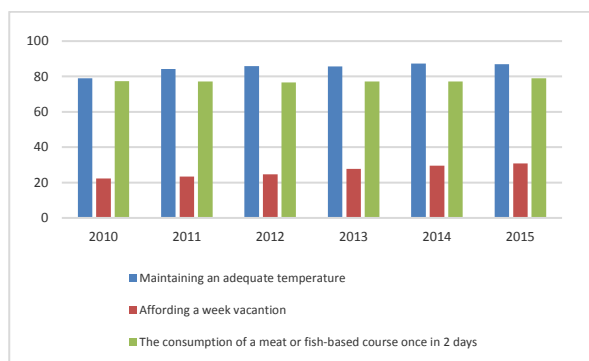


Fig. 10. Percentage of households that can afford the need

Source: <http://statistici.insse.ro>

A large amount of households can afford basic physical needs such as food, nutrients or good shelter, but higher needs (such as going on a vacation) are accomplished in a lower proportion.

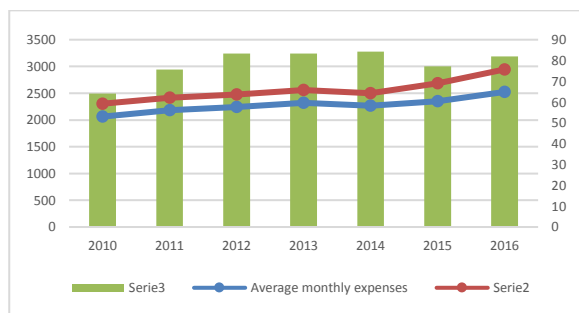


Fig. 11. The average monthly expenses and income, detailed for the income from agriculture

Source: <http://statistici.insse.ro>

The average monthly expenses shown in Figure 11 have an ascending slope, showing the increase of the average consumption.

The next figures show the correlations between the number of households and some key parameters such as the total population, the GDP per capita, the total consumption and the emigration flow. The dependent variable is the number of households, showing its dependency to the given parameters.

The dynamics of the number of households is strongly connected to the dynamics of the population, which is quite normal, but in the same time shows the atomization of the household (the increase of households with fewer members).

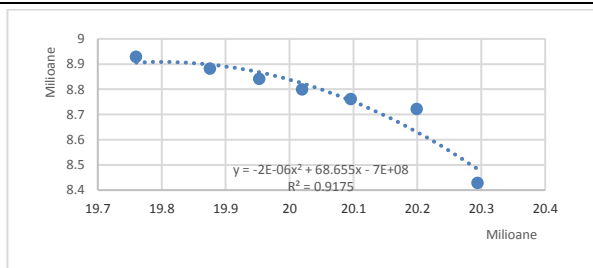


Fig. 12. Correlation between the total number of households and the population

Source: own processing after <http://statistici.insse.ro>

The increase of the number of households is reflected in a great proportion by the GDP per capita, as shown in Figure 13.

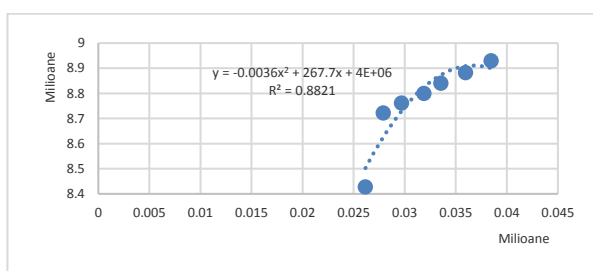


Fig. 13. Correlation between the total number of households and the GDP per capita

Source: own processing after <http://statistici.insse.ro>

The number of households depends in a great manner also by the total consumption of the population, also shown in Figure 14.

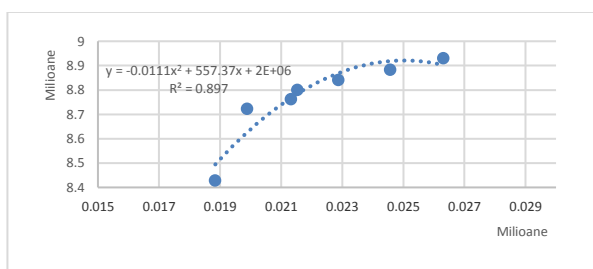


Fig. 14. Correlation between the total number of households and the total consumption

Source: own processing after <http://statistici.insse.ro>

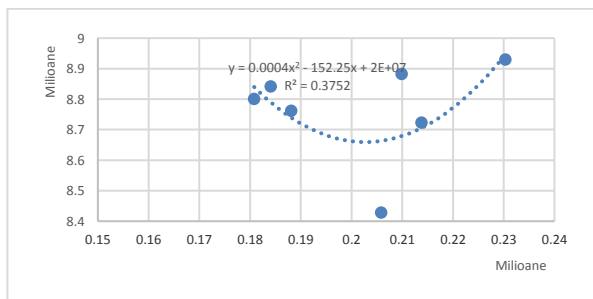


Fig. 15. Correlation between the total number of households and the number of emigrants

Source: own processing after <http://statistici.insse.ro>

The number of households is not greatly influenced by the number of emigrants, showing that a great deal of emigrants are family persons which emigrate temporarily and on a singular basis (Fig.15)[3].

## CONCLUSIONS

The research on the households in Romania in the period 2010-2016 shows that from the economic point of view this dynamic has a positive trend regarding incomes and expenses and influences social phenomena within the context.

## REFERENCES

- [1] Arsic, S., Mijajlovic, N., Kljajic, N., 2013, Organic production and its role in environment protection, Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 13 (3):17-23.
- [2] Hancu, C., D., 2004, Country-side development, Matrix Rom Publishing House, Bucharest, pp.12.
- [3] Delforce, C. J, 1994, Separability in farm-household economics: An experiment with linear programming, Agricultural Economics 10, pp.165-174.
- [4] Paunescu, I., 2000, Human resources management, AISTEDA Publishing, Bucuresti, pp.42.
- [5] Petrescu, I., 1995, Human resources management, Lux Libris Publishing, Brasov, pp.10.
- [6] Walker, J.W., 1980, Human Resource Planning, McGraw-Hill, New York, pp.229.
- [7] The National Institute of Statistics, 2018, <http://statistici.insse.ro>, Accessed January 15, 2018.



## DETERMINING EGG CONSUMPTION LEVEL AND PREFERENCES OF FAMILIES IN ISPARTA PROVINCE IN TURKEY

Vecdi DEMIRCAN, Suna ONCEBE, Sumeyye Nergis TERZI

Suleyman Demirel University, Agriculture Faculty, Department of Agricultural Economics, Isparta-Turkey, Emails: vecdidemircan@sdu.edu.tr

**Corresponding author:** vecdidemircan@sdu.edu.tr

### Abstract

*The purpose of this study was to determine families' consumption levels and preferences for egg in urban areas of Isparta province in Turkey. The main material of the study consisted of the data obtained from surveys, which were conducted by face-to-face interviews with 384 families in Isparta city center. As a result of the research, it was determined that the average population per family was 3.5 persons. It was found that the share of monthly food expenditures in income was 25.3% and the share of monthly egg expenditures was 4.6 % in food expenditures. It was determined that 98.4% of the families consumed eggs, 86.2% at breakfast and 65.1% consumed as boiled. It was found that 20.9% of the families consumed quail eggs in addition to chicken eggs. The annual egg consumption was calculated as 250 per person. It was found that 54% of the families preferred to consume medium size eggs and 60.1% of the families preferred dark colored egg yolk. Results showed that 48.7% of families paid attention on production date while purchasing eggs, 51.6 % of them purchased eggs from supermarkets, 65.9% of them bought it once a week and %50.3 of them preferred gelatin coated viol as packaging. It was also determined that 85.78 % of the interviewed families were aware of organic eggs and 86 % of them would pay higher price for organic eggs.*

**Key words:** egg, consumption level, consumer preference

### INTRODUCTION

People should consume sufficient amount of nutrients in a balanced manner necessary for growth, development and leading a long and healthy life. The energy, proteins, vitamins and minerals required for a sufficient and balanced diet is obtained from animal and vegetable sources (Baysal, 2007) [6]. Animal based foodstuff has importance among the fundamental nutrients. Decrease of animal based foodstuff below a certain limit causes insufficient nourishment in humans. Even though it varies among different age groups, it is suggested to take about 40 – 60 % minimum of the daily protein consumption from animal based nutrients (Anonymous, 2007) [2].

Egg as a product with the best protein quality among all animal based nutrients is a rich source of protein with high nutritional value that is consumed all around the world (Dede et.al. 2005) [9]. Egg preserves its worldwide importance as a valuable source of animal protein for human nourishment (Uluocak et.al., 1996; Hasipek and Aktas 1997)[21,14]

and contains all the nutrients that the human body needs in the most proper amounts and ratios (Gogus, 1986)[12].

A large size egg has on average 6.3 g protein, 4.8 g fat and 0.4 g carbohydrate (Anonymous, 2014). In addition, it is also rich in A, D, E, K and B group vitamins as well as minerals such as iron and phosphor (Stadelman *et.al.* 1988)[18].

Even though Turkey has a significant ranking among the countries of the world with regard to egg production and export, egg consumption per person is not at the desired level. According to 2015 data, Turkey is ranked number 10 in the world with a production of 17.2 billion eggs and 3<sup>rd</sup> in the world with an egg export of 404 million dollars. However, egg consumption per person in Turkey is 203 according to 2015 data. Egg consumption per person in some countries according to 2014 data are as follows: 352 in Mexico, 329 in Japan, 285 in Russia, 256 in Australia, 254 in China, 245 in Denmark and 231 in Germany (Anonymous, 2016)[3]. The main reasons why Turkey has not reached the desired level for egg



consumption despite having a significant ranking with regard to egg production are income level, eating habits (Gunes and Albayrak, 1997) [13] and increasing opinions among the public regarding high cholesterol levels of eggs (Celik and Sengul, 2001)[8]. The position and importance of eggs for a sufficient and balanced diet should be explained to the public in order to correct this and new products containing eggs should be produced which are suited for the fast pace of life in our day (Hasipek and Aktas, 1997)[14]. The main objective of the study was to determine the egg consumption levels and preferences of families living in urban areas of the city of Isparta. For this purpose, various attributes of families have been determined in the study such as their demographic characteristics, food expenses, share of egg expenditure in total food expenses, egg consumption amount, consumed meals, consumption style, purchasing places of eggs and purchasing frequency, the characteristics that families consider when purchasing eggs as well as packaging and size preferences. We hope that the study shall provide valuable information to egg producers, consumers as well as people and institutions working in this field.

## MATERIALS AND METHODS

The main material of the study was comprised of data acquired by way of face-to-face surveys carried out with 384 families selected from the Isparta city center using the sampling method. In addition, results of various studies on this subject along with reports and current statistical data were also used. The survey work for the study was completed during March 2017.

The study was carried out in the city centre of Isparta in the Western Mediterranean Region in Turkey. Isparta province is the centre of the Lake District and its area is 8,933 km<sup>2</sup>. The total population is 421,766 and the central population is 235,456 inhabitants. Isparta province is 120 km away from Turkey's tourism city, Antalya (TUIK, 2016) [20].

The method "Non-clustered single stage simple random probability sampling based on

the population" specified in Equation 1 has been used in determining the number of families to be surveyed (Collins, 1986)[7].

$$N = t^2(p*q) / e^2 \quad (1)$$

In Equation 1, t: t-table value corresponding to a significance level of 95% (1.96), p: probability of the event to take place (0.50) (in this study, the ratio of families that consume eggs), q: the probability of the event not to take place (0.50) and e: margin for error for the sampling (5%). The number of samples was calculated as 384 using Equation 1. After determining the number of samples in the study, the quarters in the Isparta city center were classified according to their socio-economic status into three groups as low, moderate and high income and survey studies were carried out in 15 quarters that may represent the study area. Whereas the number of surveys to be conducted at each quarter was distributed proportional to the populations and the families were selected randomly. Data acquired from the consumers were analyzed via MS Excel and SPSS software after which tables were formed which were then interpreted using absolute and relative distributions and interpreted using the weighted averages method.

## RESULTS AND DISCUSSIONS

The average population per family was determined as 3.5 people according to the study results. It was determined as a result of examining the population distribution with regard to gender that the male and female population ratios were similar. Female and male population ratios were as 50.2% and 49.8% respectively (Table 1).

Table 1. The average population per family

Sex	The average population per family	%
Female	1.76	50.2
Male	1.74	49.8
Total	3.50	100.0

Source: Data from Field Survey, 2017.

Erturk *et.al.* (2015) [11] carried out another study in the study region during which the

female and male population ratios were determined as 50.45% and 49.6% respectively.

Highest population ratio in the study was observed in the 41-64 age group (30.6%) followed respectively by 26-40 (22.8%) and 18-25 age groups (14.3%) (Table 2).

Table 2. Distribution of population by age groups

Age groups	The average population per family	%
0-6	0.30	8.6
7-14	0.43	12.3
15-17	0.28	8.0
18-25	0.50	14.3
26-40	0.80	22.8
41-64	1.07	30.6
65+	0.12	3.4
Total	3.50	100.0

Source: Data from Field Survey, 2017.

When the education levels of mothers in the families were examined, it was determined that the ratio of primary school graduate mothers was higher by a margin of 35.4%. The ratio of high school graduate mothers was determined as 32.7% and the ratio of university graduate mothers was determined as 17.4%. It was determined upon an examination of the education status distribution of the fathers that high school graduate fathers were ranked first (31%), followed by primary school graduates in the second position (29.6%) and university graduates in the third (23.6%) (Table 3).

Table 5. Families' food and egg expenditure

Income groups (TL/month)	Monthly income (TL) (a)	Monthly food expenditure (TL) (b)	Monthly egg expenditure (TL) (c)	(b/a) * 100	(c/b) * 100
0-1,500	1,359.2	486.9	32.0	35.8	6.6
1,501-3,000	2,474.6	859.5	39.1	34.8	4.6
3,001-4,500	3,840.6	1,100.0	44.0	28.6	4.0
4,501+	6,609.7	1,554.1	49.3	23.5	3.2
Average	3,299.8	833.6	38.3	25.3	4.6

Source: Data from Field Survey, 2017.

It was determined that the average monthly income of the examined families was 3,299.8 TL, average monthly food expense was 833.6 TL and average monthly egg expense was 38.3 TL.

Table 3. Educational status of mothers and fathers

Educational status	Mother		Father	
	n	%	n	%
Illiterate	7	1.9	1	0.3
Literate	6	1.6	3	0.8
Primary school	132	35.4	108	29.6
Middle school	41	11.0	54	14.8
High school	122	32.7	113	31.0
University	65	17.4	86	23.6
Total	373	100.0	365	100.0

Source: Data from Field Survey, 2017.

The distribution of families according to their income levels has been given in Table 4.

It was determined that majority of the families were in the 1,501-3,000 TL monthly income group. The ratio of families in the monthly income groups of 0-1,500 TL, 1,501-3,000 TL, 3,001-4,500 TL and 4,501+ TL were calculated respectively as 18.2%, 47.7%, 13.8% and 20.3%.

Table 4. Distribution of families by income groups

Income groups (TL/month)	n	%
0 – 1,500	70	18.2
1,501 – 3,000	183	47.7
3,001 – 4,500	53	13.8
4,501 +	78	20.3
Total	384	100.0

Source: Data from Field Survey, 2017.

The monthly incomes of families along with their food and egg expenses have been given in Table 5.

The share of monthly food expenses in the monthly income was determined as 25.3% whereas the share of monthly egg expenses in the monthly income was determined as 4.6%. It was determined that the average income levels and the food expenses of the

interviewed families increased with increasing average income levels and that the share of food and egg expenses in the monthly income decreased.

Table 6 shows the egg consumption status of families and the meals during which egg is consumed. It was determined that the majority of the interviewed families (98.4%) consume eggs and that only a small portion does not (1.6%). Those who do not consume eggs stated the reasons mostly as health and that they do not like eggs. Those who consume eggs indicated that they mostly consume eggs in the mornings (86.2%) and some stated that the meals they consume eggs do not change (9.5%). It was determined that egg consumption was very low during lunch and dinners. Mizrak *et.al.*, (2012) [17] carried out a study in which the ratio of consumers who consume eggs during breakfast was reported as 85.52%; while Iskender and Kanbay (2014)[15] put forth that 91.2% of the consumers consume eggs during breakfast. When the consumption styles were examined, it was determined that families consume eggs mostly as boiled (65.1%) followed by omelets in the second place (22.2%). Lower egg consumptions were determined at meals and in pastry. The ratio of consumers who consume eggs as boiled was determined by Durmus *et.al.*, (2007)[10] as 69.18% and by Mizrak *et.al.*, (2012)[17] as 70.28 %.

Table 6. Egg consumption status, consumed meals and consumption style

Egg consumption status	n	%
Yes	378	98.4
No	6	1.6
Total	384	100.0
Consumed meals		
Breakfast	326	86.2
Lunch	9	2.4
Dinner	7	1.9
Varies	36	9.5
Total	378	100.0
Consumption style of egg		
Boiled	246	65.1
Omelet	84	22.2
At meals	11	2.9
In pastry	18	4.8
Other	19	5.0
Total	378	100.0

Source: Data from Field Survey, 2017.

When the families who participated in the survey were asked who consumes the most eggs in the family, the ratio of those who responded as everyone was determined as 57.7%. The ratio of families who responded as children consume more was determined as 24.6% (Table 7).

Table 7. People who consume the most eggs in the family

Family members	n	%
Everyone	218	57.7
Children	93	24.6
Elders	34	9.0
Young	32	8.4
Patients	1	0.3
Total	378	100.0

Source: Data from Field Survey, 2017.

It was determined that majority of the examined families consume 0-15 eggs per week (58.25%). The ratio of families that consume 16-30 eggs per week was calculated as 37% (Table 8).

Table 8. Weekly egg consumption of families

Weekly egg consumption (Units)	n	%
0-15	220	58.2
16-30	140	37.0
31+	18	4.8
Total	378	100.0

Source: Data from Field Survey, 2017.

Weekly egg consumption per family was determined as 16.8 eggs and as 4.8 eggs per person. Annual egg consumption per person was determined as 250. According to 2015 date, egg consumption per person in Turkey was determined as 203 (Anonymous, 2016) [3].

These results put forth that annual egg consumption per person is higher in the study region when compared with the Turkey average.

It was determined that 20.9% of the examined families consume quail eggs. Putting up alternative protein sources for sale is important for meeting the animal protein deficit. One of these resources is quail eggs. Recently quail eggs have been put up for sale in various markets with increasing rates of

consumption. The ratio of families which do not consume any other eggs than chicken eggs was determined as 77.8 % (Table 9).

Table 9. Egg types consumed outside of chicken eggs

Egg types	n	%
Duck	3	0.8
Turkey	2	0.5
Quail	79	20.9
None	294	77.8
Total	378	100.0

Source: Data from Field Survey, 2017.

Durmus *et.al.*, (2007)[10] carried out a study in which a quail egg consumption ratio of 13.4% was determined besides chicken eggs. The reason why the ratios of consumption of eggs other than chicken eggs are low may be due to the fact that consumers do not have a habit of consuming these types of eggs.

Whereas supermarkets are ranked first among purchasing places for eggs with a ratio of 51.6%, they are followed by neighborhood bazaars (20.4%), producers (12.9%), grocery stores (9.8%) and own production (5.3%). Majority of the families stated that they would prefer village eggs (75.7%) when asked which egg type they would prefer between village and commercial types (Table 10).

Table 10. Families' purchasing places of eggs and village and commercial egg preferences

purchasing places of egg	n	%
Grocery store	37	9.8
Supermarket	195	51.6
Neighborhood bazaar	77	20.4
Producer	49	12.9
own production	20	5.3
Total	378	100.0
Village and commercial egg preference		
Village	286	75.7
Commercial	92	24.3
Total	378	100.0

Source: Data from Field Survey, 2017.

Iskender and Kanbay (2014)[15] carried out a study in which it was set forth that village eggs would be preferred more if the sales place had both village and commercial eggs.

It was observed that majority of the families purchase eggs once a week (65.9%). The ratio of families which purchase eggs twice a week was calculated as 20.1% (Table 11).

Table 11. Families' egg purchasing frequency

Egg purchasing frequency	n	%
More than once a week	33	8.7
Once a week	249	65.9
Once two weeks	76	20.1
Once a month	20	5.3
Total	378	100.0

Source: Data from Field Survey, 2017.

Akdemir (1989)[1] carried out a study in which it was reported that majority of the consumers (80.4%) have an egg purchasing frequency of once a week.

It was determined that families mostly consider the date of production (48.7%) followed respectively by brand (14.3%), size (11.1%), price (8.7%) and color (5.3%) factors (Table 12).

Table 12. The characteristics that the families consider when purchasing egg

Features	n	%
Brand	54	14.3
Color	20	5.3
Size	42	11.1
Date of production	184	48.7
Price	33	8.7
Other	45	11.9
Total	378	100.0

Source: Data from Field Survey, 2017.

The weight of eggs is a parameter that determines economic gain and is one of the most important criteria that consumers consider when purchasing eggs (Sahin and Gul, 1998)[19]. In addition, eggs are also priced according to size at sales places. It was indicated in the study that 54% of the families prefer middle sized eggs. The ratio of families that prefer large eggs was determined as 35.7% (Table 13).

Table 13. Families' preference of egg by size

Egg size	n	%
Large	135	35.7
Medium	204	54.0
Small	9	2.4
It does not matter	30	7.9
Total	378	100.0

Source: Data from Field Survey, 2017.

Karakaya *et.al.*, (2014)[16] carried out a study in which it was determined that consumer generally prefer purchasing large eggs (49.0%). It was reported in the study carried

out by Celik and Sengul (2001) [8] that even though there were no statistically significant differences between the income groups with regard to considering egg size ( $P > 0.05$ ), it was observed that consumers generally prefer purchasing large eggs. It was also determined in studies carried out by Mizrak *et.al.*, (2012) [17]; Iskender and Kanbay (2014) [15] that medium size eggs are preferred more.

Another important factor with impacts on the egg preferences of consumers is the yolk color. The yolk color preferences of families and their reasons have been given in Table 14.

Table 14. Families' preference egg yolk and reasons

Families' preference	n	%
Dark colored	227	60.1
Light colored	53	14.0
It does not matter	98	25.9
Total	378	100.0
Preference reasons of dark colored egg yolk		
I like it visually	24	10.6
Taste is more delicious	74	32.6
I use it for cakes and pastries	8	3.5
Nutritional value is higher	104	45.8
Other	17	7.5
Total	227	100.0

Source: Data from Field Survey, 2017.

Majority of the families (60.1%) indicated in the study carried out that they prefer dark colored egg yolks. The families stated that factors such as higher nutrient values of dark colored egg yolks (45.8%) and better taste (32.6%) were more effective. Mizrak *et.al.*, (2012)[17] carried out a study in which the ratio of families that prefer dark colored yolk was determined as 81.20% while Iskender and Kanbay (2014) [15] reported in another study that the ratio of students who prefer dark colored yolk was 58.3%.

Egg consumption may vary among consumers according to seasons. Of the participating families, 55.8% indicated that their egg consumption does not vary with the seasons, while 44.2% indicated that their egg consumption varies with the seasons. Consumers who stated that their egg consumptions vary with the seasons stated that they consume more eggs in winter. Indeed, 83.8% of the families which indicated that their egg consumption varies with the

seasons also stated that they consume more eggs in winter (Table 15).

Table 15. Egg consumption by season

Does the consumption of egg change by season?	n	%
Yes	167	44.2
No	211	55.8
Total	378	100.0
The most consumed season		
Spring	4	2.4
Summer	22	13.2
Autumn	1	0.6
Winter	140	83.8
Total	167	100.0

Source: Data from Field Survey, 2017.

Packaging is an important marketing service that has significant impact on consumer preference. It was determined in the study carried out that majority of the families preferred gelatin coated viol (50.3%) followed by closed cardboard viol (30.2%). It was determined that families mostly prefer 15-egg packages (48.4%) and 30-egg packages (41.8%) (Table 16).

Table 16. Families' packaging preferences

Type of packaging	n	%
Open viol	29	7.7
Gelatin coated viol	190	50.3
Closed cardboard viol	114	30.2
Transparent viol	20	5.3
Foam viol	11	2.9
Other	14	3.7
Total	378	100.0
Size of packaging		
6 eggs	10	2.6
10 eggs	11	2.9
15 eggs	183	48.4
30 eggs	158	41.8
Other	16	4.2
Total	378	100.0

Source: Data from Field Survey, 2017.

It was reported in the study by Iskender and Kanbay (2014)[15] that students prefer 15-egg closed cardboard viols and gelatin coated viols.

It was determined in the study that majority of the families (85.7%) indicated that they know organic eggs. Of the families who know organic eggs, 84% stated that they would pay more for organic eggs, while 16% stated that they do not want to pay more. The ratios of

families which indicated that they would pay 10%, 30% and 50% more were determined respectively as 23.8%, 15.7% and 27.2% (Table 17).

Armagan and Ozdogan (2005) [5] carried out a study in which it was determined that consumers would pay 30.4% more for ecologic chicken meat and 30.6% more for ecologic eggs.

Table 17. Families' knowledge status and payment preference for organic egg

Do you know organic egg?	n	%
Yes	324	85.7
No	54	14.3
Total	378	100.0
Payment preferences for organic eggs		
I pay %10 more	77	23.8
I pay %20 more	38	11.7
I pay %30 more	51	15.7
I pay %40 more	18	5.6
I pay %50 more	88	27.2
I don't want to pay more	52	16.0
Total	324	100.0

Source: Data from Field Survey, 2017.

## CONCLUSIONS

In conclusion, it was determined that 98.4% of the families which participated in the surveys consume eggs, that their egg consumption is higher in winter, that eggs are consumed mostly in the morning more as boiled and omelets. It was also determined that families consume quail eggs other than chicken eggs. It was determined that majority of the interviewed families purchase eggs from the supermarkets once a week and that they consider mostly the date of production while mostly preferring medium sized eggs. It was determined in the study that families prefer darker colored egg yolks since it has higher nutritional value and is tastier. It was determined that majority of the interviewed families prefer gelatin coated viols with 15-egg packages as the preferred packaging size. Annual egg consumption per person was calculated as 250 in the study which was above Turkish average. Informational activities which emphasize the importance of eggs for human health should be given more importance in order to increase the rate of egg

consumption both in the study region and in Turkey.

## ACKNOWLEDGEMENTS

The authors thank to the Scientific and Technological Research Council of Turkey (TÜBİTAK) for supporting the research project 2209-A under which this work was financed.

## REFERENCES

- [1] Akdemir, Ş., 1989, Consumers' egg purchasing and consumption behavior in urban areas of Adana city (in Turkish). Ç.Ü. Ziraat Fak. Derg. 4 (5): 126-136. Adana.
- [2] Anonymous, 2007, DPT (State Planning Organization), Ninth development plan, Animal husbandry commission report (in Turkish), Ankara.
- [3] Anonymous, 2016, Turkish Egg Producers Association, <http://www.yumbir.org.tr/>. Accessed on 25 July 2017.
- [4] Anonymous, 2014, Egg Nutrition Center, <http://www.eggnutritioncenter.org/wp-content/uploads/2012/04/Nutrient-Content-of-1-Large-Egg.Pdf>, Accessed on 25 July 2017.
- [5] Armagan, G., Ozdogan, M., 2005, Consumption patterns of ecological egg and chicken meat and determining the consumer preferences (in Turkish). Hayvansal Üretim 46(2): 14-21.
- [6] Baysal, A., 2007, General nutrition (in Turkish), 12. Baskı, Hatipoğlu Yayın evi, Ankara.
- [7] Collins, M., 1986, Sampling (Editor: R. Worcester et al., 1986), Consumer Marketing Research Handbook, Elsevier Sci. Pub. Company Inc.
- [8] Celik, Y., Sengul, T., 2001, Determination of level of egg consumption and consumption pattern of consumers in Şanlıurfa urban areas (in Turkish). Hayvansal Üretim, 42 (2): 53-62.
- [9] Dede, M., Kahraman, N., Kaleli, D.O., 2005, Egg consumption of Çukurova University students (in Turkish). 1. Ulusal Zootekni Öğrenci Kongresi, 16-17 Mayıs, Adana, s.12-13.
- [10] Durmus, I., Demirtas, S., Can, M., Kalebası, S., 2007. Determining egg consumption habits in Ankara (in Turkish). Tavukçuluk Araştırma Dergisi, 7 (1): 42-45.
- [11] Erturk, A., Arslantas, N., Sarica, D., Demircan, V., 2015, Families' bread consumption and waste in urban areas of Isparta city, Turkey (in Turkish). Akademik Gıda 13(4): 291-298.
- [12] Gogus, A.K., 1986, Meat technology (in Turkish), Yayın No: 991, Ankara Üniversitesi Ziraat Fakültesi Yayınları, Ankara, s.243.
- [13] Gunes, T., Albayrak, M., 1997, Marketing problems and solutions of poultry sector in Turkey (in Turkish). Uluslararası Tavukçuluk Konferansı, YUTAV-97,4-17 Mayıs, İstanbul, s.57-64.

- [14]Hasipek, S., Aktas, N., 1997. The importance of chicken products for human nutrition in Turkey (in Turkish). Uluslararası Tavukçuluk Fuarı ve Konferansı, 14-17 Mayıs, İstanbul.
- [15]Iskender, H., Kanbay, Y., 2014, Determination of egg consumption habits of university students (in Turkish). YYÜ Veteriner Fakültesi Dergisi, 25 (3), 57-62.
- [16]Karakaya, E., Inci, H., Sogut, B., Sengul, T., 2014, A study on status of egg consumption of households in central of Bingöl Province (in Turkish). Türk Tarım ve Doğa Bilimleri Dergisi, 1(2): 239–247.
- [17]Mizrak, C., Durmus, I., Kamanli, S., Demirtas, S., Kalebasi, S., Karademir, E., Dogu, M., 2012, Determination of egg consumption and consumer habits in Turkey. Turk. J. Vet. Anim. Sci, 36(6): 592-601.
- [18]Stadelman, W.J., Olson, V.M., Shemwell, G.A., Pasch, S., 1988, Egg and Meat Processing, Ellis Horword Ltd. Chichester (England) s.211.
- [19]Sahin, K., Gul, A., 1998, Families' egg purchasing and consumption behavior in Adana province (in Turkish). Çukurova Üniv. Zir. Fak. Derg., 13(1), 91-100.
- [20]TUIK (Turkish Statistical Institute), 2016. <http://www.tuik.gov.tr>, Accessed on 20 July 2017.
- [21]Uluocak, A.N., Nacar, H., Cebeci, Z., Baylan, M., 1996, Changes of quality characteristics of quail eggs with age (in Turkish). Ulusal Hayvancılık 96 Kongresi, 18-20 Eylül, İzmir, s.269-282.

## DETERMINATION OF CONSUMERS' CONSCIOUSNESS LEVEL ON FOOD SAFETY: CASE OF ISPARTA, TURKEY

Vecdi DEMİRCAN, Hacer CELİK ATES, Deniz SARICA, Nadiye CAVDAR

Suleyman Demirel University, Faculty of Agriculture, Isparta, Turkey, Emails:  
vecdidemircan@sdu.edu.tr, celikha@yahoo.com, denizsarica@sdu.edu.tr ,  
nadiye\_cavdar@hotmail.com

**Corresponding author:** celikha@yahoo.com

### **Abstract**

*The lack of both food assurance and food safety is of global concern. With the welfare of the countries increasing, consumers have put more importance on the food content, reliability and health of the food they consume. With the development of technology, radio, television, and internet, consumers' awareness about safe food has also begun to evolve through communication tools. In this study, it was aimed to determine the level of consciousness of consumers in Isparta province on food safety. The main material of the study was the data provided from the questionnaires conducted by face-to-face interviews with families residing in Isparta city centre. Single-step simple random probability sampling method was used to determine the number of families to be surveyed. The number of samples in the calculation is 384. The study shows that 57.8% of consumers heard about the concept of food safety and 42.2% of them did not hear the concept of food safety. It was found that 13.8% of the consumers had knowledge about the quality control and audit institutions and 86.2% of them had no information on this issue.*

**Key words:** food safety, consumers, informed, Isparta, Turkey

### **INTRODUCTION**

In recent years, issues related climate change, poverty, food safety and sustainability have been leading discussions in the world. Some of the issues are certainly interrelated. Food safety is a source of concern on a global scale. Consumers' concerns over food are not only about health, but also about agriculture, ecology and food culture. Modern food production and the use of pesticides are as vital as technological and environmental changes, and genetic engineering (Holm and Kildevang, 1996) [8]. This is because microbiological food safety problems and the estimation of foodborne diseases, and in general their social and economic costs are still at unacceptable levels. New emerging tools that can be useful in managing such food safety problems have become increasingly sophisticated. Countries face different and diverse food safety risks and problems, depending on consumption patterns, production processes, trade order, and so on (FAO, 2016; FAO, 2017) [6, 7]. For this reason, food safety issues, pesticide residues, anti-microbial resistance, wax coatings,

nanomaterial, and genetically modified organisms increasingly continue to be anxiety sources for consumers. It becomes important to determine the purchasing behaviour of consumers depending on these concerns. Consumers make more conscious choices and their demands on safe food rise along with the increasing levels of communication, transportation and technology as well as increasing income and wealth levels of the countries.

In this study, it was aimed to determine the level of consumers' consciousness on food safety in Isparta province. To this end, the study intends to provide information on consumers' demographic characteristics, food expenditures, places to buy food products, the futures that consumers pay attention when purchasing food products, the situations of finding consumed foods risky in terms of health, the level of knowledge about food safety concept and food safety management systems, information sources on food safety and the willingness to pay extra for reliable food.



## MATERIALS AND METHODS

The main material of the research is the data obtained from 384 questionnaires conducted by face-to-face interviews with selected families in Isparta city centre. The non-clustered, single-step simple random probability sampling method based on the primary mass ratios was used in determining the number of families to be surveyed (Collins, 1986) [5]. After the sample size was determined, the total neighbourhoods in Isparta city centre are divided into three groups according to the socio-economic characteristics: low, medium and high income. The survey was conducted in 15 neighbourhoods which represent the research area. The number of the questionnaires to be made from each district was distributed in proportion to the population of the neighbourhoods and the consumers were chosen by chance. The data were interpreted using chi-square, simple and weighted average methods with absolute and relative distributions.

## RESULTS AND DISCUSSIONS

### *Social and demographic characteristics*

Demographic and economic characteristics and lifestyles can be decisive in determination of the consumers' food purchasing behaviours. In addition, changes in the traditional family structure and intra-family distribution of roles, divorce, increase in the number of working women and people living alone reveal changing consumer behaviour patterns (Gracia, 2005; as cited in Onurlubas and Gurler, 2015) [9].

As a result of the evaluation of 384 questionnaires, 40.1% of the respondents are female and 59.9% are male. In the survey, 56% of the consumers hail from urban background and 44% of them are of rural origin. Monthly average income of the consumers' families is 2,925.39 TL (801.5 USD) while the monthly average expenditure is 1,790.47 TL (490.5 USD). Monthly food expenditures of the consumers are also found as 829.52 TL (227.3 USD) in average.

The surveyed consumers are mostly in the middle age group (57%), married (70%), high school graduates (44%), and workers (29%) or unemployed (25%).

### *Consumers' Consciousness about Food Safety*

Increasing eating habits outside home, prolongation of the process from production to consumption of the food, preference of fresh or less processed foods and changes in food consumption lead to foodborne illnesses caused by microorganisms (WHO, 2002) [13]. Much research has shown that consumers do not have enough information to take precautions to prevent foodborne illness in the home. Contaminated raw foods, inadequate cooking, and unsafe source for food consumption are the most common factors in association with reported outbreaks of foodborne illness inside the home (Mederios, et al., 2001; as cited in Unusan, 2007) [11]. Previous research has revealed that the knowledge of food safety in adults tends to increase with age and practice, that women are better off in this regard, and that young people also need additional training on food safety. In addition, urbanites are far behind the rural people in this subject (Albert, 1995; Bruhn and Schutz, 1999; Rimal et al., 2001) [1, 4, 10].

In the study, nearly half of the consumers (57.8%) heard the concept of food safety, but the vast majority of them still did not hear about it (42.2%). Those who hear correctly define the concept of food safety to a great extent (93.2%). The relationship between the consumers who hear or not hear the concept of food safety and education ( $p=0.00$ ,  $p<0.05$ ), and income ( $p=0.02$ ,  $p<0.05$ ) are statistically significant. Also, there is a significant relationship between those who define the concept of food safety right-wrong and education ( $p=0.00$ ,  $p<0.05$ ), and income ( $p=0.03$ ,  $p<0.05$ ).

Republic of Turkey Ministry of Food, Agriculture and Livestock has established a telephone line (174 Food line) to receive consumers' complaints and audit requests about food. Although 65.9% of consumers know the function of this line, 30.2% of them (which is not a low rate) stated that they have

never heard of this line. The correlation between recognition of 174 lines and education ( $p=0.00$   $p<0.05$ ), and income ( $p=0.00$ ,  $p<0.05$ ) are found significant.

Turkish Standards Institutions (86.5%) and International Organization for Standardization (59.9%) are the most known food security systems.

Table 1. Consumers' Social and Demographic Characteristics

	Women		Men		Total	
	Number	%	Number	%	Number	%
Age						
18-25	20	12.9	25	10.9	45	11.7
26-30	38	24.7	38	16.5	76	19.8
31-40	56	36.4	90	39.1	146	38.0
41-50	26	16.9	46	20.0	72	18.8
51-60	8	5.2	29	12.6	37	9.6
61+	6	3.9	2	0.9	8	2.1
Total	154	100.0	230	100.0	384	100.0
Marital Status						
Married	112	72.7	158	68.7	270	70.3
Single	35	22.8	55	23.9	90	23.4
Divorced	7	4.5	17	7.4	24	6.3
Total	154	100.0	230	100.0	384	100.0
Education Level						
Not Literate	2	1.3	1	0.4	3	0.8
Literate	6	3.9	8	3.5	14	3.6
Primary school	20	12.9	18	7.8	38	9.9
Secondary school	33	21.4	43	18.7	76	19.8
High school	66	42.9	103	44.8	169	44.0
Graduate	27	17.6	57	24.8	84	21.9
Total	154	100.0	230	100.0	384	100.0
Occupation						
Civil Servant	14	9.1	58	25.2	72	18.8
Worker	33	21.4	78	33.9	111	28.9
Self-employed	24	15.6	65	28.3	89	23.2
Retired	2	1.3	15	6.5	17	4.4
Not working	81	52.6	14	6.1	95	24.7
Total	154	100.0	230	100.0	384	100.0
Family Income (USD/monthly)*	Number	%				
>411	35	9.1				
412-1233	312	81.3				
1234 <+	37	9.6				
Total	384	100.0				
Food Expenditures (USD/Monthly)*	Number	%				
>68,5	5	1.3				
69.0-137.0	97	25.3				
138.0-205.5	80	20.8				
205+	202	52.6				
Total	384	100.0				

Source: Authors' calculations based on survey data

\*Calculated according to the average exchange rate of the CBRT (Central Bank of the Republic of Turkey) year 2017 (1 USD= 3.65TL).

While there is no relationship between knowing food security systems and gender, a significant relationship is found between knowledge of food security systems and education, and income. The results show that the consumers still have insufficient knowledge of food safety. In the survey, it is determined that consumers use radio and

television (69.8%) the most as information sources on food safety. There is a significant correlation between the sources of information and education in the chi-square analysis.

According to the results, it is necessary to give more space to these resources to inform consumers about the issue. Giving more space

to food safety issues especially in radio and TV programs can increase the knowledge and awareness level in this subject.

It is very important that food can be stored for long periods without losing its properties in transportation, storage and sale phases. In order to do it, food additives are used in various doses during the production of food.

The food additive is defined as substances, which are not consumed alone as food or not

used as raw food or auxiliary material. It also permitted to be used for the purpose of preserving, correcting or preventing unwanted changes in the taste, smell, appearance, structure and other qualities of the food during preparation, sorting, processing, packaging, transport, storage and distribution of the food (Anonymous 2004; Bekar, 2013) [2, 3].

Table 2. Consumers' Knowledge about Food Safety Concept

	Women		Men		Total	
	Number	%	Number	%	Number	%
Food Safety Concept						
Consumers who hear	85	55.2	137	59.6	222	57.8
Consumers who do not hear	69	44.8	93	40.4	162	42.2
Total	154	100.0	230	100.0	384	100.0
Food Safety Concept						
Correctly Defining	80	94.1	127	92.7	207	93.2
Wrongly Defining	5	5.9	10	7.3	15	6.8
Total	85	100.0	137	100.0	222	100.0
Food Line Definitions						
Assessment of all complaints and requests of consumers regarding food	93	60.4	160	69.6	253	65.9
A phone number that consumers seek to learn about food-related qualifications	3	1.9	5	2.2	8	2.1
It is a line to find out which brands of food are good	2	1.3	5	2.2	7	1.8
I have not heard of the line	56	36.4	60	26.1	116	30.2
Total	154	100.0	230	100.0	384	100.0
Knowledge of Food Security Systems						
Turkish Standards Institutions (TSE)	130	39.2	202	60.8	332	86.5
International Organization for Standardization (ISO)	88	38.3	142	61.7	230	59.9
Hazard Analysis and Critical Control Points (HACCP)	19	31.1	42	68.9	61	15.9
Organic and Ecological Product Certificate	17	35.4	31	64.6	48	12.5
Good Agricultural Practice (G.A.P.)	13	31.7	28	68.3	41	10.7
Do not Know Anything	19	51.4	18	48.6	37	9.6
Willingness to Pay More for Reliable Food						
Do	110	71.4	154	67.0	264	68.8
Do not	44	28.6	76	33.0	120	31.2
Total	154	100.0	230	100.0	384	100.0

Source: Authors' calculations based on survey data

Table 3. Consumers' Information Sources about Food Safety

	Number	%
Radio-TV	268	69.8
Gazette-Journal	62	16.1
Scientific Writings, Books	34	8.9
Friend, Spouses, Companions	64	16.7
Subject Experts	42	10.9
No knowledge	49	12.8

Source: Authors' calculations based on survey data

However, the amount of food additive used is important to prevent any health problems.

Consumers are therefore concerned about whether the food they buy is safe.

The majority of consumers indicate that packaging (86.5%) and labels (77.6%) are now better than in the past while prices (55.5%) and tastes (57.6%) are better in the past. According to the data, it is seen that consumers are not satisfied with the deterioration of tastes in food and the rise in prices although there is now progress in packaging and labelling.

**Consumer Attitudes about Food Safety**

Consumer attitudes on food safety can be differentiated according to the type of food safety issues. Brewer et al. (1994) state that participants' attitudes to the food safety are dominated by six factors. These are chemicals (e.g. hormones in milk and food additives),

health (e.g. cholesterol content and nutritional imbalances), degradation problems (e.g. microbial contamination), regulatory issues (e.g. food inspection and labelling), deceptive practices (e.g. weight loss diets) and ideal conditions (e.g. time for insecticide safety) (as cited in Wilcock et al., 2004) [12].

Table 4. Consumers' Thoughts on Food

	Same		Better in the Past		Better Now		Total	
	Number	%	Number	%	Number	%	Number	%
Price	88	22.9	213	55.5	83	21.6	384	100.0
Quality	38	9.9	151	39.3	195	50.8	384	100.0
Label	57	14.8	29	7.6	298	77.6	384	100.0
Packing	31	8.1	21	5.5	332	86.5	384	100.0
Freshness	60	15.6	127	33.1	197	51.3	384	100.0
Taste	66	17.2	221	57.6	97	25.3	384	100.0
Reliability	57	14.8	150	39.1	17	46.1	384	100.0

Source: Authors' calculations based on survey data

According to another study conducted in Turkey (Bekar, 2013) [3], consumers are most concerned about artificial colour substances added to food, hormone and antibiotic residues in meat, milk and poultry, food with pesticide residues, food additives, GMO foods, contamination risk for food by microorganisms, microbiologically inappropriate food production, and restaurant sanitation. It is notable that the consumers are less anxious about food content, technological applications and production. It is important

how the consumers behave when choosing food in this respect. In the research, the most important subject for consumers when buying product is the hygiene where the purchased products are produced (62.2%). It is followed by the effects of products on environment when buying those (58.6%) and not harmful food packaging for health (58.1%). Sales promoting campaigns such as promotions and product campaigns are seen as the least important issue.

Table 5. The Subjects That Consumers Pay Attention When Consumers Purchase Products (%)

	Very Important	Important	Have no Idea	Not Important	Not Important at All	Score	Sorting
Effects on environment when buying products	58.6	33.9	6.5	1.0	0.0	4.50	3
Being delicious when buying food products	49.7	46.9	1.6	0.8	1.0	4.43	7
To check the packaging stability of food products	52.1	41.7	4.7	1.6	0.0	4.44	6
Origin of the purchased product	39.3	40.1	16.4	2.3	1.8	4.12	11
Cooking and storing food products according to instructions	50.3	34.9	12.8	0.8	1.3	4.32	8
Low price when purchasing food products	31.5	43.0	5.2	16.1	4.2	3.81	12
Hygiene at the place where the purchased products are produced	62.2	34.4	2.1	1.3	0.0	4.57	1
Packaging used in food products is not harmful to health	58.1	40.1	0.8	0.3	0.8	4.54	2
Satisfying purchased products	36.5	51.8	4.4	6.8	0.5	4.16	10
Considering the health risk of purchased products	53.6	43.0	2.6	0.5	0.3	4.49	4
Nutritional values of purchased food products	45.8	40.6	7.6	3.9	2.1	4.24	9
Sales promotion campaigns such as promotions and product campaigns	20.3	41.4	13.0	16.4	8.9	3.47	5

5= Very Important 4= Important 3= Have no idea 2= Not important 1= Not important at all

Source: Authors' calculations based on survey data

The relationship between the education which consumers attach importance to while purchasing products and the effects of buying products on environment (p=0.04) is found to

be significant. The relation between education and the origin of the purchased product (p=0.01) is also significant.

Table 6. Evaluations of Food Sales and Consumption Places in Terms of Reliability (%)

	Very Reliable	Medium Reliable	Less Reliable	Unreliable	Never Reliable	Score	Sorting
Luxury Restaurants	12.2	61.7	20.1	2.6	3.4	3.74	3
Fast food	5.5	42.4	27.1	16.1	8.9	3.19	11
Canteens	1.0	37.5	43.0	12.8	5.7	3.15	12
Restaurants	3.4	53.6	31.3	7.0	4.7	3.44	8
Dining Halls	2.9	49.7	32.3	9.6	5.5	3.34	10
Cafeterias	0.8	57.8	29.7	6.8	4.9	3.42	9
Bakeries	4.9	57.3	26.0	6.3	5.5	3.50	7
24/7 Convenience Store	2.1	25.3	35.4	25.8	11.5	2.80	13
Supermarkets	22.7	66.1	8.6	1.0	1.6	4.07	1
Butchers	9.1	66.4	20.3	1.6	2.6	3.70	4
Fish Markets	7.8	54.2	26.0	4.4	7.6	3.50	6
Groceries	7.3	59.1	25.8	4.4	3.4	3.62	5
Hawkers	3.1	9.6	32.0	26.6	28.6	2.32	15
Neighbourhood Markets	13.8	68.2	11.5	3.6	2.9	3.86	2
Other (Buffet, Wrap Seller)	1.0	11.2	34.4	28.4	25.0	2.34	14

5= Very Reliable 4= Medium Reliable 3= Less Reliable 2= Unreliable 1= Never Reliable

Source: Authors' calculations based on survey data

Furthermore, the relationship between income and storing and cooking food products according to the instructions (p=0.01), low price when purchasing food products (p=0.04), and not harmful food packaging for health (p=0.01) are significant.

The relationship between age and the effects of products on environment when buying products (p=0.03), and taking into account the health risk of the purchased products (p=0.047) are also significant.

Table 7. Tools That Affected Consumers during Food Purchase

	Number	%
TV Advertisements	249	64.8
Discount Days	145	37.8
Radio Advertisements	5	1.3
Promotional Sales	65	16.9
Newspaper-Magazine Advertisements	13	3.4
Wall Banners - Hand Banners	31	8.1
Friend, Neighbour, Business Circle	110	28.6
Other	53	13.8

Source: Authors' calculations based on survey data

Consumers find that supermarkets are the most reliable places for the reliability of food sales places, followed by neighbourhood markets and luxury restaurants. Hawkens and

24/7 convenience stores are considered to be unreliable.

In addition, the consumers are mostly affected by TV advertisements and discount days while buying food. The least affecting one is radio advertisements.

## CONCLUSIONS

Food safety is very important issue, especially in developing countries, concerning producers, intermediaries who process and store food, policy makers, decision makers, and consumers. Health, environment and agriculture are directly related to food safety. In the study, it is aimed to determine the level of consciousness of consumers on food safety in Isparta province. In the research, it is understood that the consumers' food safety concerns tend to increase nowadays along with technological progress and diversification of food processing technology. It is also found that consumers are not sufficiently knowledgeable and conscious about food safety systems and other issues related with it. They do not also know how to report their complaints about it. The most

common information source in related to food safety is televisions.

In terms of a sustainable food safety system, consumers need to be trained about providing the necessary hygienic and sanitary conditions in preparation and preservation of food at home. They should demand from the industry and the state that the food provided for consumption should be safe. The state should also make a legal framework and audit in order to ensure safe food. The effectiveness of these efforts will be enhanced by the fact that the trainings on food safety are carried out by the joint efforts of the state, industry and educational institutions, and by using televisions as information tools.

### ACKNOWLEDGEMENTS

The authors thank to the Scientific and Technological Research Council of Turkey (TUBITAK) for supporting the research project 2209-A under which this work was financed.

### REFERENCES

- [1]Albert, J. A., 1995, Food Safety Knowledge and Practices of Consumers in the USA. *Journal of Consumer Studies and Home Economics*, 19,119–134.
- [2]Anonymous (Ministry of Agriculture and Welfare), 2004. Law No. 5179 on the Adoption of the Decision on amending the Delegated Legislation for the Production, Consumption and Inspection of Foods. Official Gazette dated 05/06/2004 and numbered 25483 (in Turkish).
- [3]Bekar, A., 2013, Attitudes of Consumers towards Food Safety, *Yuzuncu Yil University Journal of Agricultural Sciences*, 23(2): 90-101
- [4]Bruhn, C. M., Schutz, H. G., 1999, Consumer Food Safety Knowledge and Practices. *Journal of Food Safety*, 19:73–87.
- [5]Collins, M., 1986, Sampling (Editors: Worcester et al., 1986), *Consumer Marketing Research Handbook*, Elsevier Sci. Pub. Company Inc.
- [6]FAO, 2016, Food and Agriculture Organization of the United Nations (FAO) in Collaboration with the World Health Organization, Applications of Whole Genome Sequencing in Food Safety Management, p. 29, Available at: <http://www.fao.org/documents/card/en/c/61e44b34-b328-4239-b59c-a9e926e327b4/>, Accessed :25.01.2018
- [7]FAO, 2017, Food Safety Risk Management Evidence-Informed Policies and Decisions, Considering Multiple Factors, Rome.

[8]Holm, L., Kildevang, H., 1996, Consumers' Views on Food Quality. A Qualitative Interview Study. *Appetite*, 27:1-14.

[9]Onurlubas, E., Gurler, Z., 2015, Measurement of Consumers Knowledge Level on Food Safety: A Case Study in Tokat, *Journal of Agricultural Economic and Policy Development Institute, Ankara* (in Turkish).

[10]Rimal, A., Fletcher, S. M., McWatters, K. H., Misra, S. K., Deodhar, S., 2001, Perception of Food Safety and Changes in Food Consumption Habits: A Consumer Analysis. *International Journal of Consumer Studies*, 25(1): 43-52.

[11]Unusan, N., 2007, Consumer Food Safety Knowledge and Practices in the Home in Turkey, *Food Control* 18: 45-51.

[12]Wilcock, A., Pun, M., Khanona, J., Aung, M., 2004, Consumer Attitudes, Knowledge and Behaviour: A Review of Food Safety Issues, *Trends in Food Science & Technology* 15: 56-66

[13] World Health Organization (WHO), 2002, WHO Global Strategy for Food Safety. Available at: [http://www.who.int/foodsafety/publications/general/en/strategy\\_en.pdf](http://www.who.int/foodsafety/publications/general/en/strategy_en.pdf)



## INPUT USAGE AND PROBLEMS IN CHICKPEA PRODUCTION IN KÜTAHYA PROVINCE, TURKEY

Aybike ERTÜRK, Mevlüt GÜL

University of Süleyman Demirel, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Phone: +902462118588, Fax:+902462118696, Emails: Aybikeerturk43@gmail.com, mevlutgul@sdu.edu.tr

**Corresponding author:** Aybikeerturk43@gmail.com

### Abstract

*Chickpea (Cicer arietinum) is an important cultural plant of the Fabaceae family, rich in nutrients and consumed almost everywhere in the world. Turkey has not been self-sufficient in recent years in the production of chickpeas. The chickpea's producers prices were unstable. As a research field, Kütahya was chosen as one of the most important crops in terms of chickpea cultivation area and production in Turkey. There are more technical aspects of chickpea production in Turkey. The aims of this study were to examine socio-economic structures of chickpea producing farms in Kütahya province, and to analyse input usage and to determine problems related to production. The sample size was determined by stratified sampling method and was calculated as 85 chickpea farmers. The face-to-face survey method was used for obtained data from farmers. The study determined the usage of seed, fertilizers and pesticides and calculated the labour and machine power per hectare. The most important problems in the investigated area were the increase in input prices and anthracnose disease.*

**Key words:** chickpea, farmer, input, Kütahya, Turkey

### INTRODUCTION

Chickpea contains 16.4% - 31.12% protein. It is an important product in terms of protein in the diet to meet the needs of the growing population in the world and Turkey. [18][24] Chickpea also used as a yeast for making traditional bread in Turkey. Gül et al. [11] stated out that the bread characteristics and sensorial properties of chickpea bread were more pronounced than white wheat bread. At the same time chickpea generally takes place in gluten-free bread formulations [10].

Chickpea acreage was 878,000 hectares in 1991, reduced by 60% in 2016, decreased to 351,687 hectares in Turkey. Chickpea production was 855,000 tons in 1991 also fell by about 47% and fell to 455,000 tons in 2016. Over the years, the production and sowing area of chickpea tended to decrease continuously (Fig. 1).

The decline in production was less than in the sowing area, with increases in the yield (Fig. 1 and 2).

Uşak province is biggest share in Turkey chickpea cultivation area (8.26% ratio), however, the highest share in the production

is Antalya (with a ratio of 7.59%). Important areas in chickpea production were Antalya, Uşak, Kırşehir, Konya, Mersin, Ankara, Karaman and Kütahya provinces. Compared to 2000, the cultivation area of chickpeas increased in Karaman, Kırşehir and Ankara and decreased in other provinces. According to 2000, chickpea production rose in Kırşehir, Ankara, Antalya, Karaman and Mersin. In the province of Kütahya, chickpea sowing areas decreased by 33% compared to 1991, and production decreased by 14% (Fig. 1).

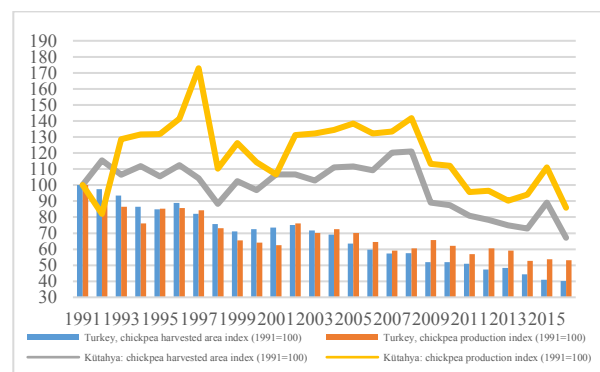


Fig. 1. Development of chickpea production and cultivation area in Turkey and Kütahya

Source: TÜİK [22].



Kütahya province is the 46th place for the chickpea yield, and it is the 9th place for production and sowing area.

Turkey and Kütahya chickpea yields tend to increase in the years 1991 to 2016. But this increase has fluctuated (Fig. 2). The reasons for these are the production of chickpeas in arid areas and the direct influence in the weather conditions.

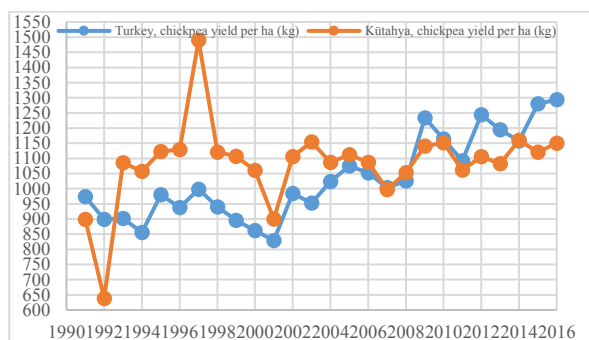


Fig. 2. Development of chickpea yield in Turkey and Kütahya

Source: TÜİK [22].

Kütahya's share in the production of chickpea acreage is about the 2-fold increase in the years 1991 to 2016 (Fig. 3). Therefore, this province was chosen as the research area.

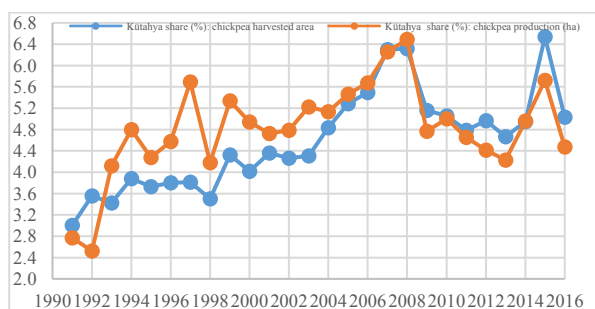


Fig. 3. Development of chickpea production and cultivation area in Turkey and Kütahya

Source: TÜİK [22].

The aims of working at this point were: (i) to examine the socio-economic structure of chickpea farms in Kütahya, (ii) to analyse the use of inputs, (iii) to identify problems related to production and to develop them in solution proposals.

## MATERIALS AND METHODS

The data were obtained by the face-to-face survey method from the farmers who made chickpea cultivation in Kütahya province.

Also on the subject of the research findings conducted at national and international level was used. The data were from the 2016 production period.

The main population of the study consisted of farmers in the Merkez, Çavdarhisar, Dumlupınar and Gediz districts. These districts constitute 80.90% of chickpea production and 76.10% of sowing area in Kütahya province.

Simple layered sampling method was used [25] and Neyman Method was used in the stratification of the sample number [6]. Accordingly, the sample population to be represented by the main population was calculated as 85 farmers with a 95% confidence limit and 10% error margin. Farmers were divided into three groups (I, II, and III.) according to their frequency distribution, taking into account the size of cultivated chickpeas. First group's farmers (I) were defined as ranged between 0.10-0.400 ha of chickpea harvested area (15 farmers), the second group (II) was 0.401-1.50 ha (32) and third group (III) was 1.501 ha (38 farmers) and above. Descriptive statistics and tabulation were used to analyse of input usage and characteristics of the farms.

## RESULTS AND DISCUSSIONS

The farmers' ages, education level, household size, experience level of agriculture and chickpea farming, and some indicators were given in Table 1 in the study area. The age of farmers was 50.13 years in the average. The first group of farmers was younger than the other groups with 45.87 years. The second group was the oldest with 51.69 years. Farmer's age was 50.50 years in the third group.

Farmers' education level was 6.94 years. The third group farmers' education level was higher with 7.37 years. The first group farmers' level was 6.80 years, and the second group was 6.50 years. Farmers' education levels were above the primary school level in the research region and these findings were close to the average education level of Turkey.

Chickpea farmers' household size was about 4 person in the research area. This value was about 5 person in the third group (Table 1). This value was 3.15 person in Kütahya province as a whole in the year 2013 [21]. Therefore, the rural area household size was more than the urban average.

Interviewed farmers had 27.84 years of agricultural experience. The second group had the most experimental in plant production with 29.59 years (Table 1).

Farmers' experience in chickpea production was more than 21 years. Experience level was higher in the third groups with more than 23 years. While the first group of farmers had 14 years, the second group had more than 22 years (Table 1).

The farmers interviewed had 0.89 credit cards in the average. The third group farmers had a maximum credit cards with 1.11 number. The debt status was again higher in the third group of farmers with 1,914.47 TRY (Table 1).

It was investigated the farmers' tendency to continue of producing chickpea. Responses from farmers were taken from Likert of 5. The farmers interviewed had a tendency to continue production. This tendency was greater in the third group (Table 1).

Farmers described their knowledge of chickpea production as moderate. Knowledge level was higher in the third group. This level was low in the first group. Farmers also expressed their level of satisfaction with chickpea production at moderate levels. This level of satisfaction was higher in the third group. But the satisfaction level of the first group was low (Table 1).

Consisting of agricultural land in Turkey has a multi-part problem. As a matter of fact, this result was also reflected in the findings of this research. The number of pieces of chickpeas land was 4.92 pieces in the average. Farmers of the third group had 8.16 pieces of chickpea land. The first group had the lowest number of land pieces with 1.40 pieces (Table 1).

Chickpea land size was 3.65 hectares in the average. First group farmers had 0.22 hectares, the second group farmers had 1.02 hectares, and the third group farmers had 7.22 hectares of chickpea land, respectively (Table 1).

The 95% of the farmers produced chickpea in their owned land. Generally, farmers interviewed was small-scale farmers and did farming in the owned land. The chickpea land's share was 31.82% in the total agricultural land. This value varied between 5.81% and 39.55% in the farm groups (Table 1).

Farmers' ownership of non-agricultural employment was 31.76% on average. The first group with 40% of farmers surveyed had the highest participation in non-agricultural work (Table 1). Agricultural income was important in the total income of the interviewed farmers.

About 7% of the interviewed farmers were earned agricultural income outside of their operation (Table 1).

Table 1. Some socio-economic indicators in the chickpea farms

Indicators	I	II	III	Average
Age of farmer (years)	45.87	51.69	50.50	50.13
Education level of farmer (years)	6.80	6.50	7.37	6.94
Household size (person)	3.93	3.25	4.53	3.94
Experience in agriculture (years)	22.13	29.59	28.61	27.84
Experience in chickpea production (years)	13.87	22.63	23.08	21.28
Number of credit cards (number)	0.60	0.78	1.11	0.89
Amount of debt (TRY)	1,016.67	990.63	1,914.47	1,408.24
Tendency to continue growing chickpeas *	2.87	3.22	3.87	3.45
Knowledge level in chickpea cultivation **	3.13	3.16	3.53	3.32
Satisfaction level in chickpea cultivation **	2.60	2.72	3.21	2.92
Parcels number of chickpea area (pieces)	1.40	2.72	8.16	4.92
Chickpea area (ha)	0.22	1.02	7.22	3.65
Owned land of chickpea area (%)	100.00	100.00	94.35	95.00
Share of chickpea area in total area (%)	5.81	14.50	39.55	31.82
Farmer engaged in non-agricultural work (%)	40.00	28.13	31.58	31.76
Income earned by the other farms (%)	0.00	6.25	10.53	7.06

\*: Likert Scale: 1 = absolutely not thinking; 2 = Does not think; 3 = Undecided; 4 = Thinking; 5 = definitely thinking

\*\* : Likert Scale: 1 = Very low; 2 = Low; 3 = Medium; 4 = High; 5 = Very high

Source: Own calculation.

In the survey, farmers' total agricultural land was the sum of rented land, owned land and the sharing land.

It was estimated that the number of pieces of agricultural land for farmers was 16.40 parts (Table 2).

The average farmland in interviewed farmers was 11.47 hectares. About 4.04% of this land area could be irrigated, and 95.96% were arid land. The fallow area was 0.63 hectares in average, accounting for 5.48% of the total farmland.

In the average of the farms surveyed, 97.23% of the land with 11.47 hectares of land was composed of owned land, 1.49% of the rented land and 1.28% of the sharing land (Table 2). This situation indicated that the farmers interviewed in the region continued agricultural activities in the property.

In Kütahya province and in the selected region, the rate of irrigated agricultural areas is as low as 2.68%. For this reason, approximately 79.72% of agricultural areas are planted with field crops. Wheat, barley, chickpeas, vetch, clover, sugar beet, sour cherry are important agricultural products.

Table 2. Land property and ownership

Indicators	I	II	III	Average
Parcels numbers (piece)	8.33	12.19	23.13	16.40
Fallow land (ha)	0.57	0.36	0.88	0.63
Owned (ha)	3.79	6.99	17.57	11.15
Rented (ha)	0.00	0.03	0.36	0.17
Sharing (ha)	0.00	0.00	0.33	0.15
Irrigated (ha)	0.30	0.52	0.48	0.46
Arid (ha)	3.49	6.50	17.77	11.01
<b>Total land (ha)</b>	<b>3.79</b>	<b>7.02</b>	<b>18.26</b>	<b>11.47</b>
Fallow land (%)	14.96	5.08	4.83	5.48
Owned (%)	100.00	99.55	96.25	97.23
Rented (%)	0.00	0.45	1.95	1.49
Share (%)	0.00	0.00	1.80	1.28
Irrigated (%)	7.92	7.35	2.65	4.04
Arid (%)	92.08	92.65	97.35	95.96
<b>Total land (%)</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source: Own calculation.

The 0-6 age group share was 2.39% of the total family population in the groups' average. About 11.34% of them were in the age group of 7-14 and 48.06% were in the 15-49. The age group over 50 share was 38.21% (Table 3). The age group of 50 and above was 28.55% in the Kütahya province in the year 2013. The 15-49 age group, 0-9 age group, and 10-14 age group share were 52.72%, 12.09%, and 6.64% respectively [21]. Accordingly, there are more elderly people in the rural area. Young generations are trying to look for work in an urban area.

Table 3. Family population by age groups

Age groups	I	II	III	Average
0-6	0.00	3.85	2.33	2.39
7-14	15.25	12.50	9.30	11.34
15-49	55.93	38.46	51.16	48.06
50+	28.81	45.19	37.21	38.21
Total men	47.46	49.04	51.74	50.15
Total women	52.54	50.96	48.26	49.85
Household size	100.00	100.00	100.00	100.00

Source: Own calculation.

In TR33 (Manisa, Afyonkarahisar, Kütahya, Uşak) region, 44.6% of those employed in population aged 15 years and over in 2013 were employed in agriculture and 23.1% in industry. Employment in the services sector was 32.3%. [21] Therefore, agriculture is important in terms of regional economy. The share of employment in agriculture was 23.57% in Turkey.

It was determined that 8.56% was literate, 2.45% was not literate, 44.04% was the primary school, 12.23% was the secondary school, 29.05% was high school and 3.67% was university graduates. According to this, it is found that primary school graduates were more likely to have family members in the region studied. The education level of the third group farmers' family members was higher (Table 4).

The rate of illiteracy for people over age 15 was 4.7% in Turkey, while 95.3% was literate in 2013. In Kütahya, these rates were 3.2% and 96.8% respectively. In 2013, the ratio of the college or faculty graduates of Kütahya to the same age group population was 9.6%. [21] The results of the study were close to the average of Kütahya.

Table 4. Education Level of Family Population

Education level	I	II	III	Average
Be illiterate	0.00	5.00	1.79	2.45
Literate	8.47	10.00	7.74	8.56
Primary school	54.24	47.00	38.69	44.04
Secondary school	11.86	15.00	10.71	12.23
High school	22.03	23.00	35.12	29.05
University	3.39	0.00	5.95	3.67
Total	100.00	100.00	100.00	100.00

Source: Own calculation.

Since chickpea is a summer plant, sowing time is in spring. Suitable time for sowing is between 15 March-30 April for chickpea. [13] In the survey, the farmers did the sowing time of chickpeas in April (37.65%), May (55.29%), and June (7.06%) months.

The amount of chickpea seed applied varies depending sowing method, sowing interval, seed weight of 1,000 and seed germination power per hectare. [13]

Planting methods in chickpea farming are traditional with broadcasting high seed rate by hand and drill. It is recommended that the

seeds amount is to be 150-180 kg. This amount drops to 40-50 kg with drill. [13]

The farmers usually sowed chickpea with sowing machine in the research area. Farmers used as 147.41 kg seed per hectare in the average. This varied between 140.40 kg and 148.30 kg in farmer groups (Table 5).

About 22.35% of the farmers in the region planted traditional methods of broadcasting by hand. This rate was higher in small scale farmers (40%). The 77.65% of the farmers used drill machine for chickpea cultivation.

The farmers in the region applied 9.67 kg of N on average in the cultivation of chickpeas per hectare. It is estimated that the farmers interviewed use 16.92 kg of P on average. K application was 5.04 kg on average per hectare. The third group used the highest NPK (Table 5).

Some herbicides are used before or after sowing in the chemical pathways of weeds in chickpea cultivation [13]. Chickpea growth periods are also affected by many diseases and harmful effects. Anthracnose, Rhizoctonia root rot, Pythium rot, Fusarium wilt, white mould, bacterial blight and some virus diseases are important diseases in chickpea cultivation. However, the most common and most harmful disease in chickpea farming is "anthracnose". Common pests are *Liriomyza cicerina* Rond and *Heliothis virescens*. [13]

The 98.82% of the farmers reported that the most important disease was anthracnose problem in the area studied. It was estimated that the herbicide use in the cultivation of chickpea was 666.91 g per hectare in the studied region. Fungicide and insecticide applications were 107.66 g and 58.02 g, respectively, on average. The use of fungicide was greater. The first group farmers did not use fungicide and insecticide in chickpea cultivation (Table 5).

Foliar fertilizer applications were 11.79 kg per hectare. The application of manure was 2.58 kg in average and very low compared to the use of chemical fertilizer (Table 5).

The application of 20-30 kg N and 40-60 kg P fertilizer per hectare brings a considerable increase in chickpea yield [15]. Farmers had low fertilizer application. This situation was

also affected by climate conditions that year and soil structures.

Farmers used 11.25 hours machine power on average per hectare in chickpea production. They used 107.39 hours labour on average per hectare. The third group farmers used 107.39 hours labour in chickpea farming. This group was the lowest labour usage. The first group of farmers was the most with labour usage of 384.24 hours per hectare. Family labour force utilization was 61.74 hours a year on average in chickpea agriculture per hectare. This value varied between 58.59 hours and 272.12 hours in the farmers' groups. The use of paid worker was calculated to be 45.64 hours per hectare (Table 5). As the business scale grew, the rate of paid workers increased. As a matter of fact, 57.50% of the total workforce was in the family labour force and 54.99% to 70.82% on the enterprise scale. Therefore, more than half of the workforce employed was provided with family labour in the cultivation of chickpea.

About 52.94% of the farmers in the region used harvesters machine in chickpea harvesting. According to the production scale, harvesting machinery usage increased. The 73.68% of the third group farmers used harvesters.

The yield of chickpea was calculated to be 985.75 kg per hectare. The chickpea yield varied between 862.12 kg and 998.45 kg per hectare in the farmers' groups, with the highest yield in the third group of farmers (Table 5).

The number of registered chickpea varieties in Turkey is 19 [7]. The farmers who were interviewed found that 20.00% of Sarı 98 variety, 36.47% of Hisar, 22.35% of İspanyol and 21.18% of Azkan variety were suitable for regional chickpea farming.

In different ecological conditions, the yield of chickpea is also different. Singh and Saxena [16] reported that the chickpea yield was 1,674 kg per hectare in a 10-year period (1983-1993) at three locations in ICARDA. Azkan et al. [3] found that chickpea yield was 1,682 kg hectare in the Bursa province, Anlarsal et al. [2] determined that chickpea yield was 2,173 kg per hectare in the Çukurova region. Özdemir et al. [13] found that the chickpea yield was 2,670 kg in 10

different types of chickpeas in the Eastern Mediterranean Region. Altınbaş and Sepetoğlu [1] determined chickpea yield ranging values between 1,786 kg and 2,719 kg per hectare in İzmir province. Togay and Togay [19] reported that the yield was 876.2 kg per hectare in Van province. Türk and Koç [23] determined that the yields of domestic chickpea were 1,444 kg, the yield of 995 kg in Diyar-95 variety in Ceylanpınar ecological conditions. Toker and Çancı [20] reported that chickpeas yielded was changed 871-1,676 kg per hectare in Antalya province. Bakoğlu and Ayçiçek [4] determined that the chickpea yield was changed between 497.9-986.7 kg in Bingöl province. Yiğitoğlu [27] reported that chickpea yields were changed between 1,524 kg and 2,457 kg in early winter sowing, 1,235 kg and 2,160 kg per hectare in early spring sowing in Kahramanmaraş province. Yaşar [26] determined that chickpea yields were changed between 1,215 kg to 1,730 kg per hectare in Diyarbakır province. Biçer et al. [5] found that chickpea yields were ranged from 922 kg to 1,954 kg per hectare in winter planting, ranged from 810 kg to 1,403 kg in spring planting in Diyarbakır.

Table 5. Input utilization rates in chickpea farming

Inputs	I	II	III	Average
N usage per hectare (kg)	4.72	8.92	9.82	9.67
P usage per hectare (kg)	8.28	15.61	17.18	16.92
K usage per hectare (kg)	2.44	4.64	5.12	5.04
Seed per hectare (kg)	142.58	140.40	148.30	147.41
Herbicide usage per hectare (g)	212.12	427.34	700.80	666.91
Fungicide usage per hectare (g)	0.00	187.40	99.49	107.66
Insecticide usage per hectare (g)	0.00	129.03	50.29	58.02
Foliar fertilizers usage per hectare (kg)	0.00	16.77	11.34	11.79
Manure usage per hectare (kg)	0.00	3.07	2.55	2.58
Machinery power used per hectare (hour)	36.36	17.11	10.25	11.25
Family labour used per hectare (hour)	272.12	66.97	58.59	61.74
Paid-labour used per hectare (hour)	112.12	54.81	43.76	45.64
Total labour used per hectare (hour)	384.24	121.78	102.35	107.39
Yield of chickpeas per hectare (kg)	862.12	891.24	998.45	985.75

Source: Own calculation.

Chemical fertilizer use rate was 30.59%. The 51.76% of the farmers interviewed also had herbicide application (Table 6). Also Duzdemir et al. [9] found that 59.5% of farmers used chemical fertilizers for chickpea growing in Tokat province. The first 30 to 60 days of the emergence of chickpea plants are the most critical period for weed control [14]. Şanlı et al. [17] reported that most effective for control of weeds was hand hoeing application at the 36th day after crop emergence in Isparta ecological conditions. Şanlı et al. [17] claimed that this application

increased the yield of chickpeas by 142% and with this application, the yield was 1,430 kg per hectare. Demir et al. [8] also found that hand hoeing was the most effective for control of weeds, resulting in the highest yield in chickpea throughout in Diyarbakır.

Fungicide (12.94%) and insecticide (4.71%) use rates were low. About 23.53% of the farmers applied foliar fertilizers and 3.53% applied manure. The farmers' production scale increased the use of inputs (Table 6).

Also, the farmers in the region usually used the chickpea-wheat rotation system. However, some farmers in this issue had lack of knowledge.

Table 6. Input usage amounts in chickpea farming

Inputs	I	II	III	Average
Chemical fertilizer usage (%)	13.33	31.25	36.84	30.59
Herbicide usage (%)	20.00	46.88	68.42	51.76
Fungicide usage (%)	0.00	9.38	21.05	12.94
Insecticide usage (%)	0.00	6.25	5.26	4.71
Foliar fertilizers usage (%)	0.00	25.00	31.58	23.53
Manure usage (%)	0.00	3.13	5.26	3.53

Source: Own calculation.

Chickpea is a more extensive agriculture than fruits, vegetables and other industrial plants. The sources of information on input use of chickpea farmers in the research area were also examined. Farmers' answers were taken with the Likert scale of 5. In selecting the inputs, farmers reported that their knowledge and experience were more important. Their experience in input selection, use and preference were important. The result of this study also corroborate with Gül and Parlak [12] and Duzdemir et al.'s [9] findings. In addition, the technical staff recommendations in the provincial/district directorate of agriculture were important. The result of this study also corroborate with Gül and Parlak [12].

Table 7. Importance of information sources on the input used

Information sources	I	II	III	Average
According to your own knowledge and experience	4.27	4.06	4.24	4.18
Recommendations of technical staff in Provincial Directorate of Agriculture	4.40	4.16	3.87	4.07
Dealer recommendations	3.73	3.88	3.58	3.72
Neighbours and relatives recommendation	3.80	3.78	3.63	3.72
Books, magazines, newspapers, brochures, etc.	3.20	2.84	2.63	2.81
Buyer recommendation (trader)	2.67	2.50	2.37	2.47

5 Likert scale: absolutely no(1), no(2), partly(3), yes(4), absolutely yes(5)

Source: Own calculation.



Dealer's recommendations, neighbours and relatives' recommendation were also found to be important (Table 7).

The problems encountered in the chickpea cultivar in the study area were also examined and the replies given by the farmers were taken with the Likert scale of 5. Farmers expressed the most important problems as high input prices and low chickpea prices. In addition, disease and pests of chickpea farming, breeding techniques, and marketing possibilities/limitations were expressed as important problems (Table 8).

Table 8. Importance level of problems in chickpea farming

Problem areas	I	II	III	Average
High inputs prices	4.00	4.22	4.26	4.20
Low product prices	4.00	4.13	4.11	4.09
Disease and harmful struggle	3.87	4.00	3.89	3.93
On breeding techniques	3.87	3.94	3.89	3.91
Inadequate market and buyer	3.87	3.88	3.79	3.84
Supervision of input vendors	3.27	3.72	4.00	3.76
Fertilizer and fertilizer application	3.53	3.81	3.76	3.74
Providing quality input	3.33	3.88	3.63	3.67
Supply of equipment	3.60	3.41	3.34	3.41
Providing appropriate credit	3.07	3.03	3.26	3.14
Machine use	3.07	2.66	2.68	2.74
Lack of collaboration and organization between producers	2.47	2.72	2.68	2.66

5 likert scale: no problem (1), little problem(2), moderate trouble(3), there is a major problem(4), there is a lot of trouble(5),

Source: Own calculation.

## CONCLUSIONS

In this study, farmers' family population, education level, land assets, some social indicators of farmers and technical applications of chickpea cultivation were evaluated in the case of Kütahya province. In addition, farmers' problems encountered in the cultivation of chickpea were determined.

Farmers' age was 50.13 years in the average. Their education level was more than 6 years, and their household size was 3.94. Experiences in chickpea cultivation were 21.28 years on average. This situation showed that chickpea production is important for farmers in this region.

Farmers' use of inputs in chickpea farming was low. The amount of annual rainfall in the region is low and the possibility of irrigation the land is also insufficient. Generally, farmers were farming in the arid land. The number of land parts was high and they farmed in their owned lands. The yield that farmers gain from chickpea cultivation was also low. Climate conditions are also very effective in the production of grown crops in

the region. Anthracnose disease, input prices and product prices were the most important problems. These indicate that the cultivation of chickpeas was done in extensive agriculture in the region. Therefore, these criteria also indicate the reasons why the agricultural incomes of producers were low. This leads farmers in search of non-agricultural jobs. As a matter of fact, 31.76% of 85 farmers interviewed were working in non-agricultural jobs.

In terms of sustainability of chickpea cultivation in the region, it is important to share the results of the field work done in arid areas with farmers and to inform rotation system, and the farm management to obtain more efficiency from the unit area.

## ACKNOWLEDGEMENTS

This study was a part of Aybike ERTÜRK's MSc. thesis and supported under the scope of the Project no. 4875-YL1-17. We would like to present our cordial thanks to Süleyman Demirel University Department of Scientific Research Projects for their financial supports.

## REFERENCES

- [1]Altınbaş, M., Sepetoğlu, H., 2001, Studies on the seed yield and some agronomic traits of newly developed chickpea lines under Bornova condition (in Turkish). Ege University Ziraat Fakültesi Dergisi, Vol.38(2-3):39-46.
- [2]Anlarsal, A.E., Yücel, C., Özveren, D., 1999, A study on the determination of yield and yield related characteristics of some chickpea lines in Çukurova conditions (Çukurova koşullarında bazı nohut hatlarının verim ve verimle ilgili özelliklerinin saptanması üzerinde bir araştırma). Türkiye 3. Tarla Bitkileri Kongresi Cilt III (Çayır Mera Yembitkileri ve Yemelik Tane Baklagiller), 15-18 Kasım, Adana, 342-347p.
- [3]Azkan, N., Kaçar, O., Doğangüzel, E., Sincik, M., Çöplü, N., 1999, Effect of different sowing times on yield and yield items in chickpea line and varieties in Bursa ecological conditions (Bursa ekolojik koşullarında farklı ekim zamanlarının nohut hat ve çeşitlerinde verim ve verim öğeleri üzerine etkisi). Türkiye 3. Tarla Bitkileri Kongresi Cilt III (Çayır Mera Yembitkileri ve Yemelik Tane Baklagiller), 15-18 Kasım, Adana, pp.318-323.
- [4]Bakoğlu, A., Ayçiçek, M., 2005, A study on yield and yield parameters of some chickpea (Cicer arietinum L.) varieties in Bingöl ecological conditions

- (Bingöl ekolojik koşullarında bazı nohut (*Cicer arietinum* L.) çeşitlerinin verim ve verim öğeleri üzerine bir araştırma). Fırat Üniversitesi Fen ve Mühendislik Bilimleri Dergisi, Vol.17(1):107-113.
- [5]Biçer, B.T., Albayrak, Ö., Akıncı, C., 2017, Effect of different sowing dates on yield and yield characters in chickpea. Adnan Menderes Üniversitesi Ziraat Fakültesi Dergisi, Vol.14(1):51-57.
- [6]Çiçek, A., Erkan, O., 1996, Research and sampling methods in agricultural economics (in Turkish). Gaziosmanpaşa Üniversitesi, Ziraat Fakültesi Yayınları No 12, 118p, Tokat.
- [7]Çiftçi, C.Y., 2004, Agriculture edible legumes in the world and Turkey (Dünyada ve Türkiye’de yemeklik tane baklagiller tarımı. TMMOB Ziraat Mühendisleri Odası Teknik Yayınlar Dizisi no: 5, Ankara, 200 p.
- [8]Demir, A., Tepe, I., Erman, M., 2005, Effect of different control methods on weeds, yields, some yield components and nodulation in chickpea (*Cicer arietinum* L.) (in Turkish). Yüzüncü Yıl Üniversitesi, Ziraat Fakültesi, Tarım Bilimleri Dergisi, Vol.15(1):71-75.
- [9]Duzdemir, O., Akca, H., Sayılı, M., 2008, Factors affecting fertilizer use in chickpea (*Cicer arietinum*) growing: a case from Turkey. New Zealand Journal of Crop and Horticultural Science, Vol.36: 53-57.
- [10]Gül, H., Hayıt, F., 2017, Optimization of gluten-free bread formulation by using response surface methodology. Abstract Proceeding Book of International Conference on Agriculture, Forest, Food Sciences and Technologies (ICAFOF 2017) Conference, May 15 - 17, 2017, Cappadocia, 148 p.
- [11]Gül, H., Hayıt, F., Açar, C., Kurt, N., 2016, Effects of chickpea yeast on physical, textural and sensory properties of breads. 8th International Conference on Chemical, Agricultural, Biological and Environmental Sciences (CABES-16), Dec 30-31, Dubai (UAE), 67 p.
- [12]Gül, M., Parlak, H., 2017, Input usage and problems in green bean production: a case of Burdur province, Turkey. AgroLife Scientific Journal, Vol.6(1): 133-140.
- [13]MEB, 2016, Agriculture. Edible legumes (Yemeklik tane baklagil bitkileri). T.C. Milli Eğitim Bakanlığı Yayınları, Ankara, 55 p.
- [14]Özdemir, S., Karadavut, U., Erdoğan, C., 1999, Stability analysis of some chickpeas cultivated in winter in East Mediterranean Region (Doğu Akdeniz Bölgesinde kışlık ekilen bazı nohut çeşitlerinde stabilite analizi). Türk Tarım ve Ormanlık Dergisi, Vol.23: 201-205.
- [15]Saxena, M.C., Subramaniyam, K.K., Yadav, D.S., 1976, Chemical and mechanical control of weeds in gram. Pantnagar Journal of Research, 1:112-116.
- [16]Singh, K.B., Saxena, M.C., 1996, Winter chickpea in Mediterranean-type environments. A Technical Bulletin, ICARDA, Aleppo, Syria, Vii+39pp.
- [17]Şanlı, A., Kaya, M., Kara, B., 2009, Effects of herbicide applications and hoeing times of weed on yield and some yield components of chickpea (*Cicer arietinum* L.) (in Turkish). Anadolu Tarım Bilimleri Dergisi, Vol.24(1):13-20.
- [18]Şehirli, S., 1988, Yemeklik Dane Baklagiller (in Turkish). Ankara Üniversitesi Ziraat Fakültesi Yayınları, No: 1089 Ders Kitabı, Ankara, 435p.
- [19]Togay, N., Togay, N., 2001, Effect of different row spaces on some agronomic characters in chickpea (*Cicer arietinum* L.) (in Turkish). Tarım Bilimleri Dergisi, Vol.7(2):32-35.
- [20]Toker, C., Çancı, H., 2003, Selection of chickpea (*Cicer arietinum* L.) genotypes for resistance to ascochyta blight [*Ascochyta rabiei* (Pass.) Labr.], yield and yield criteria. Turkish Journal of Agriculture and Forestry, Vol.27:277-283.
- [21]TUİK, 2014, Selected indicators Kütahya 2013 (Seçilmiş Göstergelerle Kütahya 2013). Turkish Statistical Institute Publications, Ankara, 172p.
- [22]TUİK, 2017, TUİK (Turkish Statistical Institute) Statistical Data. (web page: <http://www.tuik.org.tr>, accessed on (20.12.2017).
- [23]Türk, Z., Koç, M., 2003, A study on the determination of the factors limiting the yield and yield parameters of chickpea (*Cicer arietinum* L.) in the Ceylanpınar ecological conditions (Ceylanpınar ekolojik koşullarında nohut (*Cicer arietinum* L.)’ta verim ve verim öğelerini sınırlayan etkenlerin belirlenmesi üzerine bir araştırma). Türkiye 5. Tarla Bitkileri Kongresi, 13-17 Ekim, Diyarbakır, 118-420.
- [24]Uzun, A., Özçelik, H., Yılmaz, S., 2012, Evaluation of some selected chick pea (*Cicer arietinum* L.) lines in respect to agronomic and quality traits (in Turkish). Akademik Ziraat Dergisi, Vol.1(1): 29-36.
- [25]Yamane, T., 2001, Basic sampling methods (in Turkish). (First edition). Translators: Alptekin ESİN, M. Akif BAKIR, Celal AYDIN and Esen GÜRBÜZSEL, Literatür Yayıncılık, İstanbul.
- [26]Yaşar, M., 2010, An investigation on determining yield and yield components of some chickpea (*Cicer arietinum* L.) varieties and lines under Diyarbakir ecological conditions region (in Turkish). MSc. Thesis, Çukurova University, Adana, 60 p.
- [27]Yığıtoğlu, D., 2006. Research on the effect of different sowing densities on the yield and yield components of some chickpea (*Cicer arietinum* L.) cultivars that sown in winter and spring in Kahramanmaraş region (in Turkish). PhD. Thesis, Çukurova University, Adana, 163 p.

## ANALYSIS OF PRODUCTION AND TRADE OF CHICKPEA IN TURKEY AND THE WORLD

Aybike ERTÜRK, Mevlüt GÜL

University of Süleyman Demirel, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Phone: +902462118588, Fax:+902462118696, Emails: Aybikeerturk43@gmail.com, mevlutgul@sdu.edu.tr

**Corresponding author:** Aybikeerturk43@gmail.com

### Abstract

*In this study, the changes in world's and Turkish chickpea market were discussed. The data used in this study were obtained from FAO (Food and Agricultural Organisation) and TÜİK (Turkish Statistical Service) for the 1980-2016 periods. According to the data collected, world's production of chickpea has increased due to an expansion of sown area and yield have also experienced a massive increment of 1.90 times over the period. In the world, Turkey is ranked 5th out of the world's total production of chickpea. Turkey is placed seventh and 52nd in sown area and yield in the world. The trade of chickpea has seen significant development in the world. Thus, over the above mentioned period, export of chickpea quantity increased by 6.88 times, value by 10.34 times. Over the period, the chickpea production of Turkey has increased due to the expansion of the planting area. The chickpea production is being carried out intensively in the following provinces of Turkey, Antalya, Uşak, Konya, Karaman, Mersin, Kırşehir, Kütahya, Yozgat, Ankara, and Isparta provinces are also well known in the production of the chickpea. Turkey's production share and export have decreased. Recently, Turkey is not self-sufficient in the chickpea production. In this respect, especially the increased production of the chickpea sector, this is an essential point of policy regarding the development and improvements.*

**Key words:** chickpea, market, trade, price, Turkey

### INTRODUCTION

Chickpea (*Cicer arietinum* L) is a plant rich in nutrients and consumed almost everywhere in the world. Chickpea is an essential cultural plant of the Fabaceae family. It contains protein content (16.4-31.12%) and regarding carbohydrate values in Turkey and is an essential crop regarding meeting the needs of protein in the diet against the growing population in the world [14]. In addition to being consumed as food, it is an agricultural industry product that can be used both as roasted chickpea and as an animal food [1] [2] [12] [8]. Chickpea is also used as an ingredient of sweet type natural yeast for making traditional bread [6]. Chickpea is generally used in gluten-free food formulations such as for production of gluten free-bread [5].

In the world, chickpea has an essential place in total legume production. India is in the first place regarding chickpea harvested area and production. The fact that histidine amino acid,

which is essential in the digestion of protein in chickpeas and the feeding of children, is higher in the chickpea protein than in the mother's milk leads to the separate importance of this food. It is also rich in mineral substances such as calcium, iron, and phosphorus. A, B and C group vitamins, as well as a rich appetiser with roasted chickpeas and edible grain consumption in Turkey, is quite common [3].

This study aimed to analyse the situation of chickpeas in Turkey and the world. These objectives were the development and compared of chickpea harvested areas, production, yield, consumption, and the export-import situation in the world and Turkey. Moreover, also provinces in Turkey were evaluated on the basis of developments in chickpeas production.

### MATERIALS AND METHODS

The primary material of the study was FAO, TURKSTAT statistical data. In this context,



the 1980-2016 year, chickpea harvested area, yields, production, import and export data in some countries with the data in some provinces of Turkey were evaluated.

Five-year averages of data were obtained since 1980. This data calculated index was analysed using ratios.

The current prices of chickpea were converted to real values in 2016 using the Producer Price Index (UFE; 2016 = 100) calculated by TURKSTAT. Thus, over the years, the changes in prices, their developments, and the causes were tried to be revealed.

Gujarati [10] and Greene [9] defined regression analysis as the estimation of the linear relationship between a dependent variable and one or more independent variables or covariates. The primary goal of regression analysis is to model the various factors which cause variations of the dependent variable [9] [10].

We used the multiple regression analysis to identify the factors that affect chickpea harvested area of Turkey. The regression model in its implicit form was given as:

$$Y = F(X_1, X_2, U) \quad [9] \quad [10] \quad (1)$$

where Y = Harvested area of chickpea (ha)

X<sub>1</sub> = Chickpea yield a year ago (kg)

X<sub>2</sub> = the farmer's real price of chickpea two years ago (TRY)

U = Error term.

Logarithmic function was used to calculate the model. Logarithmic regression model was:

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + U \quad (2)$$

## RESULTS AND DISCUSSIONS

Firstly, the developments in the total world pulses production 2014-2016 averages, and their shares were examined. World total pulses production was estimated to have increased by 75 percent (Fig. 1) from the 45 million tonnes in 1980/84 to 79 million tonnes in 2014/16. The highest share in total pulses production was 34.3% of dry beans. This share was followed by peas dry with 16.0% and chickpeas with 15.4%.

Turkey total pulses production was estimated to have decreased by 1.3 percent (Fig. 1) from the 112.2 thousand tonnes in 1980/84 to 110.8 thousand tonnes in 2014/16. The decline in Turkey production could be attributed to the erratic rainfall and severe harmattan related weather conditions which prevailed mostly during the period. The highest share in Turkey's total pulses production was 41.1% of chickpeas. Lentil followed this share with 32.2% and dry beans with 20.6%.

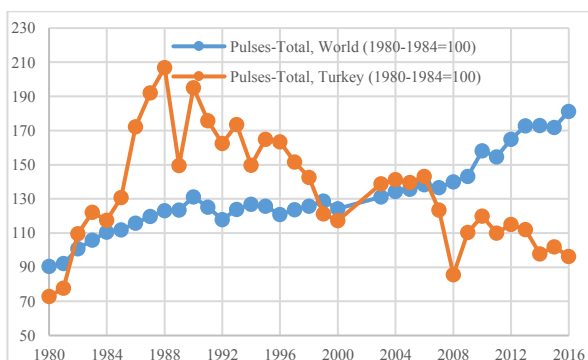


Fig. 1. Development of total pulses production

Source: FAOSTAT [4].

Chickpea is grown in 59 countries around the world. When world chickpea production is examined between 1980 and 2016; the production of chickpeas, which was 6.1 million tons in the 1980-1984 period, increased 1.90 times compared to the base period in 2015-2016. Moreover, world chickpea production reached approximately 11.5 million tonnes (Table 1). The most important producer of chickpea in the world is India (with a significant share of 65.5%). Important other countries in the production of chickpeas were Australia, Myanmar, Ethiopia, Turkey, Pakistan, Russia, Iran, Mexico, USA, and Canada. In the investigated periods in which chickpea production was considered, Australia was the country that increased the most (376 times) followed by Russian Federation (268 times more) (Table 1). India's share in world chickpea production has declined by 7.9% over the years covered, while Australia's share has increased by 6.2%. Turkey accounts for 4% of the world chickpea production. In the considered period, Turkey has increased production of chickpeas, but it appears to other countries and because of the

increase chickpea production in world production rate less than the rate of decrease of share in the world.

In the study direction, chickpea cultivation areas in the world were also examined. World

chickpea harvested area in 1980 - 1984 was about 9.8 million hectares, increased about 1.26 times in the period of 2015-16 and increased to 12.3 million hectares (Table 2).

Table 1. Chickpea production

Country	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2016
Production (tonnes)								
India	4,473,260	4,727,140	4,618,440	5,982,660	4,880,160	6,037,420	8,352,500	7,574,492
Australia	1,900	69,678	169,893	238,394	185,105	279,837	623,291	714,997
Myanmar	118,991	139,796	89,012	83,780	195,200	353,980	515,000	565,445
Pakistan	391,380	486,080	472,740	659,500	521,980	680,180	498,411	448,150
Turkey	283,000	643,100	775,000	673,400	590,600	547,540	498,422	457,500
Ethiopia	121,352	88,804	92,456	132,192	165,190	250,571	400,239	482,556
Russian Federation	-	-	-	800	10,500	25,600	78,062	214,954
Iran (Islamic Republic of)	112,410	125,557	259,119	277,051	278,017	239,973	191,747	185,299
Mexico	158,468	154,682	162,057	197,160	208,462	148,584	171,508	129,688
United States of America	-	-	8,337	23,269	43,699	60,573	125,555	110,991
Canada	-	-	1,684	51,520	221,160	126,880	133,540	95,200
Others	431,201	436,065	441,149	473,420	490,375	386,523	550,878	585,318
<b>World</b>	<b>6,091,964</b>	<b>6,870,904</b>	<b>7,089,887</b>	<b>8,793,146</b>	<b>7,790,447</b>	<b>9,137,661</b>	<b>12,139,153</b>	<b>11,564,589</b>
Index (1980-1984=100)								
India	100	106	103	134	109	135	187	169
Australia	100	3,667	8,942	12,547	9,742	14,728	32,805	37,631
Myanmar	100	117	75	70	164	297	433	475
Pakistan	100	124	121	169	133	174	127	115
Turkey	100	227	274	238	209	193	176	162
Ethiopia	100	73	76	109	136	206	330	398
Russian Federation	-	-	-	100	1,313	3,200	9,758	26,869
Iran (Islamic Republic of)	100	112	231	246	247	213	171	165
Mexico	100	98	102	124	132	94	108	82
United States of America	-	-	100	279	524	727	1,506	1,331
Canada	-	-	100	3,060	13,136	7,536	7,932	5,655
Others	100	101	102	110	114	90	128	136
<b>World</b>	<b>100</b>	<b>113</b>	<b>116</b>	<b>144</b>	<b>128</b>	<b>150</b>	<b>199</b>	<b>190</b>
Share (%)								
India	73.4	68.8	65.1	68.0	62.6	66.1	68.8	65.5
Australia	0.0	1.0	2.4	2.7	2.4	3.1	5.1	6.2
Myanmar	2.0	2.0	1.3	1.0	2.5	3.9	4.2	4.9
Pakistan	6.4	7.1	6.7	7.5	6.7	7.4	4.1	3.9
Turkey	4.6	9.4	10.9	7.7	7.6	6.0	4.1	4.0
Ethiopia	2.0	1.3	1.3	1.5	2.1	2.7	3.3	4.2
Russian Federation	-	-	-	0.0	0.1	0.3	0.6	1.9
Iran (Islamic Republic of)	1.8	1.8	3.7	3.2	3.6	2.6	1.6	1.6
Mexico	2.6	2.3	2.3	2.2	2.7	1.6	1.4	1.1
United States of America	-	-	0.1	0.3	0.6	0.7	1.0	1.0
Canada	-	-	0.0	0.6	2.8	1.4	1.1	0.8
Others	7.1	6.3	6.2	5.4	6.3	4.2	4.5	5.1
<b>World</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: FAOSTAT [4].

According to 1980-1984 period in the period of 2015-2016, Australia (about 290 times) chickpea area was the country that is expanding the cultivation area the most. Also, there was a 48% drop in the area of chickpea in Mexico (Table 2).

World chickpea cultivation seems to have occurred in India as well as in production. India accounts for 67.5% of world chickpea cultivated areas. Pakistan follows this share with 7.9% and Australia with 4.5% share. 2.9% of the world chickpea acreage constitutes Turkey (Table 2).

World chickpea yields increased by 1,640 hg per ha in the period 1980-1984 to 1,540 hg per ha in the period 2015-2016 (Table 3).

Ethiopia is the highest yield country in 2015-2016 with 19,921 hg per ha (Table 3). Canada follows Ethiopia with 17,917 hg per ha, Mexico with 17,738 hg per ha, Myanmar with 15,362 hg per ha, and the USA with 14,549 hg per ha (Table 3). Canada and Australia have a production advantage especially yield per hectare. These countries also become leaders on chickpea export.

When countries compare chickpea yield with world average in selected periods, Ethiopia has 2.1 times more yield than average world chickpea yield. In the 2015-2016 period, Turkey's average yield is 37% higher than the world average yield of chickpea.

Table 2. Chickpea harvested area

Country	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-14	2015-16
	Harvested area (ha)							
India	7,199,420	6,853,760	6,476,860	7,507,600	6,140,460	7,307,680	8,825,800	8,291,326
Pakistan	937,100	985,820	1,035,280	1,092,560	951,200	1,072,360	1,013,922	973,677
Australia	1,900	61,918	186,717	251,483	234,103	240,387	523,919	551,122
Iran (Islamic Republic of)	197,961	281,467	560,205	695,432	664,736	538,820	446,906	448,072
Myanmar	150,611	159,891	134,451	126,343	192,469	279,719	357,662	368,091
Russian Federation	-	-	-	1000	11,300	26,200	79,097	228,973
Turkey	272,594	631,311	823,265	703,311	629,375	504,161	412,468	354,455
Ethiopia	150,756	134,600	119,722	159,142	185,408	210,507	229,735	242,047
United States of America	-	-	6,486	17,327	31,776	41,804	74,106	76,535
Mexico	141,161	133,129	110,975	126,422	133,008	94,007	98,548	73,351
Canada	-	-	1,216	36,834	198,680	91,400	68,340	53,150
Others	701,522	671,918	680,993	746,686	706,882	506,664	623,165	628,134
<b>World</b>	<b>9,753,026</b>	<b>9,913,815</b>	<b>10,136,170</b>	<b>11,464,139</b>	<b>10,079,398</b>	<b>10,913,710</b>	<b>12,753,668</b>	<b>12,288,931</b>
	Index (1980-1984=100)							
India	100	95	90	104	85	102	123	115
Pakistan	100	105	110	117	102	114	108	104
Australia	100	3,259	9,827	13,236	12,321	12,652	27,575	29,006
Iran (Islamic Republic of)	100	142	283	351	336	272	226	226
Myanmar	100	106	89	84	128	186	237	244
Russian Federation	-	-	-	100	1,130	2,620	7910	22,897
Turkey	100	232	302	258	231	185	151	130
Ethiopia	100	89	79	106	123	140	152	161
United States of America	-	-	100	267	490	644	1,142	1,180
Mexico	100	94	79	90	94	67	70	52
Canada	-	-	100	3,030	16,344	7,519	5,622	4,372
Others	100	96	97	106	101	72	89	90
<b>World</b>	<b>100</b>	<b>102</b>	<b>104</b>	<b>118</b>	<b>103</b>	<b>112</b>	<b>131</b>	<b>126</b>
	Share (%)							
India	73.8	69.1	63.9	65.5	60.9	67.0	69.2	67.5
Pakistan	9.6	9.9	10.2	9.5	9.4	9.8	8.0	7.9
Australia	0.0	0.6	1.8	2.2	2.3	2.2	4.1	4.5
Iran (Islamic Republic of)	2.0	2.8	5.5	6.1	6.6	4.9	3.5	3.6
Myanmar	1.5	1.6	1.3	1.1	1.9	2.6	2.8	3.0
Russian Federation	-	-	-	0.0	0.1	0.2	0.6	1.9
Turkey	2.8	6.4	8.1	6.1	6.2	4.6	3.2	2.9
Ethiopia	1.5	1.4	1.2	1.4	1.8	1.9	1.8	2.0
United States of America	-	-	0.1	0.2	0.3	0.4	0.6	0.6
Mexico	1.4	1.3	1.1	1.1	1.3	0.9	0.8	0.6
Canada	-	-	0.0	0.3	2.0	0.8	0.5	0.4
Others	7.2	6.8	6.7	6.5	7.0	4.6	4.9	5.1
<b>World</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: FAOSTAT [4].

Table 3. Chickpea yield

Country	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-14	2015-16
	Yield (hg per hectares)							
Ethiopia	8,042	6,733	7,730	8,454	8,917	11,884	17,374	19,921
Canada	-	-	8,410	13,465	11,541	14,906	19,466	17,917
Mexico	11,264	11,538	14,612	15,423	15,335	15,937	16,892	17,738
Myanmar	7,550	8,647	6,576	6,715	10,028	12,581	14,374	15,362
Australia	4,166	11,473	9,537	9,824	7,972	11,582	12,111	12,992
USA	-	-	10,225	13,397	13,580	14,652	16,925	14,549
Turkey	10,612	10,308	9,392	9,560	9,388	10,891	12,083	12,908
Russian Federation	-	-	-	3,333	9,280	10,366	9,818	9,969
India	6,212	6,866	7,140	7,959	7,915	8,250	9,464	9,133
Iran (Islamic Republic of)	5,921	4,449	4,657	3,951	4,220	4,326	4,253	4,135
Pakistan	4,241	4,916	4,563	6,033	5,461	6,341	4,913	4,585
<b>World</b>	<b>6,244</b>	<b>6,913</b>	<b>6,995</b>	<b>7,669</b>	<b>7,715</b>	<b>8,363</b>	<b>9,516</b>	<b>9,407</b>
	Index (1980-1984=100)							
Ethiopia	100	84	96	105	111	148	216	248
Canada	-	-	100	160	137	177	231	213
Mexico	100	102	130	137	136	141	150	157
Myanmar	100	115	87	89	133	167	190	203
Australia	100	275	229	236	191	278	291	312
USA	-	-	100	131	133	143	166	142
Turkey	100	97	88	90	88	103	114	122
Russian Federation	-	-	-	100	278	311	295	299
India	100	111	115	128	127	133	152	147
Iran	100	75	79	67	71	73	72	70
Pakistan	100	116	108	142	129	150	116	108
<b>World</b>	<b>100</b>	<b>111</b>	<b>112</b>	<b>123</b>	<b>124</b>	<b>134</b>	<b>152</b>	<b>151</b>

Source: FAOSTAT [4].

In the period 1980-1984 world chickpea exports 237 thousand tons and by the year 2013 world chickpea exports increased 6.88 times to 1.63 million tons.

When the developments in countries exporting chickpeas were examined, the most massive increase in 2013 (from 1980 to 2013) took place in Ethiopia with about 46,879

times. Russia followed Ethiopia with an increase of 5,697 times and Canada with an increase of 640 times.

Turkey's chickpea exports in 2013 (compared to the period 1980-1984) was down 87%.

The 33.8% of world chickpea exports were in Australia, 24.6% in India and 11.0% in Russia. Turkey exported a rate of less than 1.2% of world exports chickpeas.

World exports of chickpeas rose to \$ 111 million in the 1980-84 period, \$ 204 million in the 1990-94 period, \$ 595 million in the 2005-09 period and \$ 1.15 billion in the year 2013.

Countries with high chickpea export values continue to be India, Australia, Mexico, and Russia. In 2013, India increased by about 1,032 times to 348 million dollars. In 2013, the most significant increase in the value of chickpeas exported over the 1980-84 period was in Ethiopia. Turkey's export value showed a 67% decline in 2013.

The amount of world chickpea import increased from 149 thousand tons in the 1980-1984 period to 10.61 million tons in 2013. When the developments in the country's imports of chickpeas were examined, in 2013 (according to the 1980 to 1984 period) Turkey's import was the most massive increase with 7,109 times. Bangladesh's chickpeas import was a 423-fold increase, followed by a 136-fold increase in India. Turkey 1980-1984 period, while imports do not do chickpeas, were imported 56,875 tons in 2013.

India was imported 33.4% of the world's chickpea, 12.7% in Bangladesh and 6.8% in Algeria.

When the world imports of chickpeas were evaluated as worth, the import value of about 95 million dollars in the 1980-84 period rose to 225 million dollars in the 1990-94 period, 623 million dollars in the 2005-09 period and 1.28 billion dollars in the year 2013. Countries with high imports of world chickpeas continue to be India, Algeria, Bangladesh, and Spain.

The value of imports of chickpeas, which was \$ 1 million in the 1980-84 period of India, rose to \$ 43 million in the 1995-99 period and rose to 323 million dollars in 2013. In 2013,

the most significant increase compared to the 1980-84 period had been worth chickpea imports about 39,115 fold in Turkey.

Turkey and the world export quantity of chickpeas share in the production were given in Fig. 2. According to this, 12.3% of the chickpeas produced in the world in 2013 is subject to export. In the world between 1980 and 2013, this rate varied between 3.4% and 16.5%, with an average of 8.1%. This ratio is continuing to increase in the world. Turkey's chickpea exports amount share in the production was 3.8% by 2013. In Turkey, this ratio ranged from 3.8% to 73.2% in the years 1980-2013, the average was realised as 29.2%. This rate was the highest value for Turkey in 1981 (73.2%) had received. From this year onwards, it has tended to decrease (Fig. 2).

Australia and Russian Federation important export countries and they exported nearly all their produced chickpeas. Mexico, Canada and USA also become important export countries, and they exported above/nearly half of their chickpeas production. The domestic consumption of chickpea is low in these countries. Their markets are generally Asia and the Middle East.

Turkey's imports of chickpea began in 1989. The share of world imports of chickpeas has also increased over the years examined. Turkey chickpeas in the world regarding import value rose to ninth place. Chickpea major exporter of Turkey in recent years has lost its situation. Turkey's export volume of chickpea showed an upward trend until the period 1980-1989 (average 225 thousand tons), the average realised export 206 thousand tons in 1990-1999 periods, and it has a tendency to decrease after 1994. The share of world chickpeas export amount has been declining. Turkey's export amount of chickpeas 2000-2013 period, the average has dropped to 88 thousand tons. After 2010, it exported less than 30 thousand tonnes. Especially after 2009 and chickpeas Turkey's share in world export volume dropped below 8% after the year 2012 also declined below 2%.

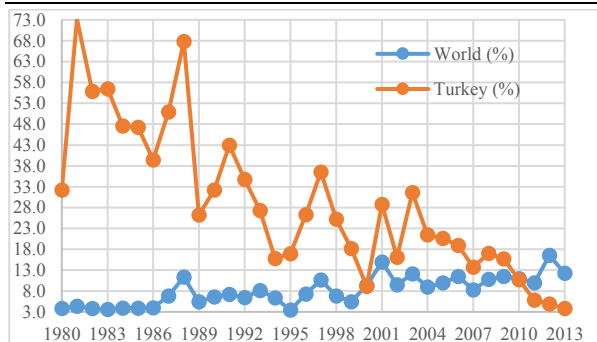


Fig. 2. World and Turkey's chickpea export volume share in production (%)  
Source: FAOSTAT [4].

According to the 1980-1984 period, the amount of world chickpea imports increased by about 14 times and import value increased by about 15 times. In this, it can be said that besides world trade volume, higher prices of chickpeas are effective. The same is right for world chickpea export quantity and value. According to the baseline period, world chickpea export quantity increased 8.73 times in 2013 and chickpea export value increased by 10.7 times. Therefore, it can be said that the world chickpea export quantity is increased in volume, and the increase in chickpeas export prices is more effective in this. As the year's chickpeas, export value increased in the world, while Turkey has fluctuated in the 2000s. Indeed, Turkey's share declined to 10th.

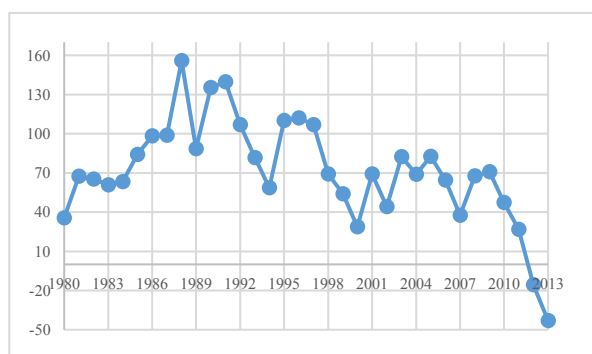


Fig. 3. Turkey trade balance (million \$)  
Source: FAOSTAT[4].

Turkey's chickpea export-import amount and Turkey's chickpea export-import values difference was given in Fig. 3 and Fig. 4, in this case, it was more clearly understandable. Turkey's difference in the amount of export-import chickpeas was around 225 thousand tons in the 1980-1989 and decreased to 77

thousand tons in 2000's, implements the -38 thousand tons in 2013. Turkey's difference chickpeas export-import value was 82 million \$ in 1980-1989, while 45 million \$ in the 2000s, then declined to 43 million \$ in 2013.

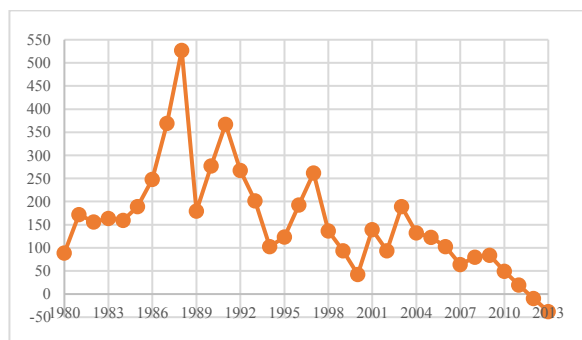


Fig. 4. Turkey trade balance (thousand tonnes)  
Source: FAOSTAT [4].

The producers' real prices of chickpea have fluctuated based on the supply-demand balance in 1982-2016 in Turkey (Fig. 5).

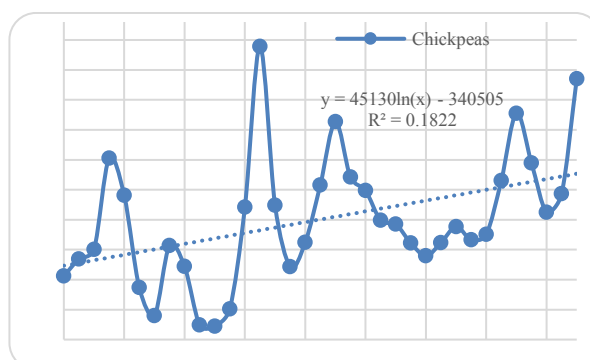


Fig. 5. Real Prices of Chickpeas (1982-2016, TRY/tons) in Turkey  
Source: Own design.

It could be said that these had been felt more in chickpeas producers and decreased or fluctuated on farmers' net profit. Reducing the production costs to the minimum level or increasing the yield potential in this situation are the ways of the farmer. However, this is hardly achieved due to the nature of agricultural products.

In Fig. 6, the change of some pulses real prices were given as % (according to the average of 1982-1984 years). Not only in chickpea but also in lentils and dry beans prices fluctuated between 1982-2016. However, the coefficient of variation was higher in chickpeas, followed by lentils.



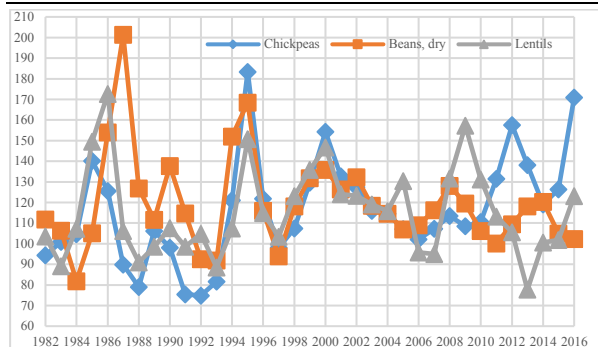


Fig. 6. Change of real prices of some pulses (1982-2016, TRY/tons) in Turkey  
Source: TÜİK [13]

We used regression analysis to determine the factors that affect the harvested area of chickpea production in Turkey. The dependent variable was the quantity of chickpea harvested area Y (ha) in the model specified. The independent variables were chickpea yield a year ago ( $X_1$ ) and farmers' real price of chickpea two years ago ( $X_2$ ) in a function. The summary of the model result was given in Table 4 below.

The calculated logarithmic model can be expressed as:

$$\ln Y = 18.627 - 0.869 \ln X_1 + 0.342 \ln X_2$$

The value of the coefficient of determination  $R^2$  was amounted to be 0.518 (51.8%), and this parameter was indicated that the independent variables in the model could explain about 52 percent of the variation in chickpea harvested areas. The F-test was statistically significant at the 1% level ( $F_{\text{calculated}} > F_{\text{table}}$ ,  $20.368 > 3.32$ ). These parameters indicate that the calculated model can be used for the prediction purpose. Chickpea yield and farmer's chickpea real price identify as the significant factors affecting the harvested area of chickpea production in Turkey. The yield a year ago ( $X_1$ ) had a negative coefficient. The decrease in this parameter will result in a decrease of 0.869 units in the area of chickpea cultivation. However, the real price two years ago ( $X_2$ ) had a positive coefficient. The value of the coefficient was calculated to be 0.342. This score shows that a unit increase in real price will lead to an increase of 0.342 units in the area of chickpea cultivation (Table 4).

Table 4. Regression analysis result

	Constant	$X_1$	$X_2$	F test	$R^2$
Coefficient	18.627	-0.869	0.342		
Standard error	3.039	0.315	0.066		
t-values	6.129	-2.756	5.205	20.368	0.518

Source: own calculation.

Turkey ranks fifth in chickpea production, ranked seventh in chickpea acreage, while in chickpea yield ranks fifty-second in the world. Ten provinces; Antalya, Istanbul, Konya, Karaman, Mersin, Kirsehir, Kutahya, Istanbul, Ankara, and Isparta, were the most chickpeas producers in Turkey. Antalya is produced 34,918 tonnes of chickpea in Turkey with 7.6% shares. Usak follows Antalya with 30,937 tons and 6.7% shares, Konya with 29,747 tons and 6.5% shares, Karaman with 29,358 tons and 6.4% shares and Mersin with 27,131 tons and 5.9% shares, respectively. Kirsehir has increased its production by 4.67 times in comparison with 1991-95 period. Uşak, Konya, Yozgat, and Isparta chickpea productions decreased by 20% to 59% compared to the 1991-95 period. The decline in sowing area was effective in this downfall. There are many diseases, pests, and weeds in places where leguminous farming is carried out. Among them, anthracnose (*Ascochyta rabiei*) stands out as the most critical disease, while *Liriomyza cicerina* also stands out as a critical harmful agent [11].

Chickpeas consumption ranged from 4.5 kg to 6.0 kg per capita in Turkey. Turkey is not self-sufficient in the chickpeas in recent years. Gül and Işık [7] examined the developments total pulses production and trade in the world and Turkey as compared to the period 1961-2000.

Gül and Işık [7] reported that beans, peas and chickpeas production in total pulses have an essential share in the world, lentil and chickpeas production have almost all of total pulses production in Turkey. Turkey, an important pulses exporter in the period of review, lost this feature with the decline in pulses cultivation areas in recent years and had become the importer country.

Some projects started in some provinces and regions in Turkey in the 1970s; pulses production has been increasing with the

policies applied [7]. These products have lost their significance in recent years, while they have peaked in exports. In this case, the policies implemented related pulses sector indicates that it should be revised. To sustain the pulses production, taking long-term measures must be established and forward-looking projections.

## CONCLUSIONS

In this study, changes in world market chickpeas and Turkey were discussed. Chickpea production increased 2.34 times in the world. This increase was due to the increase in crop area (1.5 times) and the increase in yield (1.5 times). Turkey is in fifth place in the world chickpea production. The share in the world decreased by the beginning of the period, but its production increased by 62%. In Turkey, this increase in production in more acreage (30%) increase was effective. Yield increased by 22%.

Turkey ranks fifth in world production of chickpeas, chickpea acreage in the seventh is located fifty-second in chickpea yield.

The countries that exports most chickpeas are Australia, India, Russia, Canada and the United States. The countries that import most chickpeas are Pakistan, India, Bangladesh, United Arab Emirates and Algeria.

As a result, Turkey in recent years regarding the production of chickpeas is not self-sufficient. It shows fluctuations in the price of chickpeas in Turkey. Worldwide, the price of chickpea has also fluctuated, but it tends to increase. This situation affects farmers' production decision. Usually, the farmer takes into account the prices of the previous year. By such factors as the low yields in Turkey, disease and pest population density, and the natural conditions of production affect the net income of farmers directly. Therefore, the agricultural policies of the product must take these criteria into account.

## ACKNOWLEDGEMENTS

This study was supported by the scope of the Project number: 4875-YL1-17. We would like to thanks to Süleyman Demirel University

Department of Scientific Research Projects for their financial support.

## REFERENCES

- [1]Akçin, A., 1988, Yemeklik Dane Baklagiller (in Turkish). Selçuk Üniversitesi Yayınları:43, Konya.
- [2]Devos, P., 1988, Nitrogen value of lentils and chickpeas and changes during processing. Lentils for everyone symposium, 29-30th September, Marmaris, Turkey.
- [3]Ercan, A.S., 1986, Chickpea external market research (in Turkish). T.C. Basbakanlık Hazine ve Dış Ticaret Müsteşarlığı İhracatı Geliştirme Etüt Merkezi, İGEME Yayınları, No:110, Ankara, 80p.
- [4]FAOSTAT, 2017, Food and Agriculture Organization of the United Nations Statistical Data. (Internet address: <http://www.fao.org/faostat/en/#home>, accessed on (02.11.2017).
- [5]Gül, H., Hayıt, F., 2017, Optimization of gluten-free bread formulation by using response surface methodology. Abstract Proceeding Book of International Conference on Agriculture, Forest, Food Sciences and Technologies Conference, May 15-17, Cappadocia, Turkey, 148p.
- [6]Gül, H., Hayıt, F., Açar, C., Kurt, N., 2016, Effects of chickpea yeast on physical, textural and sensory properties of breads. 8th International Conference on Chemical, Agricultural, Biological and Environmental Sciences, Dec 30-31, Dubai, 67p.
- [7]Gül, M., Işık, H., 2002, Developments in pulses production and trade in the World and Turkey (in Turkish). Mustafa Kemal University Ziraat Fakültesi Dergisi, Vol.7(1-2):59-72.
- [8]Gül, M.K., Egesel, C.Ö., Kahrıman, F., Tayyar, Ş., 2006, Winter production possibilities of chickpea in Çanakkale province (in Turkish). Uludağ Üniversitesi Ziraat Fakültesi Dergisi, Vol.20(1):57-66.
- [9]Greene, W.H., 2008, Econometric Analysis. Department of Economics at the Stern School of Business, New York University.
- [10]Gujarati, D.N., 2006, Essentials of Econometrics. Basic Econometrics. Aravaca, Madrid: Mac Graw- Hill interamericana, Spain.
- [11]Özdem, M.A., 2012, Dry beans in the world and Turkey (Dünya ve Türkiye'de kuru baklagiller). Tarımsal Ekonomi ve Politika Geliştirme Enstitüsü, 9p, Ankara.
- [12]Şehirli, S., 1998, Yemeklik Dane Baklagiller (in Turkish). Ankara Üniversitesi Ziraat Fakültesi Yayınları, No: 1089, Ankara, 314p.
- [13]TUIK, 2017, TUIK (Turkish Statistical Institute) Statistical Data. (web page: <http://www.tuik.org.tr>, Accessed on 20.12.2017.
- [14]Uzun, A., Özçelik, H., Yılmaz, S., 2012, Evaluation of some selected chickpea (*Cicer arietinum* L.) lines in respect to agronomic and quality traits (in Turkish). Akademik Ziraat Dergisi, Vol.1(1):29-36.

## ECO-INNOVATION PARKS FOR A GREEN DEVELOPMENT IN SMALL AND MEDIUM SIZED ENTERPRISES

Dumitru Florin FRONE<sup>1</sup>, Simona FRONE<sup>2</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, 011464, Bucharest, Romania, Email: ffrone@hotmail.com

<sup>2</sup>Institute of National Economy, Romanian Academy, 13, Calea 13 Septembrie 050711, Bucharest, Romania: Email: frone.simona@gmail.com

**Corresponding author:** ffrone@hotmail.com

### Abstract

*An important issue to be tackled is that the Romanian Small and Medium-sized Enterprises (SMEs) are less likely to adopt measures to improve their resource efficiency in comparison to the EU average and have a low propensity to collaborate for a systemic transformation agenda such as the circular and green economy. The main research objective of this paper is to stress eventually the strategic role of eco-innovation in developing eco-industrial parks as a community of manufacturing and service enterprises seeking enhanced environmental and economic performance through collaboration in managing environmental and resource issues including energy, water, and materials. The methodological approach will be based mostly on some own recently published theoretical and empirical research findings, referring to a case-study as well. The main results and conclusions outline the urge to identify, design and plan the possibilities of industrial symbiosis between several enterprises within an eco-industrial park as a way for promoting green development in the SME-s as well as at the local, regional and macroeconomic scale.*

**Key words:** resource efficiency, eco-innovation, green economy, SME, eco-innovation park (EInvP),

### INTRODUCTION

Eco-innovation and implementing a green development becomes a must for sustainable economic growth, based on increased resource efficiency and a circular economy.

The green economy means a sustainable management of environmental resources, in our biosphere as a closed system with finite resources and a limited capacity for self-regulation and self-renewal. [10]

The main objective of the paper is to ground and stress the strategic role of developing eco-innovation parks as circular industrial ecosystems for a community of manufacturing and service small and medium enterprises seeking enhanced environmental and economic performance through collaboration in managing environmental and resource issues including energy, water, and materials.

The Small and Medium Enterprises (SMEs) which represent the majority of European Businesses have become more and more important at the scale of the EU, both economically and environmentally.

This is not due to their individual environmental impact (too low), but to the cumulated impact of the SME, quite significant and important to be considered for a green development outlook.

Consequently, the Green Action Plan for SMEs (2014) may help these companies benefit from the opportunities of the green economy, since it describes in detail how the partnerships of the European Commission with Member States and regions can turn environmental challenges into business opportunities for SMEs. [5]

Previous cited papers have emphasized some synergic features of the eco-innovation parks (EInvP) and their important economic, ecologic and social advantages for the restructuring and turning of the economy and industry into a resource-efficient path. This is meant to bring increased competitiveness and a better whole life cycle management of resources, for all the economic entities involving SMEs partnerships in the industrial ecosystem. In this context, although environmental policies can create challenges



for SMEs, they also provide business opportunities, as we shall highlight in the paper.

European SMEs can generate employment and economic growth and may also boost their productivity and competitiveness by raising the resource efficiency, adopting circular economy solutions and entering on green markets.

The paper analyses the efforts and policies to increase resource-efficiency in the European Union SMEs, focusing on the potential and outcomes of working in symbiotic clusters or eco-industrial parks for efficient resource recovery and recycling, as well as for a sustainable economic growth and a green development at the micro and mezzo scale.

## MATERIALS AND METHODS

In this paper, with the theoretical and empirical approaches employed there is argued again on the urge for a green development of the SME by using, recovering and redirecting resources for reuse and by keeping resources in productive use in the economy for longer.

The methodology used below is based on:

- Clarification and definition of the main methodological and operational concepts (in the section of theoretical and methodological background);
- Description of economic and environmental drivers in the resource efficiency, using figures and tables (in the section Issues and trends of green development in the European Union SMEs);
- Analysis and synthesis of the characteristics and mechanisms of a green development within the eco-innovation park, from the ECOREG case study (in the section Eco-Innovation Parks for a Green Development in Small and Medium Sized Enterprises);
- Adjacent calculations in tables for a comparative analysis of the trends of some eco-innovation indicators of SMEs, most of them resulting from case-studies or from previous research outcomes in the section Eco-Innovation Parks for a Green Development in Small and Medium Sized Enterprises).

## RESULTS AND DISCUSSIONS

### Theoretical and methodological background

The principles of a green economy support ideas and mechanisms for increased competitiveness and economic growth in the European Union, by taking into consideration the potential of the increased environmental awareness and resource efficiency for creating new business and jobs opportunities as well as a sustainable management of resources.

The green economy is a model that "secures growth and development, safeguards human health and well-being, provides decent jobs, reduces inequalities and invests in, and preserves biodiversity, including the ecosystem services it provides (natural capital), for its intrinsic value and for its essential contribution to human well-being and economic prosperity". [6]

There should be also acknowledged more on the meaning of resource-efficiency. More theoretical analysis is detailed in previous research, since resource efficiency is a main concept in all the ideal forms of economy and development, such as the sustainable development, the green economy and the circular economy, as well as for the strategies dedicated to their objectives. [4]

Also resource-efficient economy is very close to advanced concepts such as the green economy or the circular economy; both promote great resource-efficiency gains through a systemic transformation in the way resources flow through the economy and society, arguing that there are business and job opportunities to build by revolutionising recycling and re-use. [8]

In this conceptual framework, it was launched the Green Action Plan by the European Commission, in order to foster the re-industrialisation of Europe as advocated by the and supported by the European Council, by enhancing SMEs competitiveness and supporting green business developments across all European regions, since significant differences in resource efficiency exist between sectors and between European countries. [5]

Indeed, as shown in [11], there are quite important differences between the EU member states as concerning the national level of resource-productivity, but our regression analysis based on the data-base of the eco-innovation parks in Europe, as well as on a Romanian regional case-study have shown indubitable evidence on the role of these most advanced EIP, namely the eco-innovation parks (EInvP) in promoting local, regional and national sustainable economic development and transition to a green economy. [9, 10]

The eco-innovation has an ability to maintain a balance between ecosystem services and the intrinsic economic circuits, adjusting also, by geared technical means, both the renewing of resources according to the assimilative capacity of the environment and the transactions that include ecosystem services into the economic cycle.

Also, another significant concept for green development is the industrial symbiosis implemented in the industrial ecology, since alignment of ecology to industry as a key area for economic development, suggests its reorientation towards a sustainable use of resources.

In this paper the focus is more on the role and potential of the SMEs in finding the best ways for their green development, meaning a sustainable economic growth of their business while considering the entire regional and national economic prospects and environmental resources.

The main green economy goals of recycling are to:

- prevent wasting potentially useful materials;
  - reduce consumption of fresh raw materials;
  - reduce energy usage;
  - reduce air pollution and water pollution;
- lower greenhouse gas emissions as compared to virgin production. [10]

### **Issues and trends of green development in the European Union SMEs**

The preventing or correcting of environmental damage is a social challenge for transition to a low carbon economy, but also an economic and business opportunity for most enterprises. Since technological innovation could become the cornerstone of minimizing pollution and at

the same time, the key to global sustainable economic development, it supports the eco-innovation which is a concept embedding more than technology. [1]

Eco-innovation is considered to be the introduction of any new or significantly improved product, process, organisational change or marketing solution that either reduces the consumption of natural resources and/or the release of pollution across the entire life-cycle. [13]

However, eco-innovation' like any other types of innovation, needs a fertile ecosystem to flourish and green innovators depend on support to develop their ideas and on access to finance to implement them. [4]

The green entrepreneurship is enabled in the presence in the proximity of factors like consulting and academic institutions, skilled labour and cross-sectoral cooperation. These conditions are appropriate for the creation of eco-innovative clusters that we also refer as eco-innovation parks (EInvP).

As stated in [5], the Green Action Plan for the European Union builds on the Eco-Innovation Action Plan (EcoAP), which provides directions for eco-innovation policy and funding under the umbrella of the Europe 2020 strategy. Some instruments of the EcoAP are relevant for SMEs: the European Innovation Scoreboard Eco-IS, the Eco-innovation Observatory, the European Forum on Eco-innovation, European Innovation Partnerships and financing instruments for eco-innovation under Horizon 2020. The actions featured in the Green Action Plan and the EcoAP are, therefore, complementary and generate important synergies.

In this framework, the Eco-Innovation Index shows how well individual Member States perform in different dimensions of eco-innovation compared to the EU average and presents their strengths and weaknesses. The Eco-IS and the Eco-Innovation Index complements other measurement approaches of innovativeness of EU countries and aim to promote a holistic view on economic, environmental and social performance. [2]

For instance, as presented in previous research according to the latest EIO Country Profile, Romania ranks 18th in the Eco-Innovation

Scoreboard (Eco-IS), obtaining a score of 87.1. This indicates it is still below the overall EU-28 average score by 13%. [9]

Why is eco-innovation for resource efficiency improvements also important for SMEs?

Eco-innovation can have a twofold positive impact on resource efficiency:

- (i) it can increase the generated economic value, while at the same time
- (ii) it will decrease pressures on the natural environment.

Hence, according to legal experts, eco-innovation is any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy. [3]

An important aspect related to eco-innovation activities meant for the resource-efficiency enhancing signalled previously was that the Romanian SMEs were less likely to adopt measures to improve their resource efficiency in comparison to the EU average and had a low propensity to collaborate. [12]

Also in this respect, Romania's eco-innovation system can be broadly characterised in terms of push and pull factors acting in opposition. It may be stated that there is still:

-low level of investment in basic infrastructure and framework conditions for recycling, waste management and resource efficiency;

-low input into R&D from the public and private sectors. [13]

In Green Action Plan for SMEs it was stated that generally European SMEs are aware that being resource efficient is important since 75% of SMEs have observed an increase in their materials costs in the past five years. About 93% of SMEs in the EU are taking at least one action to be more resource efficient which, in most cases, is a low-cost action. [5]

It is therefore important to underline that the specific resource efficiency actions taken by companies mainly are the following:

- (a) Minimising waste;
- (b) Recycle by reusing waste within the company;

(c) Design products that are easier to maintain, repair and reuse;

(d) Sell scrap material to other companies. [2]

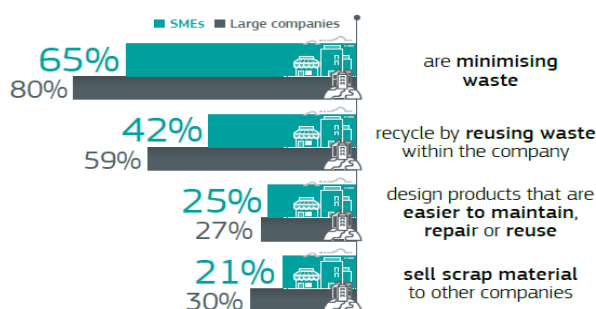


Fig. 1. Share of companies taking actions to become more resource efficient

Source: SMEs and the Circular economy. Facts from the Eurobarometer, 2017 [2]

Although significant shares of SMEs are undertaking these actions in order to become resource efficient, they are still less likely to do so than large companies (Fig.1).

However, only 42% of SMEs that implement measures to improve resource efficiency have seen a reduction of their production costs [5].

	Significantly decreased	Slightly decreased	Slightly increased	Significantly increased	Not changed (SPONTANEOUS)	Don't know
<b>SMEs</b>						
EU28	4	37	14	4	27	14
<b>Large companies</b>						
EU28	10	43	15	5	10	17

Base: All companies that have taken at least one resource efficiency action (N=11,595)

Fig. 2. Impact of the undertaken resource efficiency actions had on the production costs over the past two years (% - EU)

Source: SMEs and the Circular economy. Facts from the Eurobarometer, 2017

Besides, as observable in Fig. 2, according to a recent report large companies are more likely than SMEs to say production costs have decreased (53% vs. 41%) as a result of resource efficiency actions. [2]

SMEs are more likely to say there has been no change (27% vs. 10%). This indicates the necessity to provide more guidance to SMEs on the cost-effectiveness of resource efficiency investments.

Thus a partial conclusion is that SMEs need some conditions for increased resource-efficiency:

-a favourable business environment, for development and financing green ideas as well as

-close cooperation and clustering for efficient spatial eco-innovation and facilitated resource recycling and recovery.

### **Eco-Innovation Parks for a Green Development in Small and Medium Sized Enterprises**

Some previous papers have focused on the eco-innovation trend of industrial ecology meant to enable transformation of traditional model of industrial activity in a more comprehensive model by which regional economies can be assembled in an industrial ecosystem composition, and so the residues of some companies can be used as input for others. [13]

There was also evidence on the role of eco-innovation parks (EInvP) as vectors of transition to a green economy. [11]

Here we aim to analyse more the role of the eco-innovation parks as industrial ecosystems, by grouping several SME-s in a certain area in order to let them share some technological eco-innovation facilities, as well as to put them in a relation of industrial synergy, leading to waste recovery and recycling as a resource, eventually improving the resource efficiency and productivity at the microeconomic as well as the sectoral and regional scale.

Some negative issues but also positive findings about the green economy prospects of the Romanian companies analysed include the following: companies show weak environmental awareness and weak levels of transparency and communication on environmental issues; in terms of cost assessment, companies do not measure or do not want to declare the costs and benefits obtained through their environmental management practices; many companies do not monitor their resource use systematically, which is why they are not able to take measures to improve their environmental performance; there is a perception that investment in a more sophisticated

environmental monitoring system would outweigh the benefits from reduced costs; there is an increase in companies' use of renewable energy sources, since 9.3% of the surveyed companies predominantly use renewable energy sources, while for 18.5% of the companies, less than 50% of their energy use comes from renewables; unfortunately, the majority of the surveyed companies (57%) did not use recycled resources as production materials at all, while for another 16.3%, recycled resources make up less than 2.5% of their production materials. [13]

These facts showed there are still large opportunities for a green development, mainly of the circular economy in Romania.

This is why we stress again on the necessity and opportunity to for the small and medium size enterprises to group or cluster in some kind of Eco-Innovation Park, taking advantage of all the premises involved, especially those of an industrial ecosystem aimed for promoting a circular economy.

In another paper, the term eco-innovation park (EInvP) is introduced and used to define both eco-industrial parks and eco-innovative areas combining residential and industrial activities. EInvP are optimized from an environmental point of view (e.g., piloting installations and processes that incorporate environmental technologies and services) and are open for continuous improvement (e.g., collaboration with institutions of research and development). [11]

In this section, there is a reconsideration and resuming of our previous findings on the case-study of the ECOREG (a pilot EInvP in the Romanian Suceava County) aiming to provide evidence for the actual dimension and realization of green and complex environmental, economic and social benefits provided by the EInvP for the SMEs involved. Industrial ecosystems can be organized around product or material supply chains and/or in defined geographical areas. [13]

Significant for the current research is the key feature of the eco-innovation park in which material flow exchanges (or industrial symbioses) generally encompass other eco-criteria, in particular resource and energy efficiency, by the waste and water

management improvements through a shared, regional eco-innovation, for all the clustered companies. This inner circular mechanism closing-the-loop of resource use in a company or in a region (such as in the EInvP) deserves further attention due to the outstanding green economic growth impact (Fig 3).

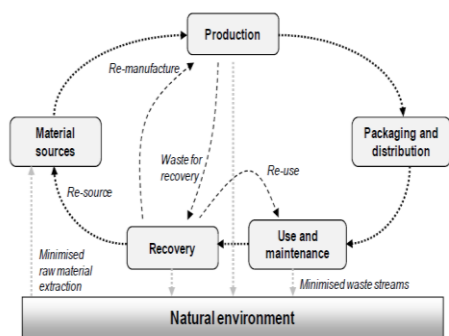


Fig.3. Features of a closed-loop green production system  
 Source: Figure 1 in [15]

The eco-industrial parks (EInvP) have this tremendous potential of increasing the resource efficiency by implementing and making work the new modern synergic and circular business models, with industrial symbiosis.

We have disclosed and analysed [9, 10] from the Romanian ECOREG EInvP of Suceava, several industrial synergies such as:

(1) The agri-food industrial synergy identified and implemented between the SC PRODINCOM Company – Suceava, a slaughterhouse and meat processing SME in the Suceava County, and a cluster of agri-food companies that generate animal waste and had problems with the management of this waste; PRODINCOM itself; other small meat producers (there are more than 130 SMEs having this object of activity registered in the Suceava County, having from 10 to 2,000 animals).

There were important environmental issues leading to this industrial synergy, since the SMEs partners of the industrial synergy share the problem of their animal waste (carcasses, expired animal or dairy products, waste generated by the slaughterhouse, etc.). The animal waste is a constant problem for all

farms and meat processing in the Suceava County as there are no incinerating facilities available at a reasonable distance. As described, the eco-innovation solution identified by the ECOREG team was the installation of an *organic waste incinerator* at PRODINCOM that could help the company and other similar businesses to get rid of their animal waste. [10]

Table 1. Main environmental, economic and social benefits of the PRODINCOM cluster animal waste industrial synergy

	Type	Value and characteristics
1.	Economic Benefits	150-200 lei /ton for waste transport to a different incinerator, saved; 1000 lei/ton for incinerating the waste at other location, saved Cost of LPG* saved =15,000 Lei/an
2.	Environmental Benefits	No waste to landfill 15 tons CO2 less emitted from LPG replaced
3.	Social Benefits	3 new jobs

Source: Table 1, pg.3 in (A Pattern of Cooperation for Better Animal Waste Management, 2011) LPG = Liquefied Petroleum Gas

As may be observed from the analysis (Table 1), the economic, environmental and social benefits of the ECOREG industrial synergy for animal waste at PRODCOM are very important.

(2) Another impressive industrial synergy involving SMEs within the ECOREG is the one in the wood sector, between: SC RITMIC SRL, a SME based in Ilisesti, 18 km E from Suceava, dealing, among others, with collecting wooden waste (sawdust, chops, branches, etc.), conditioning it and selling it as bio-fuel (wooden briquettes) and SC IASIMOLD SRL, another SME located near the Moldovita Commune, Suceava County.

A closing loop (circular) system created may be analysed considering that:

-raw material for the briquettes comes from an insidious waste that currently pollutes the forests' and river valleys in the Suceava as well as in other Romanian Counties.

-the processing technology is environmentally friendly, uses biomass (wooden chips) as energy source and the only waste produced is

the (benign) carbon dioxide that comes from the biomass burnt.

The economic benefits are significant, since SC RITMIC SRL obtains the raw material it needs to sustain its business at a bargain price; SC LIAMOLD SRL gets rid of the wooden debris from production space.

Table 2. Estimated environmental benefits of the industrial synergy SC IASIMOLD SRL - S.C. RITMIC SRL

Characteristics	Value	U.M.
Volume of biomass involved in synergy	380	m <sup>3</sup>
Virgin forest resources saved	0.437	ha
Methane gas saved by the biomass produced	35,625	m <sup>3</sup>
Total harmful CO <sub>2</sub> emissions avoided	255,892	tons
Persistent Organic Pollutants (POPs) emissions avoided	100.32	micrograms

Source: Own selection and computation from \*\*\*Adding Value to Wooden Waste (5), ECOREG Project Case Study No 5, 2010

The environmental benefits of this industrial symbiosis are even more interesting, especially considering the saved virgin forests in the area, as well as the biomass energy potential. [13]

## CONCLUSIONS

For the green economic development, involving also circular economy, eco-innovation is based on centralizing knowledge on material and energy flows as an efficient tool to foster a transition from a linear industrial system to a closed-loop system mimicking biological ecosystems.

The symbiotic economy maximizes resource and cost savings by prolonging the time that resources, products and components are used. The efficiently use of resources, both by reducing waste and by recycling waste into new goods and services demands eco-innovation, new intermediaries and brokerage services.

SMEs and entrepreneurs need a supportive environment to enter in new industrial relationships enabling them to move towards

a circular economy that would enable increased resource efficiency and economic benefits. This is why, in this paper there are analysed and highlighted again some of the features, principles and trends of eco-innovation and eco-innovation parks for green development in SMEs. In a green market economy, the interest of economic operators to establish a synergy is still firstly financial, each industrial manager aiming to increase resource efficiency of its business and find a market for its wastes and/or by-products.

The ECOREG eco-innovation park project was therefore promoted in the Suceava County of Romania, by highlighting the potential economic benefits of joining the programme in order to boost the interest of industry. As our case study and according to the official reporting (nisp-ecoreg.ro) ECOREG was a pilot project aimed at testing the applicability of Industrial Symbiosis in Romania. This entailed the reuse of resources and by-products used in one production cycle into another, thus creating mutually beneficial partnerships between companies in various sectors.

The most important feature of the ECOREG is *the industrial symbiosis as eco-innovation implemented at the regional scale*. [13]

The resumed examples of agri-food and wood industrial synergies between SMEs implemented by the EInvP ECOREG are only two within the total of 114 synergies implemented in the area of the project (Suceava County, Romania). The industrial synergies presented are fully sustainable and need only the input from the involved SMEs as parties. The replication potential is high, since clusters of SMEs in the animal product business and in the wood sector exist and may still appear all across Romania, as both sectors are quite traditional for rural development in Romanian history and culture. Nevertheless, from the viewpoint of the SMEs, there were quite many challenges and threats in gathering and constructing a functional industrial ecosystem within the ECOREG project [14]. There should be mentioned at least: a reluctance from the SMEs concerning the opportunities created through a IS network at local level; the lack of

interest for the industrial synergy concept at all levels.

Still, these challenges for a green and circular economy are acknowledged in the Green Action Plan for SMEs, so the European Commission will facilitate their cross-sectoral collaboration through some actions [5]: the action on 'Cluster facilitated projects for new industrial value chains' under Horizon 2020; the European Cluster Observatory providing regions with cross-sectoral clustering trends identification.

## REFERENCES

- [1]Constantinescu, A., Frone, S., 2014: The role of technological innovation in sustainable economic development, Scientific Papers International Conference on Knowledge Society, in Journal of Knowledge Management, Economics and Information Technology 2014, Vol.4 Issue 1.1;
- [2]EC COM, 2017, Flash Eurobarometer 456 Report, SMEs, resource efficiency and green markets, September 2017
- [3]EC COM, 2006, Decision No1639/2006/EC of the European Parliament and of the Council of 24 October 2006 establishing a Competitiveness and Innovation Framework Programme (2007 to 2013)
- [4]EC COM, 2014, 14 final Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions For an European Industrial Renaissance {SWD(2014) 14 final}
- [5]EC COM, 2014, 440 final: Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions, Green Action Plan for SMEs, Enabling SMEs to turn environmental challenges into business opportunities, European Commission, {SWD(2014) 213 final}
- [6]EC COM, 2015, 614 final: Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions, Closing the loop - An EU action plan for the Circular Economy, European Commission, Brussels
- [7]European Parliament and the Council of the European Union, Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet', Official Journal of the European Union, 28.12.2013
- [8]Frone, D.F., Frone Simona, 2015, Resource-efficiency objectives and issues for a green economy, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 15, Issue 3, 2015.
- [9]Frone, D.F., Frone Simona, 2017a., Eco-Innovation Park Promoting the Green Economy in Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 17, Issue 2, 2017
- [10]Frone, D.F., Frone Simona, 2017b., Circular Economy in Romania: an Industrial Synergy in the Agri-Food Sector, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 17, Issue 2, 2017
- [11]Frone Simona, 2015, The Eco-Innovation Parks: Vectors Of Transition to A Green Economy, Annals of the „Constantin Brâncuși” University of Târgu Jiu, Economy Series Special Issue ECO-TREND 2015
- [12]Frone Simona, 2016, On the Role of Eco-Innovation for a Green Economic Growth, in Internal Auditing & Risk Management no.42 (2) 201
- [13]Frone Simona, 2017, Eco-innovation promoting the circular economy in Romania, Romanian Journal of Economics, Issue 1 Vol. 44, 2017
- [14][http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=3254](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3254), COREG - Application of industrial ecosystems principles to regional development COREG LIFE07 ENV/RO/000690
- [15]OECD, 2009, Sustainable manufacturing and Eco-Innovation: Framework, Practices and Measurement-Synthesis Report, 2009.

## THE COMPETITIVENESS OF ANIMAL PRODUCTS FROM THE REPUBLIC OF MOLDOVA: THE VALUE CHAIN APPROACH

Artur GOLBAN, Rita GOLBAN, Alexandru GORGOS

The State Agrarian University of Moldova, 42 Mircești Street, Chișinău, Republic of Moldova,  
Emails: golban.artur@yahoo.com, golbanrita@gmail.com, alexandru.gorgos@gmail.com

*Corresponding author:* golban.artur@yahoo.com

### **Abstract**

*The competitiveness of an enterprise depends on the competitiveness of the offered products on the market, being based on the comparative characteristics analysis of the analyzed product with the competing products from the market, in order to satisfy specific needs and being acceptable by the customer in terms of price. The animal products from the Republic of Moldova play a significant role in the economic growth of the country. The scientific research is dedicated to the analysis of the competitiveness of animal products from the Republic of Moldova using the value chain method, namely were analyzed the elements of the animal products value chain, the problems of the agricultural producers at the level of animal products value chain, the marketplace of animal products. As a result of the performed investigations there were proposed recommendations in order to increase the competitiveness of animal products from the Republic of Moldova.*

**Key words:** competitiveness, animal products, value chain, marketplace, agricultural producers

### **INTRODUCTION**

The animal growth, after the plant growth represents the second component of the agriculture's activity. The role of the animal growth is very important, and its level of development is an essential characteristic of the modern agriculture.

Improvind the population's consumption of animal production, increasing of the availability of animal origin protein and of its share in consumption is directly related to the development of the veterinary medicine [4].

In our country there are conditions for increasing livestock, for increasing their productive potential and for development of this branch on technological principles.

An important method of determination the competitiveness of a product, of identification its competitive advantage is the value chain analysis, which gives us the possibility to determine the strong and weak points from the way the product passes starting with the producer and finishing with the final consumer [2,3,7,9].

The value chain approach of increasing the competitiveness of animal production from the Republic of Moldova gives us the possibility to analyse the elements of the

value chain of the animal production, to find out the problems of different levels of the value chain and to the formulate proposals of improving the processes where were registered deficiencies.

### **MATERIALS AND METHODS**

The scientific investigation is based on the data from the National Bureau of Statistics of the Republic of Moldova, Ministry of Agriculture and Food Industry, National Institute for Economic Research and other economic literature regarding competitiveness of enterprises, competetiveness of production value chain analysis.

As research methods were used: graphical method, time series, analysis and synthesis, induction and deduction.

### **RESULTS AND DISCUSSIONS**

The global agricultural production in 2017 in all categories of households constituted 108.6%. The increase of the global agricultural production was determined by the increase of the vegetal production by 13.1%, the animal production registering a decrease by 2.1%.



The share of the vegetal production in total agricultural production constituted 74% , registering a decrease compared to 2016 by 3% and the share of the animal production in total agricultural production constituted 26%, which also decreased by 3%.

Analysing the figure 1 we can reveal that the livestock of sheep has the highest values, registering a decrease during 2015 to 2017 from 729.8 thousand capita to 710.6 thousand capita. On the second place is situated livestock of pigs which also registered a decrease in 2017 compared to 2016 by 33.8 thousand capita, from 472.8 thousand capita to 439 thousand capita. On the third place is situated the livestock of rabbits which registered an increase from 326.1 thousand capita to 366.7 thousand capita. The livestock of cows also decreased in 2017 compared to 2015 from 130.3 thousand capita to 122.9 thousand capita.

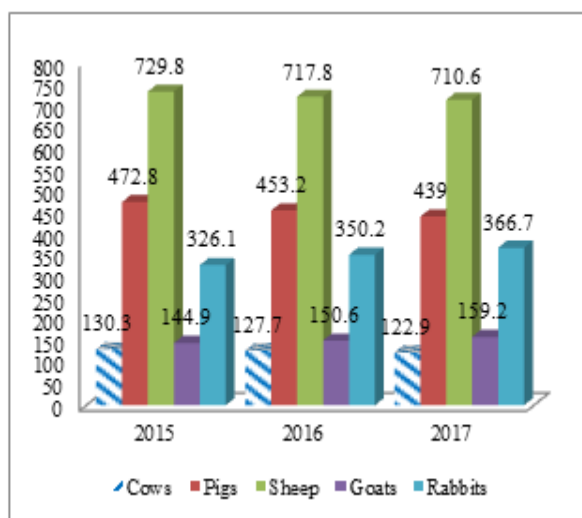


Fig. 1. The dynamics of the livestock by species of animals in all categories of producers during 2015-2016, thousand capita

Source: elaborated by the authors based on the data from the National Bureau of Statistics of Moldova

Most of the livestock by different species of animals is grown in households – 95%, and only 5 % of the livestock of animals is grown in agricultural enterprises [3].

According to the table 1 we can reveal that the livestock of cows mostly is concentrated in the North Region, where in 2017 constituted 60.6 thousand capita; livestock of pigs is concentrated in Center Region, where in 2017

constituted 247.2 thousand capita and the livestock of sheep and goats is concentrated mostly in South Region, where it constituted in 2017 – 305.6 thousand capita [1].

Table 1. Livestock in all categories of producers, in territorial aspect during 2016-2017, thousand capita

Region	Cows		Pigs		Sheep and goats	
	2016	2017	2016	2017	2016	2017
Chişinău Municipality	1.3	1.1	3.3	2.2	7.5	6.4
North	61.4	<b>60.6</b>	111.3	104.4	204.1	206.2
Center	40.9	38.4	248.6	<b>247.2</b>	217.3	219.1
South	20.5	19.4	172.4	67.9	316.1	<b>305.6</b>
UTA Găgăuzia	3.6	3.4	17.6	17.3	123.6	132.5

Source: elaborated by the authors based on the data from the National Bureau of Statistics of Moldova

Analysing the dynamics of livestock in all categories of producers, in territorial aspect during 2016-2017, we can reveal that the livestock of all categories of animals decreased.

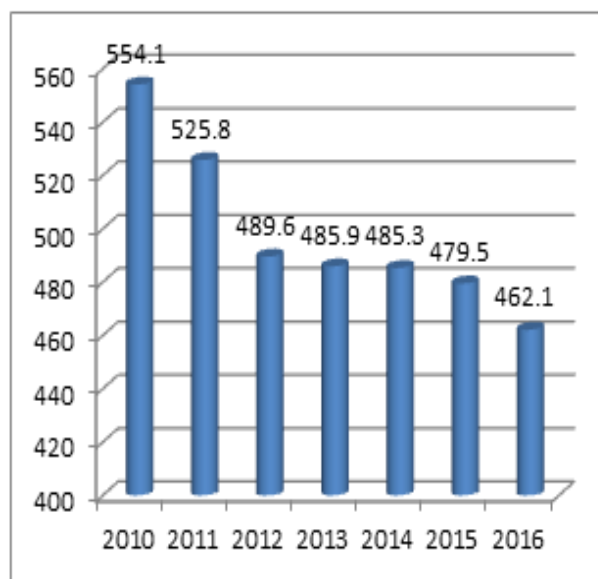


Fig. 2. The dynamics of the production of cow milk during 2010-2016, thousand tonnes

Source: elaborated by the authors based on the data from the National Bureau of Statistics of Moldova

According to the Figure 2 we can reveal that the production of cow milk during 2010-2016 registered a decreasing trend from 554.1 thousand tonnes in 2010 to 462.1 thousand tonnes in 2016, this being caused by the decreasing of the livestock of cows in the mentioned period [6].

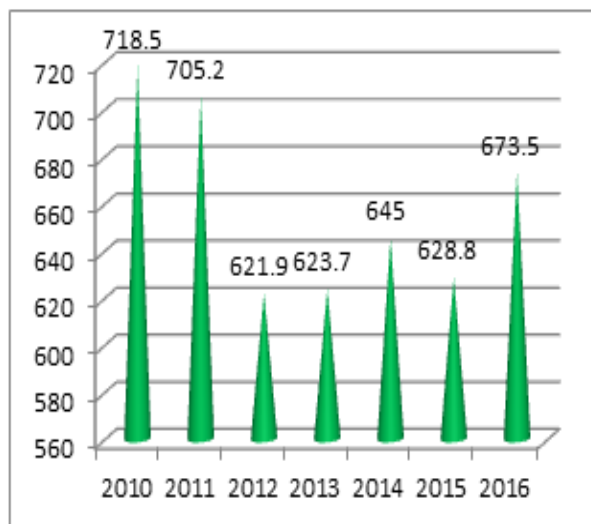


Fig. 3. The dynamics of the production of eggs during 2010-2016, mio.pcs

Source: elaborated by the authors based on the data from the National Bureau of Statistics of Moldova

The dynamics of the production of eggs during 2010-2016 according to the figure 3 reveals a non uniform evolution, registering in 2016, 673.5 mio.pcs, which is less than in 2015 by 44.7 mio.pcs [1].

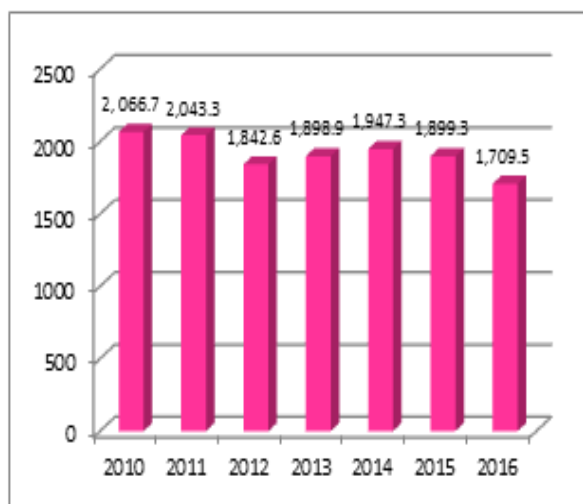


Fig. 4. The dynamics of the production of wool during 2010-2016, tonnes

Source: elaborated by the authors based on the data from the National Bureau of Statistics of Moldova

The production of wool during 2010 – 2016 also registered a decreasing trend by 357.2 tonnes, from 2,066.7 tonnes to 1,709.5 tonnes. The production of wool decreased because of the decreasing trend of the sheep livestock.

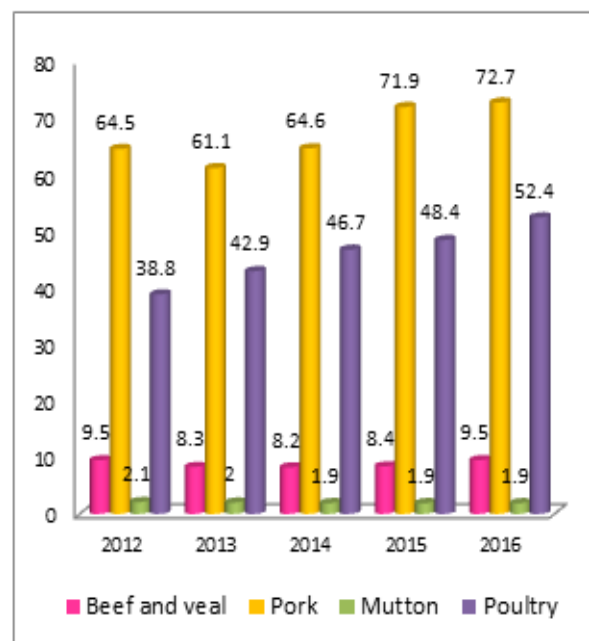


Fig. 5. The meat production by all categories of producers by types during 2012-2016, thousand tonnes

Source: elaborated by the authors based on the data from the National Bureau of Statistics of Moldova

The highest values of meat production by all categories of producers by types during 2012-2016 was registered for pork meat, which constituted in 2016, 72.7 thousand tonnes, which represents an increase compared to 2015 by 0.8 thousand tonnes. On the second place is situated poultry which registered in 2016, 52.4 thousand tonnes, which represent an increase compared to 2015, by 4 thousand tonnes [6]. On the third place is situated beef and veal, the production of which constituted in 2016 - 1.9 thousand tonnes.

The increase of animal production was determined by the increase of the productivity of poultry and beef and veal.

The majority of the animal products is sold by other channels of sale (market, own trade system, barter transactions) and a little part of animal production is sold to enterprises and organizations which collect and process agricultural production.

In this context the way the animal products pass from the producer to the final consumer represents the value chain. The analyse of the value chain is very important for understanding the relations between the actors from the market [8].

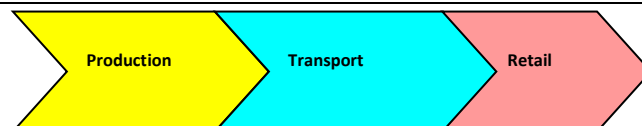


Fig. 6. The value chain of animal products  
 Source: elaborated by the author

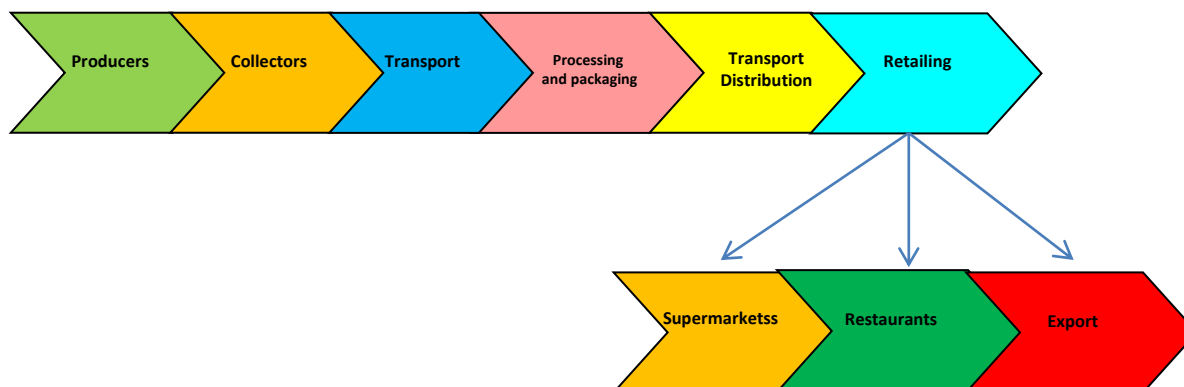


Fig. 7. The value chain of processed animal products  
 Source: elaborated by the author

The value chain of animal products from the Republic of Moldova consists of the following elements: **1. Production; 2. Transport; 3. Retail.**

In many cases animal products, such as pork, poultry, meat, cow milk is sold directly to final consumer, which causes risk to the public health, because are not used innovative systems for processing, the products are not pasteurized (for ex. milk).

In the same time exists another value chain, more sophisticated, when animal products pass through the pasteurization process, the level of fat is regulated, the products have a brand name and the prices are much higher because of the costs of processing. In this case, the value chain has the following elements: (i)**Producers**, (ii)**Collectors**, (iii)**Transport**, (iv)**Processing and Distribution**, (v) **Retailing** including: (a)**Supermarkets**, (b)**Restaurants, hotels** and (c)**Export**.

Analysing the value chains of animal products we can reveal that exists risks in the process of commercialization animal products, especially when this products are sold directly in “open markets” without any processing. It should be created special conditions to produce high quality animal products. Many agricultural producers of animal products sell this products chaotically. It doesn't exist a well organized method of collection animal

products. Also should be taken measures at the legislative level in order to increase the quality of the commercialized animal products. Many of the agricultural processors don't have ISO certification, which will give possibility to sell animal products on the international market [5].

Thus, from the mentioned above problems there must be taken several measures in order to increase the competitiveness of animal products by using high technologies of processing; by collecting animal products from producers in an organized way and also by achieving foreign markets after receiving the ISO certification.

## CONCLUSIONS

As a result of the performed investigation, we can formulate the following conclusions:

- The animal growth is an important part of the agricultural production being situated on the second place after the plant growth;
- Mostly animal production is produced in households – 95%, and a little quantity of animal production in agricultural enterprises;
- During 2012-2016 was registered an increase of meat production by all categories of producers due to the increase of productivity;
- The value chain is an important method of analysing the competitiveness of animal products, being constituted of the following

elements: Producers, Collectors, Transport, Processing and Distribution, Retailing: Supermarkets, Restaurants, hotels, Export.

-Exists many problems at the level of the value chain of animal products among which are: animal products, many times are sold chaotically directly from the “open market” without being checked on quality; lack of ISO certification at many companies; lack of a well-organized method of collection animal products from producers ensuring all the necessary standards of quality.

-In order to increase the competitiveness of animal products there is a necessity to improve the legislation in force regarding the selling of animal products limiting selling in “open markets” without adequate certification; creating a mechanism at the level of state in order to encourage the agricultural producers to achieve the ISO certification; creation of a well-organized way of collection animal products from population.

## REFERENCES

[1]Anuarele statistice ale Republicii Moldova pe anii 2010-2017.

[2]Belostecinic, G., 1999, Concurență, marketing, competitivitate. Chișinău, ASEM, 140 p.

[3]Golban, A., Golban R., 2017, Evolution of milk production in Republic of Moldova and the role of quality management in increasing the competitiveness of milk processing companies. In: Scientific papers Series „Management, Economic Engineering in Agriculture and Rural Development”, Volume 17, Issue 2, p.129-135.

[4]Golban, R., 2015, Food microbiology. Course of lectures. UASM, Chișinău, 142 p., available on line at: [uasm.moodle.md](http://uasm.moodle.md), Accessed January 11, 2018.

[5]Litvin, A., 2011, The quality management – a premise for increasing the competitiveness of enterprises. Centrul Editorial al UASM, Chișinău, 191 p.

[6]National Bureau of Statistics, Republic of Moldova, <http://www.statistica.md>, Accessed January 10, 2018

[7]Porter, M. E., 1990, The Competitive Advantage of Nations. Harvard Business Review, [http://www.economie.ens.fr/IMG/pdf/porter\\_1990\\_-\\_the\\_competitive\\_advantage\\_of\\_nations.pdf](http://www.economie.ens.fr/IMG/pdf/porter_1990_-_the_competitive_advantage_of_nations.pdf), Accessed January 11, 2018

[8]Porter, M., 1998, The competitive advantage of nations. Free Press, 896 p.

[9]Porter, M., 2008, On Competition, A Harvard Review Book, Despre concurență. Traducere: Dan Criste. București, Meteor Press, 2008.



## THE IMPORTANCE OF THE GUESTHOUSES IN THE TOURISM OF THE BRASOV COUNTY, ROMANIA

Mircea Adrian GRIGORAS<sup>1</sup>, Agatha POPESCU<sup>2</sup>, Brîndușa Antonia GRIGORAȘ<sup>3</sup>

<sup>1</sup>University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, 3-5 Manastur Str., Cluj-Napoca 400372, Phone:0264 596 384, Email: mircea.grigoras@usamvcluj.ro

<sup>2</sup>University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest Romania, Phone: +40213182564, Fax: +40213182888, Email: agatha\_popescu@yahoo.com

<sup>3</sup>Babeș-Bolyai University Cluj-Napoca, 7-9 Universitatii Street, Cluj-Napoca, 400084, Romania, Email: brindusa\_grigoras@yahoo.com

**Corresponding author:** mircea.grigoras@usamvcluj.ro

### Abstract

*The paper analyzed the tourism indicators in the Brasov County in terms of tourist inflow and accommodation capacity pointing out the importance of agro-tourist and tourist guesthouses in the period 2007-2016, based on the empirical data provided by the National Institute of Statistics and also estimated the forecast for 2017-2021 horizon. The tourism indicators was calculated according their formulas, and their dynamics was assessed using the index method and average growth rate. The tourism offer in the Brasov County registered a high development in terms of accommodation capacity. In 2017, there were 955 tourist accommodation units, of which 69.73 % guesthouse and 29,811 places, of which 65.02 % in guesthouses. The number of places in agro-tourist guesthouses had a higher dynamics than in the tourist guesthouses. The tourist inflow doubled its figure in 2016, accounting for 1,114,395 visitors in 2016, of which 83.07 % were Romanian tourists. The number of Romanian visitors increased more than 2 times, while the number of foreigners by 71.4 %. Of the total number of visitors, 26.51 % were accommodated in guesthouses. The number of visitors accommodated in agro-tourist guesthouses was 2.58 times higher in agro-tourist guesthouses and 2 times higher in tourist guesthouses. The overnight stays recorded an ascending trend, accounting for 2,213,002 in the year 2016, of which 12.89 % in agro-tourist guesthouses and 14.15 % in tourist guesthouses. About 85 % of overnight stays in guesthouses belong to the Romanian tourists. The length of stay has declined to 1.98 days at the county level, but a little higher 2.13 days in agro-tourist guesthouses. The tourism density doubled its figure, accounting for 2.02 tourist/inhabitant. The occupancy rate was in average 21.40 % at the county level, but lower in the guesthouses. Tourism will continue its development in the Brasov County, and in 2021, it was expected to receive 1.43 million tourists, by 27.7 % more than in 2016, and the accommodation capacity to reach 36,683 places. The Brasov county is an example of high quality tourism, an area where guesthouses play an important role in the tourism market.*

**Key words:** tourism, indicators, tourist guest houses, agro-tourist guesthouses, life quality, Brasov County,

### INTRODUCTION

The Brasov area has been and continues to be an important destination both for the Romanian and foreign tourists. The charm of the medieval and at the same time modern city of Brasov, with its historical and cultural heritage, the beautiful mountain landscapes in the surroundings, inviting tourists to spend an active time outdoors, the large variety of tourism offer regarding accommodation and local gastronomy, traditions and customs, events and the hospitality of the local

population are the key strengths of the Brasov county [1, 8].

An important factor for the development of tourism and economy is rural tourism which could become an objective of the rural development strategies.

The multi-plurality of the activities in the rural space has a high importance in rural development and in assuring a higher life quality and living standard for the local communities and their inhabitants [9, 10].

Rural tourism, agro-tourism, ecotourism are means which could contribute to the diversification of the activities in the rural

space, offering jobs and additional income sources for the local population, and also they could contribute to the valorisation of the natural, historical and cultural heritage [5, 6]. Rural tourism could be a component of the sustainable development of the regions, micro regions, communes and villages of Romania. It is also, a tool for promoting the beautiful landscapes, high value heritage of culture, history and traditions. Visitors need to be welcome, accommodated, nourish and entertained with hospitality by their hosts. In this purpose, the owners of tourist and agro-tourist guesthouses are prepared to offer a large range of services and facilities to their guests. [4].

In the structure of accommodation units in Romania, tourist and agro-tourist guesthouses are more and more attractive for Romanian tourists due to a diversified offer and a more convenient tariff per night compared to other types of accommodation units [13].

In this context, the purpose of the paper was to: (i) synthesize the tourist attractions in the Brasov County and its surroundings, (ii) analyze the main tourism indicators at the county level, but also at the tourist and agro-tourist guesthouses in the last decade 2007-2016 and (iii) estimate the level of the main indicators for the horizon 2017-2021.

## MATERIALS AND METHODS

The study used the specific tourism indicators to characterize the tourist flow and the offer in terms of accommodation as follows: the number of units with accommodation function for tourist reception, the number of places (beds), the number of tourist arrivals, the number of overnight stays, the average length of stay, the tourist density, the occupancy rate, and the tourist function.

The mathematical formulas for some tourism indicators have been the following ones:

The average length of stay:  $D = \sum NO_i / \sum NT_i$ , where  $\sum NO_i$  = the number of overnight stays (tourist-days) and  $\sum NT_i$  = the number of tourists.

The tourism density,  $F_1 = \sum NO_i / P$ , and also  $F_2 = \sum NT_i / P$ , where  $P$  = population in the Brasov County.

The occupancy rate,  $G_o = [NO / (NP \times Z)] 100$ , where:  $NO$  = number of overnight stays,  $NP$  = number of places,  $Z = 365$  days.

The tourism function indicator,  $F = (NP / P) 100$ , where:  $NP$  = number of places and  $P$  = population.

All these indicators mentioned above were determined both at the level of the County of Brasov, and also at the level of the tourist guesthouses and agro-tourist guesthouses, based on the data provided by the National Institute of Statistics Tempo Online Data base for the period 2007-2016.

The research is based on various methods to process and interpret the data as follows: the Index method, regarding the indices with fixed basis,  $I_{FB} = (X_n / X_0) 100$ , where  $X_n$  is the variable  $X$  in the years  $n$ , and  $X_0$  is the value of the variable  $X$  in the year zero.

The share of a variable in the total value of the variables was calculated using the formula:  $S\% = (X_n / X_T) 100$ , where  $X_i$  = the value of the variable  $n$  and  $X_T$  = the sum of the values of the variables.

The comparison method was used to identify the differences between the level of variables and indices in the tourist guesthouses and in the agro-tourist guesthouses.

The forecast for the horizon 2017-2021 was established taking into account the level of the variables achieved in the mast year of the analysis, 2016, and the average annual growth rate achieved in the period 2007-2016, using the formulas:

Average annual growth  $= \sum (X_t - X_{t-1}) / n - 1$ , where  $X_t$  = the value of the variable in the year  $t = 1, 2, \dots, n$  and  $X_{t-1}$  is the value of the variable in the year  $t-1$ .

The expected value of the variable  $X = X_{n+1} + \sum (X_t - X_{t-1}) / n - 1$ .

## RESULTS AND DISCUSSIONS

### The main tourist attractions in the City of Brasov and Brasov County.

Brasov is a beautiful and old city, officially attested in documents back in 1235. It is a medieval city with specific buildings mainly in the historical center in the Council Square, but also in various parts of the city where tourists could discover the gates of the city:

Catherine's Gate, Scheii Gate, the White Tower, the Black Tower, the Citadel of the Guard, the Graft Bastion, The Weavers Bastion, the Rope Road the narrowest in Romania and in Europe.

The culture of Brasov is a mixture of the cultures whose features have been established by the local population including Ethnic Romanians, Hungarians and Saxons.

Brasov is a historical, cultural, an industrial, business, education city. It is suitable for an active tourism: mountain, climbing, hiking, winter sports (skiing, skating etc), cycling, horse riding, spa, and relaxation. It is also a business city and good for shopping.

The main tourist attractions in the city are: *the Black Church* (1477), the most representative gothic church with the biggest bell in Romania, with the biggest organ in the South Eastern Europe and with a rich collection of old Persian carpets, *St. Nicholas Church* in Scheii Brasovului and the *Museum of the first Romanian school* (1495), *St. Bartholomew Church*, the oldest in the city, *St. Peter and Paul Roman-Catholic Cathedral* in baroque style, with nice paintings and stained glasses, *the Orthodox Cathedral* in the main square of the city, the *Synagoga Neologa*, and the *Fortified Church* in Sinpetru. Brasov has many museums among which the most important are: *the Museum of Ethnography*, including a large variety of textiles used for producing folk costumes, *The Art Museum* with masterpieces of the Romanian painters, mainly of Nicolae Grigorescu but also of foreign painters, *The County Museum of History*, the *"Casa Muresenilor" Museum*. [14].

In Brasov, there are many cultural events such as: *The Brasov's Days*, *The Juni's Parade*, *The National Festival of Contemporary Theater*. Important performances are played at the *National Theater* and the *Opera House*, and many concerts are sustained by the *Philharmonic orchestra*.

Brasov has a "ZOO" in "Noua" District.

In the surroundings, the tourists could visit: the *Poiana Brasov*, with its elegant hotels and villas, ski slopes and the telecab which bring the tourists right on the top of *Postavarul Mountain*.

*The Mountain Tampa* could be easily climbed directly from the middle of the city.

At *Bran*, the tourists may visit the well know "*the Bran Catle*" nicknamed "*the Dracula Castle*", as well as the charming villages of *Bran*, *Moeciu* and *Sirnea*, where they could enjoy seeing the Romanian traditions, folk costumes, dance, and taste traditional meals or to take part to agro and eco-tourist activities.

In *Rasnov*, the tourists could visit the *Fortress*, and the *Dino Park*, and also to practice winters sports, and in summer season to participate to cultural events. In the small city, it is an Evangelical Church and the oldest Orthodox stone-church in South-Eastern Europe. In *Valea Cetatii* it is a cave which could be explored by the people passionate of caving.

In *Prejmer*, there is the "*Prehmaer Fortress*", and in *Harman*, the "*Evangelische Fortified Church*" (1240) linked to the existence of the Knights of Malta.

In *Bunesti Commune*, the tourists could visit the charming traditional villages *Viscri*, *Cris* and *Meshendorf*.

In the city of *Fagaras*, it is the *Fagaras Fortress* (1310) destined to defend the country against the Otoman invasion and, close to it, at *Sambata de Jos*, it is the *Lipizzan Horse Farm*, the *Monastery* and a *Trout Growing Farm*.

From Brasov, in 45 minutes by car, coach or train, the tourists could arrive in the *Prahova Valley* to visit the well known mountain resorts: *Predeal*, *Azuga*, *Busteni*, *Sinaia*, and of course to visit the famous *Royal Peles Castle* and go up the mountain by telecable car.

*Rupea* and *Sighisoara* are other two charming medieval cities in the Brasov County. [2, 12].

**The evolution of the number of tourist accommodation units, the number of tourist guesthouses and the number of agro-tourist guesthouses**

In the Brasov County, the number of the accommodation units with function for tourist reception has increased by 102.76 % in the analyzed period from 471 units in the year 2007 to 955 units in the year 2017.

The number of tourist guesthouses has also recorded an ascending trend, increasing by



86.13 % from 137 units in the year 2007 to 255 units in the year 2017.

At the same time, the number of agro-tourist guesthouses registered the highest growth rate in the whole period of the analysis, +105.50 %, from 200 units in the year 2007 to 411 units in the year 2017.

The number of agro-tourist guesthouses was higher than the number of tourist guesthouses in all the analyzed years, as many owners of farms have diversified their activities offering accommodation and board using their own fresh products in order to satisfy better the tourists' needs and to get additional income from agro-tourism. (Fig.1).

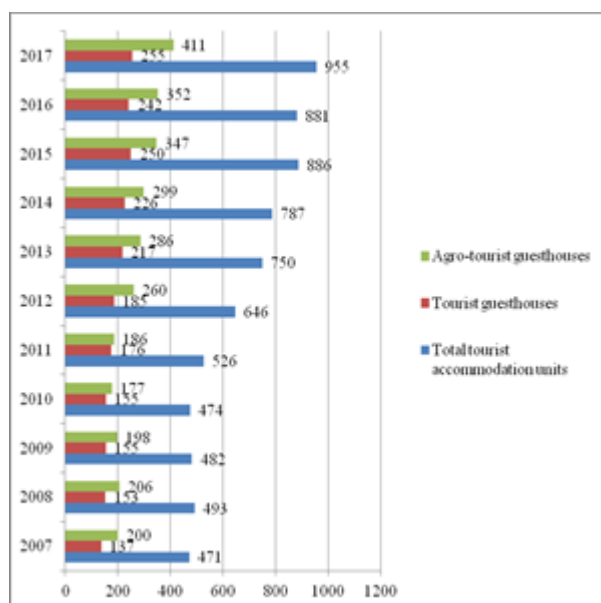


Fig.1. The evolution of the number of tourist accommodation units, of which the number of tourist guesthouses and the number of agro-tourist guesthouses in the Brasov County, 2007-2017

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

The Brasov County is on the top position regarding the number of accommodation units with function for tourists reception, being followed by Constanta, Harghita, Suceava and Prahova counties [3].

**The share of the tourist and agro-tourist guesthouses** in the total number of accommodation units with function for tourist reception registered a slight increase.

In case of the tourist guesthouses, their share declined from 29.09 % in the year 2007 to

26.70 % in the year 2017. However, in the year 2015, it was recorded the lowest share, 28.22%, and in the year 2011 the highest one, 33.46 %.

In case of the agro-tourist guesthouses, their share increased from 42.46 % in the year 2007 to 43.03 % in the year 2017. However, in the year 2011, it was recorded the lowest share, 35.36 %.

Therefore, the agro-tourist guesthouses are dominant in the Brasov County compared to the tourist guesthouses (Fig.2.).

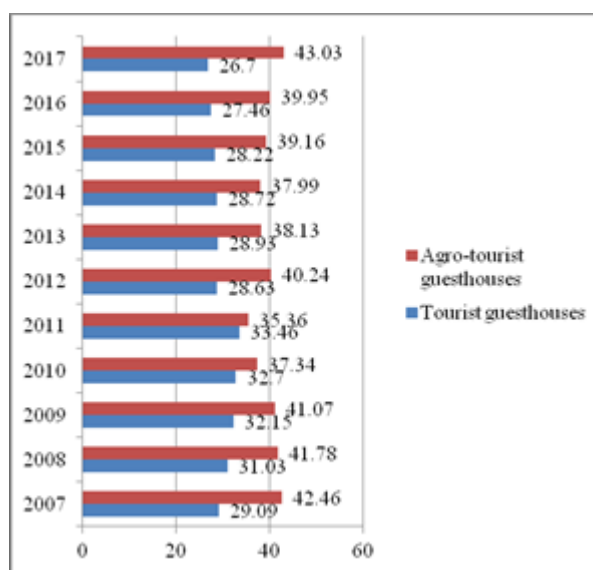


Fig.2. The evolution of the share of tourist guesthouses and agro-tourist guesthouses in the number of tourist accommodation units in the Brasov County, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

**The evolution of the number of places in the tourist accommodation units, tourist guesthouses and agro-tourist guesthouses**

The number of places in the number of the accommodation units with function for tourist reception increased by 135.95 % in the analyzed period from 12,634 places in the year 2007 to 29,811 places in the year 2017.

The number of places in the tourist guesthouses has also recorded an ascending trend, increasing by 119.29 % from 2,488 places in the year 2007 to 5,456 places in the year 2017.

At the same time, the number of places in the agro-tourist guesthouses registered the highest

growth rate in the whole period of the analysis, +190.69 %, from 2,396 places in the year 2007 to 6,965 places in the year 2017.

The number of places (beds) in agro-tourist guesthouses was higher than the number of places in tourist guesthouses as the number of agro-tourist guesthouses is much higher than the number of tourist guesthouses. (Table 1).

Table 1. The evolution of the number of places (beds) in the accommodation units with function for tourist reception, in the tourist guesthouses and agro-tourist guesthouses in the Brasov County, 2007-2017

	Total number of places in the Brasov County	Number of places in the tourist guesthouses	Number of places in the agro-tourist guesthouses
2007	12,634	2,488	2,396
2008	15,729	2,801	2,639
2009	14,728	2,996	2,772
2010	16,742	3,146	2,676
2011	17,795	3,556	3,067
2012	21,699	3,947	4,402
2013	25,524	4,719	5,024
2014	26,145	4,927	5,477
2015	28,616	5,524	6,234
2016	28,320	5,311	6,173
2017	29,811	5,456	6,965
2017/2007 %	235.95	219.29	290.69

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Database, 2018 [11].

**The share of the number of places in tourist and agro-tourist guesthouses** in the total number of places existing in the accommodation units with function for tourist reception registered a different situation depending on the type of guesthouse.

In case of the tourist guesthouses, the share of the number of places recorded a slight growth from 18.24 % in the year 2007 to 18.30 % in the year 2017.

However, in the year 2009, this type of guesthouse registered the highest share, 20.34 %, while in the year 2008, it recorded the lowest share, only 17.80 %.

In case of the agro-tourist houses, the share of the places registered in general a continuous increase from 18.96 % in the year 2007 to 23.36 % in the year 2017. In the year 2010, it

was noticed the lowest share, only 15.98 % (Fig.3).

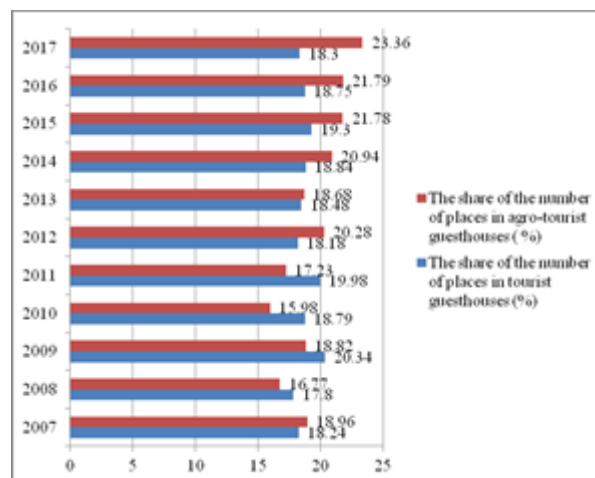


Fig.3. The share of the number of places in tourist guesthouses and agro-tourist guesthouses in the total number of places existing in the Brasov County, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018 [11].

**The tourism function indicator** recorded a continuous ascending trend from 2.12 % in the year 2007 to 5.41 % in the year 2016. This reflects that the tourism offer in terms of the number of places was higher and higher to satisfy better the tourists' demand.(Fig.4.)

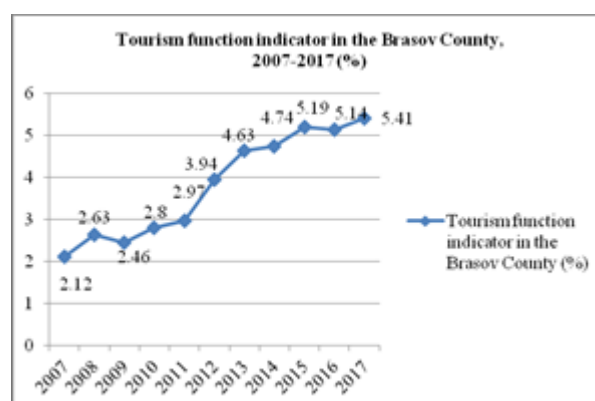


Fig.4. The tourism function indicator in the Brasov County, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

**The evolution of the number of tourist arrivals in the Brasov County and in the tourist and agro-tourist guesthouses.**

The Brasov County received more and more tourists in the analyzed period. In the year

2017, the number of tourist arrivals accounted for 1,114,395 being by 100.13 %, therefore more than double compared to the 2007 level, when it was recorded 556,816 arrivals.

In case of the tourist guesthouses, the number of tourists also increased, + 99.07 %, from 81,325 arrivals in the year 2007 to 161,899 in the year 2017.

The agro-tourist guesthouses recorded the highest growth rate of the number of tourist arrivals in the analyzed period, more exactly 258.96 %, therefore, 2.58 more than in 2007. In 2017, the number of arrivals reached 133,626 compared to 37,225 in the year 2007 (Table 2).

The figure show the preference of tourists mainly for tourist guesthouses, because they recorded the highest number of arrivals. But, if we take into account the high dynamism of the tourist arrivals in case of the agro-tourist guesthouses, we could estimate that in a few years, the number of tourists which will be accommodated in agro-tourist guesthouses will exceed the number of tourists received by the tourist guesthouses.

Table 2. The evolution of the number of tourist arrivals in the Brasov County, and in the tourist guesthouses and agro-tourist guesthouses, 2007-2017

	Total number of tourist arrivals in the Brasov County	Number of tourist arrivals in the tourist guesthouses	Number of tourist arrivals in the agro-tourist guesthouses
2007	556,816	81,325	37,225
2008	581,983	97,474	52,257
2009	451,683	75,677	41,916
2010	510,196	80,224	45,735
2011	642,829	90,270	65,633
2012	737,810	96,391	72,665
2013	834,979	117,695	87,094
2014	865,689	118,659	94,091
2015	887,601	137,070	110,417
2016	1,114,395	161,899	133,626
2016/2007 %	200.13	199.07	358.96

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

The Brasov County comes on the 3rd position after Bucharest and Constanta for the number

of tourist arrivals, [3]. Regarding the tourists profile, of the number of visitors of the Brasov County, about 85 % were Romanians, 5.4 % Germans, 3.6 % Italians, 3.5 % Swiss and 1.8 % Israelis. About a half of tourist number (50%) spent up to two nights in Brasov, 16.3 % spent 3 nights and 15.9 % spent 4 nights in Brasov [7].

**The share of the number of tourist arrivals in the tourist and agro-tourist guesthouses** in the total number of arrivals in the Brasov County registered a different evolution depending on the type of guesthouse.

In case of the tourist guesthouses, the share of the number of arrivals recorded an alternative evolution from a year to another, but in general, it declined from 14.60 % in the year 2007 to 14.52 % in the year 2017. However, in the years 2008 and 2009, this type of guesthouses registered the highest share, 16.74% and 16.75 %, while in the year 2012, it recorded the lowest share, only 13.06 %.

In case of the agro-tourist houses, the share of the number of tourist arrivals registered a continuous increase from 6.68 % in the year 2007 to 12 % in the year 2017. Therefore, in 2017 it was a an almost double number of tourists who preferred accommodation in the agro-tourist houses (Fig.5).

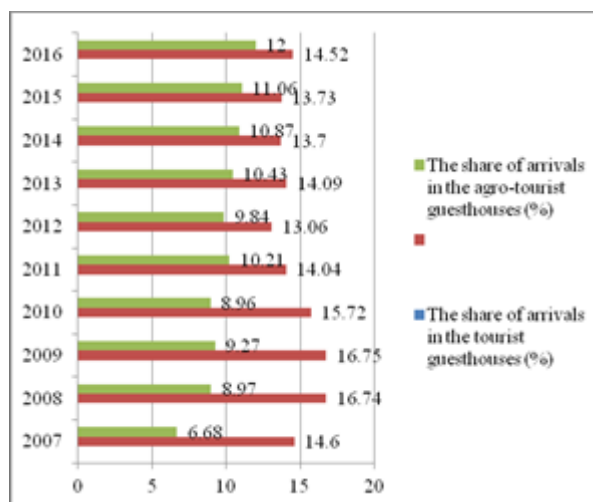


Fig.5. The share of the number of tourist arrivals in tourist guesthouses and agro-tourist guesthouses in the total number of tourist arrivals in the Brasov County, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

**The evolution of the number of Romanian and foreign tourists in the Brasov County and in the tourist and agro-tourist guesthouses.**

The number of Romanian tourists visiting the Brasov County increased by 106.73 % in the analyzed period, from 452,586 tourists in 2007 to 935,674 tourists in 2016.

The number of foreign tourists also increased by 71.46 % from 104,230 in the year 2007 to 178,721 in the year 2016, reflecting the higher and higher interest of foreigner to visit Romania and the Brasov County due to its specific attractions.

The share of the Romanian tourists is the highest one, ranging between 81.29 % in the year 2007 and 83.07 % in the year 2016. But the highest share was 85.21 % recorded in the year 2013.

Obviously, the share of the foreign tourists is still a low one, varying between 18.71 % in 2007 and 16.93 % in 2016. The top share was recorded in the year 2007, and the lowest share 14.79 % in the year 2013. But, this situation is determined by the higher growth rate of the number of Romanian tourists who are attracted to visit the Brasov County.(Table 3).

Table 3. The evolution of the number of Romanian and foreign tourist and their share in the total number of tourists in the Brasov County, 2007-2016

	Romanian tourists	Foreign tourists	Share of the Romanian tourists (%)	Share of the foreign tourists (%)
2007	452,586	104,230	81.29	18.71
2008	480,422	101,561	82.55	17.45
2009	376,716	74,967	83.41	16.59
2010	422,094	88,102	82.74	17.26
2011	528,327	104,502	83.75	16.25
2012	626,917	110,893	84.97	15.03
2013	711,440	123,539	85.21	14.79
2014	727,244	138,445	84.01	15.99
2015	839,344	158,257	84.14	15.86
2016	935,674	178,721	83.07	16.93
2016/2007 %	206.73	171.46	-	-

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

The share of the Romanian tourists in the tourist guesthouses in the total number of tourists in the Brasov County is very high and

varied between 83.43 % in the year 2007 and 87.97 % in the year 2016.

Also, the share of the Romanian tourists in the agro-tourist guesthouses in the total number of tourists in the Brasov County is very high, ranging between 94.97 % in the year 2007 and 94.99 % in the year 2016.

The low percentage of foreign tourists accommodated in the guesthouses is explained by their preference for hotels and also another cause is the low promotion of the tourist guesthouses and agro-tourist guesthouses.(Fig.6).

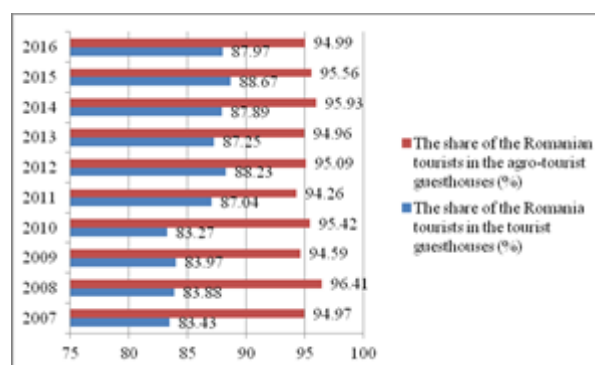


Fig.6. The share of the number of Romanian tourists in tourist guesthouses and agro-tourist guesthouses in the total number of tourists in the Brasov County, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

**The evolution of the number of overnight stays in the Brasov County and in the tourist and agro-tourist guesthouses.**

The number of overnight stays in the Brasov County increased by 85.73 % in the analyzed period, from 1,191,469 in the year 2007 to 2,213,002 in the year 2016.

The number of overnight stays has also increased in the guesthouses. In case of the tourist guesthouses, the number of overnight stays increased by 71.51 %, from 182,671 in the year 2007 to 313,321 in the year 2016, while in case of the agro-tourist guesthouses the number of overnight stays increased by 185.97 %, from 99,728 in the year 2007 to 285.97 in the year 2016.

Therefore, despite that the number of tourists accommodated in the agro-tourist guesthouses is lower than the number of tourists accommodated in the tourist guesthouses, the



number of overnights stays in the agro-tourist guesthouses has a higher growth rate (Table 4).

Table 4. The evolution of the number of overnight stays in the Brasov County, and in the tourist guesthouses and agro-tourist guesthouses, 2007-2017

	Total number of overnight stays in the Brasov County	Number of overnight stays in the tourist guesthouses	Number of overnight stays in the agro-tourist guesthouses
2007	1,191,469	182,671	99,728
2008	1,279,594	215,467	132,630
2009	985,033	160,710	105,037
2010	1,078,297	165,210	110,767
2011	1,329,831	184,170	151,697
2012	1,486,524	191,603	162,502
2013	1,754,320	238,517	198,197
2014	1,781,818	242,583	208,267
2015	2,060,959	266,041	241,913
2016	2,213,002	313,321	285,200
2016/2007 %	185.73	171.52	285.97

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

The Brasov County comes on the 3rd position after Constanta and Bucharest for the number of overnight stays. (2013) [3].

**The share of the overnight stays in the tourist guesthouses and agro-tourist guesthouses in the total number of overnight stays in the Brasov County.**

The share of the overnight stays in the tourist guesthouses in the total number of overnight stays at the county level varied between 15.33 % in the year 2007 and 14.15 % in the year 2016. Therefore, it registered a slight decreasing trend.

The share of the overnight stays in the agro-tourist guesthouses in the total number of overnight stays at the county level varied between 8.37 % in 2007 and 12.89 % in the year 2016 (Fig.7).

This is explained by the high growth rate of the tourist arrivals and the average length of stay.

The share of the number of overnight stays of the Romanian tourists in the Brasov County is high and varied between 79.54 % % in the year 2007 and 82.79 % in the year 2016.

Also, the share of the overnight stays of the Romanian tourists in the tourist guesthouses

varied between 79.11 % in the year 2007 and 85.89 % in the year 2016.

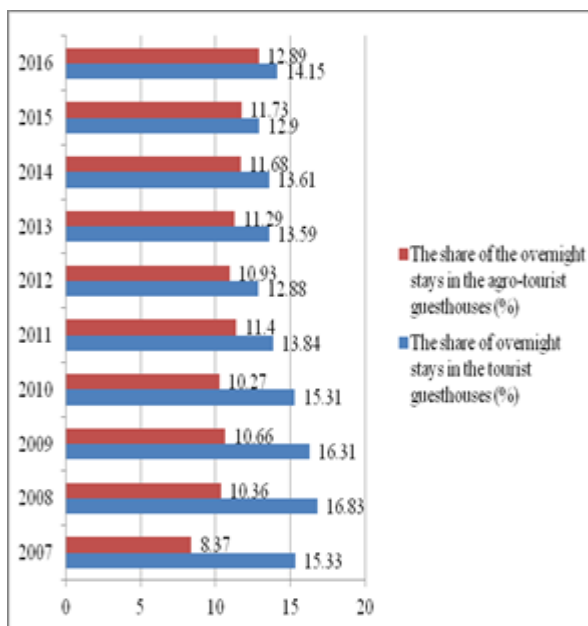


Fig.7. The share of the number of overnight stays in tourist guesthouses and agro-tourist guesthouses in the total number of overnight stays in the Brasov County, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

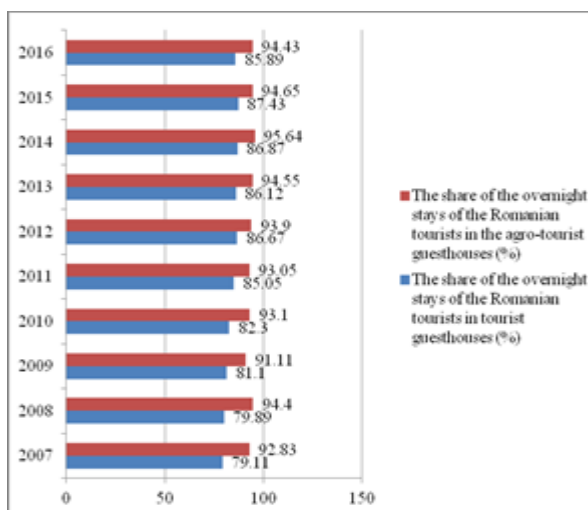


Fig.8. The share of the overnight stays of the Romanian tourists in the Brasov County , in the tourist guesthouses and agro-tourist guesthouses, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

The share of the overnight stays of the Romanian tourists in the agro-tourist

guesthouses ranged between 92.83 % in the year 2007 and 94.43 % in the year 2016.

Also, it was noticed a low percentage of the overnight stays belonging to the foreign tourists explained by their preference for hotels and the low promotion of the tourist guesthouses and agro-tourist guesthouses.(Fig.8).

**The average length of stay in the Brasov County, in the tourist guesthouses and agro-tourist guesthouses.**

The average length of stay in the Brasov County is in general small and having a general decreasing trend from 2.13 days in the year 2007 to 1.98 days in the year 2016.

In the tourist guesthouses, the average length of stay also had a general declining trend from 2.24 days in 2007 to 1.93 days in 2016.

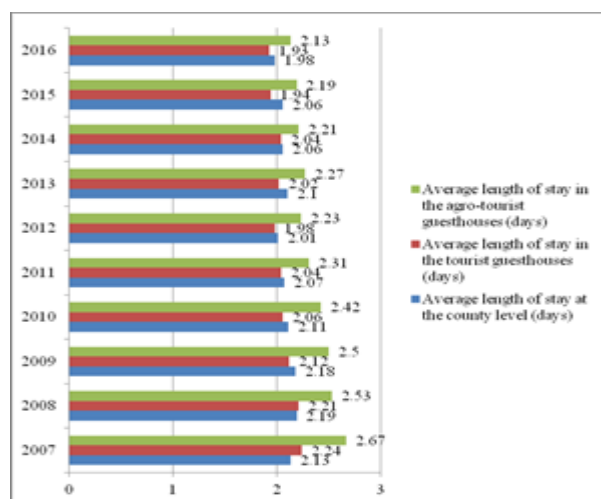


Fig.9. The average length of stay in the Brasov County, in the tourist guesthouses and agro-tourist guesthouses, 2007-2017 (days)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

In the agro-tourist guesthouses, the average length of stay also registered a general decreasing trend from 2.67 days in 2007 to 2.13 days in 2016. Comparing the figures, we could notice that the highest average length of stay is recorded in the agro-tourist guesthouses compared to the average at the county level and to the average in the tourist guesthouses. This could be explained by the fact that the agro-tourist guesthouses offer fresh meals prepared from the raw products achieved in the farm of household.(Fig.9).

**The evolution of the tourism density.**

Taking into account the number of tourists, the number of overnight stays and the population in the Brasov County, the values tourist density varied depending on the items used in the formula. the results are presented in Fig.10.

The tourism density calculated as the ratio between the number of overnight stays and the local population, varied between 2 overnight stays (tourist-days)/inhabitant in the year 2007 and 4.02 overnight stays (tourist-days)/inhabitant in the year 2016, meaning an increase of 101 %.

Taking into account the number of tourists divided by the local population, the tourist density varied between 0.94 tourists/inhabitant in 2007 and 2.02 tourists/inhabitant in 2016, reflecting an increase of 114.89 %. (Fig.10).

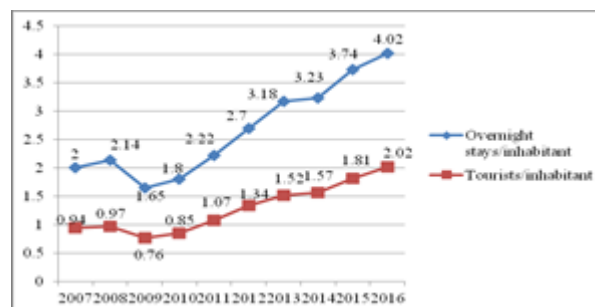


Fig.10. The tourism density in the Brasov County, 2007-2017 (overnight stays/ inhabitant and tourists/inhabitant)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

**The evolution of the occupancy rate in the Brasov County.**

Taking into account the number of overnight stays and the number of places, the occupancy rate varied at the County level, and also at the level of tourist guesthouses and agro-tourist guesthouses, as shown in Fig.11.

At the county level, the occupancy rate was 25.83 % in 2007, but in the coming years it recorded a decline till the year 2014, and then it started to recover, so that in the year 2016 it accounted for 21.40 %.

At the tourist guesthouses level, the occupancy rate registered a general decreasing trend from 20.11 % in 2007 to 16.16 % in

2016. This situation was due to the higher growth rate of the number of places compared to the growth rate of the number of overnight stays.

In case of the agro-tourist guesthouses, the occupancy rate has the lowest level. In 2007, it was 11.40 %, and varied up and down along the time, but in 2016 it reached 12.65 %. The highest occupancy rate, 13.55 %, was recorded in 2011 (Fig.11).

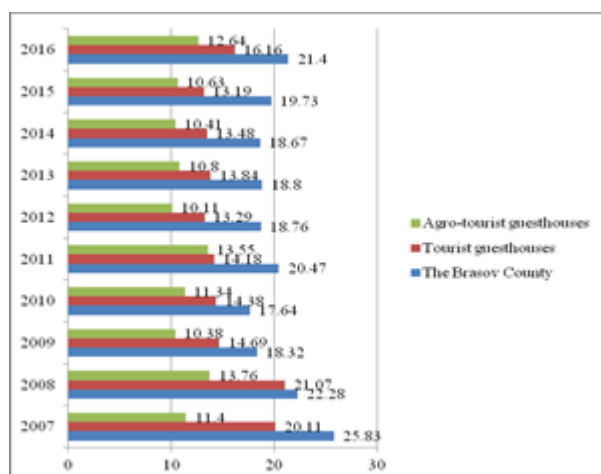


Fig.11. The tourism occupancy rate in the Brasov County, tourist guesthouses and agro-tourist guesthouses, 2007-2017 (%)

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Database, 2018. [11].

### The forecast of the main indicators in the Brasov County tourism for the horizon 2017-2021.

The estimates for the number of places, tourist arrivals, and overnight stays at the county

level, and also in the tourist guesthouses and agro-tourist guesthouses are based on the level achieved in the last year of the analysis and on the average growth rate registered in the period 2007-2016. The results are shown in Table 5.

As one can see, it is expected as in 2021, in the Brasov County the number of places in the accommodation units for tourist reception to reach 36,683 being by 23.05 % higher than in 2017. In the tourist guesthouses it is expected to achieve 6,644 places by 21.77 % more than in 2017 and in the agro-tourist guesthouses to carry out 8,793 places, meaning by 26.24 % more than in 2017.

The number of tourist arrivals, it is expected account for 1,424,160 visitors in the Brasov County in the year 2021 meaning by 27.79 % more than in 2016. The tourist guesthouses it is expected to receive 206,664 tourists in the year 2021, by 27.64 % more than in 2016, while in the agro-tourist guesthouses it is expected to accommodate 187,181 tourists in 2021 by 40.07 % more than in 2016.

In the Brasov County, the number of overnight stays will account for 2,780,522 in the year 2021 being by 25.64 % higher than in 2016. In the tourist guesthouses, it is expected to register 385,906 overnight stays in the year 2021 by 23.16 % more than in 2016, while in the agro-tourist guesthouses, it is expected to register 388,240 overnight stays in the year 2021 by 36.12 % more than in 2016.

Table 5. The forecast of the number of places, the number of tourist arrivals and overnights stays in the Brasov County and in tourist guesthouses and agro-tourist guesthouses in the horizon 2017-2021

	2017	2018	2019	2020	2021
No. of places in the tourist accommodation units in the Brasov County	29,811	31,529	33,247	34,965	36,683
No. of places in the tourist guesthouses	5,456	5,753	6,050	6,347	6,644
No. of places in the agro-tourist guesthouses	6,965	7,422	7,879	8,336	8,793
No. of tourist arrivals in the Brasov County	1,176,348	1,238,301	1,300,254	1,362,207	1,424,160
No. of tourist arrivals in the tourist guesthouses	170,852	179,805	188,758	197,711	206,664
No. of tourist arrivals in the agro-tourist guesthouses	144,337	155,048	165,759	176,470	187,181
No. of overnight stays in the Brasov County	2,326,506	2,440,010	2,553,514	2,667,018	2,780,522
No. of overnight stays in the tourist guesthouses	327,838	342,355	3,56,872	371,389	385,906
No. of overnight stays in the agro-tourist guesthouses	305,808	326,416	347,024	367,632	388,240

Source: Own calculation.

## CONCLUSIONS

The paper presented the natural and antropoc resources in the Brasov city and its surroundings and the development of main tourism indicators in the last decade, 2007-2016 and their forecast for the period 2017-2021, which prove that this part of Romania is an important tourist destination.

The Brasov county has a good tourism infrastructure in terms of accommodation units, their number accounting for 955 in the year 2017, of which 69.73 % are guesthouses, more exactly 43.03 % agro-tourist guesthouses and 26.7 % tourist guesthouses.

In the Brasov county, the accommodation capacity in terms of places has continuously increased, reaching 29,811 places in the year 2017. Of this number, 12,421 places (41.66 %) are in guesthouses, of which 23.36 % in agro-tourist guesthouses and 18.30 % in tourist guesthouses. The number of places in agro-tourist guesthouses had a higher dynamics than in the tourist guesthouses.

Due to the development of tourism capacity, the tourism function indicator has doubled in the analyzed period.

The Brasov area was visited by more tourists year by year, and their number has doubled in the analyzed period, accounting for 1,114,395 visitors in 2017, of which 295,525 (26.51 %) were been accommodated in guesthouses.

These figures show that most of tourists prefer other types of accommodation units, instead of guesthouses. But, in 2017, the number of visitors accommodated in agro-tourist guesthouses was 2.58 times higher in agro-tourist guesthouses and 2 times higher in tourist guesthouses, reflecting an increased preference for these types of units where offer is more attractive regarding the ratio between price and the quality of services.

In the total number of visitors, the Romanian tourists are dominant with a share of 83.07 %. In 2016, the number of Romanian visitors was more than double, the number of foreign tourist increased by 71.4 %.

The preference of the Romanian tourists for guesthouses is obvious as long as 94.97% were accommodated in agro-tourist guesthouses and 87.97 % in tourist

guesthouses. Therefore, the foreign tourists prefer hotels.

The number of overnight stays in the Brasov county had an ascending evolution, reaching 2,213,002 in the year 2016, of which 12.89 % in agro-tourist guesthouses and 14.15 % in tourist guesthouses. The number of stays in agro-tourist guesthouses was 2.5 times higher than in 2007.

The share of the overnight stays of the Romanian tourists is obvious higher in guesthouses, 84.4 % in agro-tourist guesthouses and 85.9% in tourist guesthouses. The average duration of stay registered a general descending trend accounting for 1.98 days at the county level, 1.93 days in tourist guesthouses and 2.13 days in agro-tourist guesthouses.

The tourism density in 2016 was double in the Brasov County, accounting for 2.02 tourist/inhabitant or 4.02 tourist-days/inhabitant, doubled figures compared to the year 2007.

The occupancy rate was in average 21.40 % at the county level, while in the guest houses is much lower: 16.16 % in the tourist guesthouses and 12.65 % in agro-tourist guesthouses.

Taking into account the progress carried out during the last decade, it is expected that in the future the tourist inflow and the accommodation capacity in the Brasov county, and mainly in the guesthouses to continue its development. In the year 2021, it was estimated that the Brasov County will be visited by 1.43 million tourists, meaning by 27.7 % more than in 2016, and the accommodation capacity to reach 36,683 places to better meet the tourists' needs.

As a final conclusion, the Brasov county is an example of high quality tourism, and an area where the agro-tourist guesthouses and tourist guesthouses play a more and more important role in the local tourism due to their attractive offer in terms of accommodation, board and other facilities.

The increased tourist flow is closely related to the growth of tourism receipts and with a better living standard and life quality for hosts and guests.



## REFERENCES

- [1]Albu, R-G., Petcu, N-L., 2014, Analysis models of the tourist destination development. Case study: Brasov area. *Calitatea*, Vol.15, S5, November 2014, pp.4-16, [http://www.srac.ro/calitatea/arhiva/supliment/2014/Q-asContents\\_Vol.15\\_S5\\_November-2014.pdf](http://www.srac.ro/calitatea/arhiva/supliment/2014/Q-asContents_Vol.15_S5_November-2014.pdf), Accessed February 10, 2018.
- [2]Brasov Landmarks, Things to do in Brasov, Trip Advisor, [https://www.tripadvisor.com/Attractions-g295394-Activities-c47-Brasov\\_Brasov\\_County\\_Central\\_Romania\\_Transylvania.html](https://www.tripadvisor.com/Attractions-g295394-Activities-c47-Brasov_Brasov_County_Central_Romania_Transylvania.html), Accessed February 10, 2018.
- [3]Bulin, D., 2015, A Romanian tourism market analysis-Developments and trends after the EU accession, *Global Economy Observer, GEO*, Vol.3 (2) : 100-109, [http://www.globeco.ro/wp-content/uploads/vol/split/vol\\_3\\_no\\_2/geo\\_2015\\_vol3\\_no2\\_art\\_012.pdf](http://www.globeco.ro/wp-content/uploads/vol/split/vol_3_no_2/geo_2015_vol3_no2_art_012.pdf), Accessed February 10, 2018.
- [4]Caratus Stanciu, M., 2017, Agrotourism and rural tourism, the way of sustainable development in rural areas of Sibiu County-Romania, *Muzeul Olteniei Craiova. Oltenia. Studii și comunicări. Științele Naturii*. Tom. 33, No. 2/2017, pp.179-182.
- [5]Cioban, G.-L., 2016, Tourism was born in the village, *Ecoforum*, Vol.5, Issue 2(9):125-130.
- [6]Condei, R., Alecu, I.N., Popescu, A, Ciocan, H.N., 2016, The analysis of the human resources involved in the rural tourism in Romania, *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* Vol. 16, Issue 2, pp.85-94.
- [7]Dinca, G., Foris, D., Demeter, T., 2017, Identifying Brasov County's touristic visitors' profile using European tourism indicators system, *Journal of Smart Economic Growth*, Vol.2(2):71-82.
- [8]Hontus, A.C., 2013, Study on tourism development and spatial resort analysis by Bran Brasov county touristic traffic, *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* Vol. 13, Issue 1, pp.165-172.
- [9]Merciu, C., Cercleux, L., Peptenatu, D., Vaidianu, N., Draghici, C., Pintilii, R., 2011, Tourism- an opportunity for the economic invigoration of rural areas in Romania, pp.75-90, [www.annalsreview.geo.unibuc.ro/2011/2011/Merciu/pdf](http://www.annalsreview.geo.unibuc.ro/2011/2011/Merciu/pdf), Accessed February 10, 2018
- [10]Naghiu, A., Vázquez, J. L., Georgiev, I., 2005, Rural development strategies through rural tourism activities in romania: chance for an internal demand?, *International Review on Public and Nonprofit Marketing*, Vol. 2 (1):85-95
- [11]National Institute of Statistics Tempo Online Data, [www.insse.ro](http://www.insse.ro)
- [12]Onea, D., 2016, Tourist Attractions in Brasov County, *Radio Romania International*, [http://www.rri.ro/en\\_gb/tourist\\_attractions\\_in\\_brasov\\_county-2555086](http://www.rri.ro/en_gb/tourist_attractions_in_brasov_county-2555086), Accessed February 10, 2018.
- [13]Popescu Agatha, 2016, The position of tourist and agrotourist guesthouses in Romania's accommodation structures, *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* Vol. 16 (1):417-424.
- [14]Tudose, C., 2017, Turist în propriul oraș: 8 muzee de vizitat în Brașov, 22 aug.2017, <https://ghidlocal.com/brasov/articole/muzee-brasov-de-vizitat/>, Accessed February 10, 2018.

## TECHNICAL EFFICIENCY OF DAIRY CATTLE FARMS IN EAST MEDITERRANEAN REGION OF TURKEY

Mevlüt GÜL<sup>1</sup>, Hilal YILMAZ<sup>2</sup>, Oguz PARLAKAY<sup>3</sup>, Selcan AKKOYUN<sup>2</sup>,  
Mehmet Emin BILGILI<sup>2</sup>, Yasemin VURARAK<sup>2</sup>, Hatice HIZLI<sup>2</sup>, Numan KILIÇALP<sup>4</sup>

<sup>1</sup>University of Süleyman Demirel, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Phone: +902462118588, Fax:+902462118696, Email: mevlutgul@sdu.edu.tr

<sup>2</sup>Eastern Mediterranean Agricultural Research Institute, Karatas Yolu 17.km. P.K: 45, Dogankent, Yuregir, Adana, Turkey, Phone: +903223340055, Fax:+903223340357, Emails: htarim01@gmail.com, selcanakkoyun@gmail.com, mehmetemin.bilgili@tarim.gov.tr, yasemin.vurarak@tarim.gov.tr, hatice.hizlibostan@tarim.gov.tr,

<sup>3</sup>University of Mustafa Kemal, Agriculture Faculty, Department of Agricultural Economics, 31060, Hatay, Turkey, Phone: +903262455845, Fax:+903262455832, Email: oparlakay@mku.edu.tr

<sup>4</sup>University of Gaziosmanpaşa, Agriculture Faculty, Department of Animal Science, 60240, Tokat, Turkey, Phone: +903562521616, Fax:+903562521488, Email: numan.kilicalp@gop.edu.tr

**Corresponding author:** mevlutgul@sdu.edu.tr

### Abstract

*This study aimed to determine the efficiency level of dairy cattle farms in provinces of East Mediterranean Region in Turkey. The data were gathered by questionnaire from 148 dairy farms in the areas of Adana, Osmaniye, Mersin, Hatay and Kahramanmaraş. Data envelopment analysis (DEA) method was used to calculate efficiency scores. Our analysis carried out in two steps. Firstly, technical efficiency scores were computed employing an input-oriented DEA. Technical efficiency value was amounted to be 78%. In the second phase, the relationship between the value of defined socio-economic variables and the value of obtained technical efficiency scores were calculated by the Tobit regression analysis. The annual milk production per cow was used in the study as the dependent variable. Concentrates, roughage, health expenditures, other variable expenditures, workforce and capital expenditures were considered per cow as independent variables. 5% statistically meaningful and positive relationship was determined by the value of technical efficiencies and rate of the family labour and herd size. It was decided that artificial insemination and farmer's age had a negative effect on the efficiency and it was at a 10% level, statistically meaningful.*

**Key words:** efficiency, dairy cattle farm, data envelopment analysis, Tobit regression analysis

### INTRODUCTION

The animal husbandry sector plays an essential role in the agricultural development of all countries [81]. Animal husbandry is vital for Turkey regarding both social and economic aspects. Turkey has the right natural resources and ecological conditions in that regard. In addition to the decline in animal numbers, support for animal husbandry has also changed in recent years. Along with these, Turkey's animal husbandry sector still suffers continuing structural, economic, and technical issues. The volatility of government

policies and market structure have restricted the growth of the industry, resulting in a decrease in the number of animals and volatility in product prices, which has affected the consumption of animal products.

As of 2016, the cattle population in Turkey was 14 million head. About 46.79% of total cattle population was culture breeds, 40.90% crossbreeds and 12.31% native breeds [77].

In the world, the dairy cattle have the most significant share in all milk-producing animals. In Turkey, the number of dairy livestock differs widely from that of the world.

As of 2016, the total amount of milk production in Turkey was 18,489,161 tons. About 16,786,263 tons (90.79%) of this milk was obtained from dairy cattle. The amount of sheep milk production, which has a significant share in the total number of dairy animals, remains very low [77].

Among the most critical subsectors in animal husbandry, are dairy cattle breeding and fattening cattle breeding. Of these two production lines, the development of fattening cattle industry may depend on dairy cattle breeding, since dairy cattle breeding is a sector associated with beef cattle. Positive events in dairy cattle directly affect the fattening animals and the meat market because the primary material of fattening cattle is obtained from dairy cattle sector. In that sense, it is possible to consider dairy cattle as the essential production area. The studies supporting dairy cattle also improve the condition of fattening cattle breeding, thus helping to develop the country's animal husbandry sector as a whole.

The research area was Eastern Mediterranean Region, which includes the provinces of Adana, Osmaniye, Mersin, Hatay and Kahramanmaraş. The cattle population in this region accounted for 5.29% of Turkey's total cattle population in 1991, but this share declined to 4.86% in 2016. The cattle population in the area has shown a sharp fall since 1991, and by 2003, the cattle presence had decreased by 27% as compared to 1991. From that year, the cattle population tended to increase again. In 2016, cattle population raised to 684,717 head (Fig. 1).

Like all cattle breeds in Turkey, the structure of cattle breeds in the Eastern Mediterranean region showed a variation in the period examined. In 1991, 10.18% of the cattle in the area consisted of culture breeds, 43.46% crossbreeds, and 46.36% native breeds. The distribution of livestock breeds continuously changed in the period, and in 2016, 42.29% of the cattle were culture breeds, 51.44% crossbreeds and 6.27% native breeds (Fig. 2). The region supplied 8.34% of total cattle milk production in 1991. However, in 2016 this value fell to 5.5%. Thus, although both cattle milk productivity and carcass weight

increased in the region, its share in Turkey showed a decline.

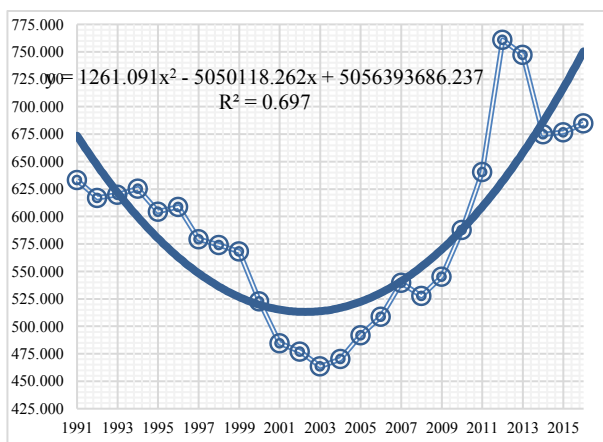


Fig. 1. Changes in cattle number in the research area  
Source: TÜİK [77].

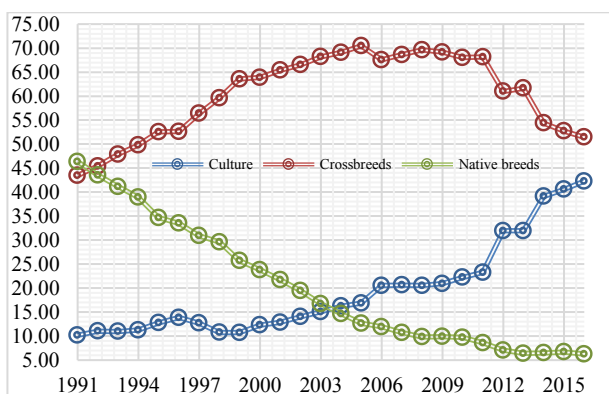


Fig. 2. Changes in cattle breeds in the research area  
Source: TÜİK [77].

That point of view, the efficiency of dairy cattle breeding in the region should be addressed.

The primary methods used to measure the efficiency of production units can be divided into two groups: parametric and nonparametric methods. In both ways, the principal is to obtain a production limit and to measure the efficiency of the production units against this limit. The production limit created represents the maximum output that can be achieved under a given technology. The production limit by parametric methods is determined econometrically. In the nonparametric techniques, a partial linear production limit is obtained by using the observed data, and there is no need for assuming any functional form for the production limit[9][41][21] [32][33][35][34].

There are some studies based on efficiency measurements in dairy cattle farms in Turkey. Binici et al. [11] in Burdur province, Koyubenbe and Özden [49] in İzmir, Gündüz [38] in Samsun, Alemdar et al. [3] in Adana, determined dairy farms' efficiency scores by parametric methods.

Koyubenbe and Candemir [48], Günden et al. [37], Uzmay et al. [78] in İzmir, Ceyhan and Hazneci [18], Özüdoğru [63] in Amasya, Demircan et al. [26] in Burdur, Dagistan et al. [25], Yılmaz [80] in Adana, Armağan and Nizam [6], Özden [60] in Aydın, Oğuz and Canan [58] in Konya, Parlakay et al. [64] in Hatay, and Terin et al. [76] in Kirklareli, calculated the efficiency scores of dairy cattle farms by non-parametric methods. Özden and Armagan [61] in Aydın and Gözener [31] in TR 83 region (Amasya, Çorum, Samsun, and Tokat provinces), determined efficiency score both methods.

There are numerous international studies conducting efficiency measurements in dairy farms. For examples; Sharma et al. [71] computed the farms' technical, allocative and economic efficiencies in swine production by using parametric and nonparametric models and discovered 0.759, 0.758 and 0.571 respectively, with the parametric models and 0.759, 0.803 and 0.603 with DEA. Ahmad and Bravo-Ureta [2] found 0.76, 0.77, and 0.86 of Vermont dairy farms' technical efficiency scores with using different parametric models for the 1971-1984 period. Kumbhakar et al. [45] used three parametric functions to compute dairy farms' technical and allocative efficiency in the US. Stokes et al. [72] determined efficiency score of dairy producers with the DEA in Pennsylvania and found that 29% of total farms were efficient. Tauer [73] calculated cost efficiency of a dairy farm in New York and claimed that the productive small-scale dairy farm could compete with the efficient large-scale farm. Tauer and Belbase [74] determined the dairy farms' technical efficiency scores by using parametric methods in New York by using the parametric method and calculated that 69% of them were efficient. Nehring et al. [56] determined the efficiency scores of small US dairy farms by using parametric functions.

Bravo- Ureta [12] calculated technical efficiency scores with the 0.8217 as the range between 0.5769-1.00 for dairy farms with the probabilistic frontier function model in New England. Bravo-Ureta and Rieger [13] used stochastic frontiers to determine dairy farm efficiency and found as 0.70 in New England. Featherstone et al. [28] calculated technical, allocative and scale efficiency scores as 0.78, 0.81, and 0.95 respectively with a nonparametric method for beef cow farms in Kansas. Cabrera et al. [16] found technical efficiency as 0.88 of a dairy farm in Wisconsin by stochastic frontier model. Also, Curtis et al. [24] calculated this score as more than 0.90 for dairy farms in Wisconsin with same methods.

Theodoridis and Psychoudakis [75] used stochastic frontier and DEA methods to calculate the dairy farms' technical efficiency values in Greece and found 0.8121 with stochastic frontier and 0.6849 with DEA. Latruffe et al. [52] determined the technical efficiency scores and measured the impacts of the subsidies on efficiency scores in European dairy farms by using the stochastic production frontier model, Madau et al. [53] calculated the technical efficiency and total factor productivity changes in European dairy farm with DEA. Abdulai and Tietje [1] computed dairy farms' technical efficiency with stochastic frontier models in northern Germany and found technical efficiency score as 0.89 to 0.945 with different models over 1997–2005. Brümmer et al. [14] determined dairy farms' technical efficiency by using parametric model and found as 0.879 in Germany, 0.904 in the Netherlands, and 0.853 in Poland. Brümmer and Loy [15] calculated technical efficiency as 0.96 of a dairy farm in Northern Germany with the stochastic frontier model. Barnes [8] calculated efficiency scores for the Scottish dairy as 0.841 by using DEA. Kleinhanß et al. [44] used DEA to estimate economic efficiency for animal farming in Spain and Germany. Reinhard et al. [67] calculated technical and environmental efficiency of Dutch dairy farms by using parametric functions. Zhu et al. [82] determined differentials of the dairy farms' technical efficiency and productivity in

German, Dutch and Swedish and measured the role of CAP subsidies on the scores. Latruffe et al. [51] used stochastic frontier and DEA model to calculate the crop and livestock farms' technical efficiency in Poland and found 0.88 with the stochastic frontier method and 0.71 with DEA for livestock farms. Hallam et al. [40] used three parametric methods to determine efficiency score and found as 0.64, 0.74 and 0.88 for dairy farms in Portugal. Hansen et al. [41] calculated economic efficiency as near 0.60 of dairy farms by using DEA in Norway. Hansson and Öhlmer [42] calculated economic, technical and allocative efficiency by DEA and found as 0.616, 0.889, and 0.692 in short run and 0.645, 0.865, and 0.752 in long run of dairy farms in Sweden. Johansson [43] determined the technical, allocative and economic efficiency of dairy farms in Sweden by using DEA and stochastic frontier model and found 0.55, 0.75, and 0.41 by stochastic frontier and 0.74, 0.61, and 0.45 by DEA respectively. Pöldaru and Roots [66] estimated economic efficiency of milk production in Estonia by using parametric models and found milk cost would be reduced as 0.80 cents of dairy farmers. Bezlepina et al. [10] researched subsidies affecting on allocative efficiency for Russian dairy farming. They used DEA analysis to calculate the these farms' technical and allocative efficiency.

Mor and Sharma [54] and Saha and Jain [68] determined as 0.66, 0.79 [54], and 0.911 [68] of the technical efficiency in dairy farms in India by using parametric functions. Moreira López et al. [55] found range 0.672 to 0.884 of technical efficiency score for dairy farms in Argentina by using stochastic production models. Paul et al. [65] calculated efficiency in New Zealand sheep and beef farming by using parametric functions and measured the impacts of regulatory reform on efficiency scores. Wei [79] calculated efficiency scores of New Zealand dairy farms as 0.96, 0.82 and 0.86 by using parametric and nonparametric methods. Fraser and Cordina [29] used DEA to calculate efficiency score as 0.905 and 0.908 with input oriented, 0.89 with output oriented, for dairy farms in Australia. Kompas

and Che [47] used two parametric functions to estimate the dairy farms' technical and economic efficiency in Australia and found as 0.87. Gelan and Muriithi [30] measured technical efficiency scores with DEA of dairy farms as 0.488 in East Africa. Lachaal et al. [50] also used DEA to estimate technical efficiency in Tunisia and determined that 47% of the dairy farms produce below 80% of their potential.

Therefore this study aimed to examine the dairy cattle farms' technical efficiency in the Eastern Mediterranean Region and detect the factors causing inefficiency in production.

## MATERIALS AND METHODS

The data were obtained through a questionnaire administered by face-to-face interviews in the farms engaged in dairy cattle breeding in the provinces of Adana, Osmaniye, Mersin, Hatay and Kahramanmaraş in the Eastern Mediterranean Region [81].

A list of agricultural farms engaged in dairy cattle breeding was retrieved from the TURKVET registration system in 20 villages determined by purposive sampling. The record revealed that there were 2,559 enterprises involved in dairy cattle farming. Since the variation was high regarding the number of dairy cattle, we chose to use stratified sampling method. After testing of the various alternatives, the enterprises were classified into four groups: farms with 1-2 head, those with 3-8, those with 9-28 and those with 29 head and more dairy cattle. The study sample size was determined within 5% error and 95% confidence limits. By the "Neyman Method", one of the stratified sampling methods the sample volume was calculated [20]. Accordingly, a total of 148 farmers have interviewed: 10 farms for the layer I, 44 for the segment II, 75 for the section III and 19 for the layer IV.

In the study, DEA method was used for nonparametric techniques which are widely used in measuring the technical activities of dairy cattle farms. The efficiency measurement employs the boundary approach,

assuming that observations with the best performance are on the efficient boundary.

Nonparametric methods involve multiple independent input and output models, but they are reduced to a single efficiency measure, allowing each dimension to be measured at the same time.

DEA was first introduced with the work of Farrell [27] and became more popular after the study by Charnes et al. [19]; various researchers in various fields now use it.

DEA can be examined with the Constant Returns to Scale (CRS), and Variable Returns to Scale (VRS) approaches. Charnes et al. [19] proposed a model that suggested an intrinsic and constant return to scale (CRS) approach. In the literature, this method is referred to as CRS or the CCR model, representing the initials of the authors. Since the CRS is valid only when all decision-making units operate at the optimal scale [23], Banker et al. [7] presented the approach of VRS. Banker et al. [7]'s model is referred to in the literature as VRS or as BCC to represent the initials of the authors. They introduced the VRS approach by adding only the convexity constant ( $\sum \lambda = 1$ ) to the equation used in the CRS approach [23].

Min  $\theta, \lambda$

Under the following constraints;

subject to  $-y_i + Y\lambda \geq 0$ ,

$\theta x_i - X\lambda \geq 0$ ,

$\sum \lambda = 1$ ,

$\lambda \geq 0$ ,

Here,  $\theta$  is a vector of scalar and  $\lambda$   $N \times 1$  constants. The value of  $\theta$  indicates the efficiency value of the  $i$ th enterprise. The result is  $\theta \leq 1$ , and one means efficiency [27].

$\sum \lambda$  is a vector consisting of value 1 with a dimension  $N \times 1$ .

Scale efficiency reveals the losses due to failure to produce at an optimal level. If a production unit's production scale is optimal, increasing or decreasing the production scale will reduce efficiency [36]. The scale efficiency (SE) can be explained by the following formula, taking advantage of the difference between the technical efficiency (TE) scores acquired with CRS and VRS[23]:

$$TE_{CRS} = TE_{VRS} \times SE$$

In this study, the resultant efficiency values calculated by the DEA were obtained as input-oriented on the assumption of CRS and VRS. All explications supposed that the producers in the dairy farms were operating under similar conditions.

A large number of computer software has been developed to perform efficiency analyses. In this study, DEAP was used for DEA, and EViews software was used for Tobit analysis [22].

In determining the variables involved in the DEA, the dependent variable was milk yield. As independent variables, inputs considered to have the highest effect on this dependent variable and those needed for the production were taken into consideration. As a dependent variable, annual milk yield per head (kg) was used. The independent variables included the amount of concentrate feed (kg) per head, the amount of roughage (kg), veterinary costs (TRY), other variable costs (TRY), labour (hour) and capital costs (TRY). The variable costs were included salt, electricity, water, insurance, artificial insemination, marketing, repair & maintenance and fuel costs. The labour was calculated in hours based on family and hired-labour. Capital costs consisted of depreciation and interest charges on buildings and equipment used in dairy cattle breeding.

Also, the effect of socioeconomic variables on the efficiency, including the farmer's age, the share of family labour, education level, the type of milking, experience in dairy farming, herd size and artificial insemination was calculated using censored Tobit regression analysis.

## RESULTS AND DISCUSSIONS

Summary statistics of the inputs used in the analysis were shown in Table 1. The average milk yield per head produced during the lactation period in 148 enterprises was calculated as 5,075.19 kg. Milk yield per head in the minimum and maximum lactation period was determined as 1,470 kg and 7,500 kg respectively. Semerci et al. [70] determined milk yield per cow in a lactation period as 5,618.65 kg in dairy cattle

enterprises in Hatay, which was consistent with our findings. It was estimated that average amount of concentrate feed was 2,992.53 kg per head and roughage feed was 2,656.07 kg. The average veterinary costs per dairy cow were TRY106.96; the other variable costs were TRY130.73, the labour usage was 103.14 hours, and the capital expenditures were TRY415.06.

Table 1. Summary statistics of the inputs used in the efficiency analysis

Variables	Min.	Max.	Average	Standard deviation
<b>Output</b>				
The average milk yield per head produced during the lactation period (kg)	1,470.00	7,500.00	5,075.19	1,176.57
<b>Inputs</b>				
Average amount of concentrate feed per cow (kg)	0.00	9,745.50	2,992.53	1,407.65
Average amount of roughage feed per cow (kg)	0.00	10,656.00	2,656.07	1,735.67
Veterinary costs per dairy cow (TRY)	0.00	600.00	106.96	78.25
Variable costs per dairy cow (TRY)	4.29	540.00	130.73	78.91
Labour used per dairy cow (hour)	2.53	649.79	103.14	85.61
Capital cost per dairy cow (TRY)	69.13	1515.91	415.06	180.90

Source: Own calculation.

DEA method was used to calculate technical efficiency in dairy cattle farms. These scores were computed as input-oriented under the assumptions of CRS and VRS. In the case of input-level measures, the objective was to reduce the amount of input in proportion to the amount of output produced.

The distribution of the technical efficiency values obtained using the DEA for input was presented in Table 2. Businesses that were found efficient were given the amount one, and efficiency value groups were given in slices of tens.

Table 2. The distribution of the technical efficiency values by DEA

Scores	Farm numbers		
	DEA-CRS	DEA-VRS	DEA-SE
1.00	21	34	21
0.91-0.99	9	16	56
0.81-0.90	19	20	35
0.71-0.80	17	23	13
0.61-0.70	26	27	11
0.51-0.60	23	15	8
0.41-0.50	16	11	3
<0.41	17	2	1
<b>Summary statistics</b>			
Minimum	0.23	0.38	0.32
Maximum	1.00	1.00	1.00
<b>Average</b>	<b>0.69</b>	<b>0.78</b>	<b>0.87</b>

Source: Own calculation.

Of the 148 dairy cattle farms surveyed, CRS found that 21 were fully efficient and VRS found that 34 enterprises were running efficiently. CRS found that 17 farms had an efficiency value below 0.41 and VRS found that only 2 of them had an amount below that number.

The mean technical efficiency score was determined to be 69% with CRS and 78% with VRS. The mean technical efficiency score of 78% with CRS means that an average operator can save 22% (1-0.78) in the inputs if they can operate at an efficient operating level. It was determined that an operator running at a minimum level with the VRS could save 62% (1-0.38) of inputs. The technical efficiency levels with VRS ranged from 38% to 100% (Table 2).

Two main factors were determined to play a role in the inefficiency of the businesses. These were scale inefficiency and input-composite inefficiency. The average scale efficiency of the dairy cattle enterprises was found to be 87%, and the majority of the farms had an efficiency score of 0.91-1.00. Thus, the inefficiency of these farms was not the scale inefficiency, so we can suggest that inefficient production resulted from input composite inefficiency [71] [59] [62] [80] [64].

In the input-oriented efficiency analysis, of the 148 dairy cattle farms, 21 constant returns to scale, 112 increasing returns and 15 decreasing returns to scale. Dairy farms with constant returns to scale were whole efficient. According to the farm types, the highest mean technical efficiency score with CRS was determined in the 4th group at 74%. The mean technical efficiency score with VRS was the highest in the third group (81%). The scale efficiency was highest in the 4th group (92%) (Table 3).

Table 3. Average technical efficiency scores by farmer groups

Farms groups	DEA-CRS	DEA-VRS	DEA-SE
I	0.67	0.75	0.87
II	0.63	0.73	0.85
III	0.71	0.81	0.87
IV	0.74	0.80	0.92
<b>Average</b>	<b>0.69</b>	<b>0.78</b>	<b>0.87</b>

Source: Own calculation.



In 2003, Candemir and Koyubenbe [17] calculated dairy cattle farms' technical efficiency as 0.934 according to the DEA scale based on the assumption of CRS and 0.954 based on the assumption of VRS in İzmir. Uzmay et al. [78] determined the technical efficiency score as 0.903 according to CRS and 0.927 according to VRS by using DEA in dairy cattle farms in İzmir. Koyubenbe and Özden [49] calculated the mean technical score as 0.864 by using Stochastic Frontier Analysis (SFA) in dairy cattle farms in İzmir in 2008. Günden et al. [37] found the technical efficiency scores as 0.615 by DEA in İzmir. Parlakay et al. [64] determined the technical efficiency of the dairy cattle farm in Hatay and they [64] determine 0.64 according to CRS and 0.69 according to VRS by DEA. These scores were calculated as 0.59 and 0.83 in Adana and Hatay province by Dagistan et al. [25], 0.75 and 0.78 in Adana by Yilmaz [80] respectively.

The efficiency values calculated in the studies carried out in Izmir [17] [78] were lower than the mean efficiency score (0.87) determined in this study. Our efficiency scores were close to those found by the works done in Adana and Hatay [25] [80] and higher than those reported in the survey conducted in Hatay [64]. The efficiency values we found in this study were consistent with those reported by Koyubenbe and Özden [49]. It should be noted here that the method chosen to measure the efficiency of the dairy farms may produce different results. Efficiency values were evaluated according to the production function in SFA and to the reference enterprise in DEA. A literature review also shows that studies utilising DEA and SFA reported different efficiency scores depending on the analysis type [39] [68] [59][62] [57][49].

The number of thoroughly efficient farms by farms groups was given in Table 4. Fully-efficient farms according to CRS, VRS and SE were mostly in group 3.

As a result of the DEA, the input slacks were also determined in the farms.

Table 4. The number of whole efficient enterprises by farms groups

Farms groups	DEA-CRS	DEA-VRS	DEA-SE
I	2	3	2
II	4	7	4
III	11	19	11
IV	4	5	4
Average	21	34	21

Source: Own calculation.

An agricultural enterprise can reduce as much as the amount of slack in the input it uses without any reduction in output. The percentage of excess use in the inputs was found by dividing the average input surplus by the average input use.

Percentage of excess input usage was the highest in other variable costs per head (19.08%). This value was followed by veterinary expenses per head (11.82%), labour (11.47%), roughage (10.33%), composite feed (4.65%) and capital costs per head (3.71%). According to these results, 76 enterprises can remain at the same production level and reduce the other variable costs by 19.08% (Table 5).

The socioeconomic variables thought to affect the efficiency of the farms included the ratio of the family labour in total labour used, education level, age of the farmer, type of milking, experience in dairy farming, herd size and artificial insemination.

There were different ways in which some variables were included in the modelling studies. Some researchers directly model the values of variables, while others prefer to use dummy variables. In this study, some variables were included in the model using dummy variables according to the qualities indicated by the variables.

The relationships between the variables determined and the technical efficiency scores were computed using Tobit regression analysis. The variables' descriptions used in the Tobit regression and some statistics were given in Table 6. The model was calculated with the EViews program.

Two-limit Tobit analysis calculated the relationship between the technical efficiency values obtained by DEA-VRS approach and the socioeconomic variables and the coefficients were given in Table 7.



Table 5. Farmers using more inputs and input surpluses

Inputs	Farmer number	Average input excess	Average input usage	Percent of excess input usage (%)
Average amount of concentrate feed per cow (kg)	7	139.06	2992.53	4.65
Average amount of roughage feed per cow (kg)	1	274.27	2656.07	10.33
Veterinary costs per dairy cow (TRY)	6	12.64	106.96	11.82
Other variable costs per dairy cow (TRY)	6	24.94	130.73	19.08
Labour used per dairy cow (hour)	3	11.83	103.14	11.47
Capital cost per dairy cow (TRY)	4	15.39	415.06	3.71

Source: Own calculation.

Table 6. Definitions of variables used in two-limit Tobit analysis

Variables	Definition	Values
Share of family labour	The ratio of family labour to the total employment used	Ratio
Education	The educational background of the farmer	1= High school or higher 0=Other
Milking type	The technique or system used in milking	1=Milking by machinery 0=Milking by hand
Experience in livestock	The farmers' experience in dairy cattle breeding	Years
Herd size	Number of cattle owned by the enterprise	Head
Artificial insemination	The status regarding the use of artificial insemination	1=Uses artificial insemination 0=No artificial insemination
Age	The age of the farmer	1=40+ 0=Other

Source: Own calculation.

Table 7. Tobit regression analysis results used in determining the relationship between socio-economic variables and technical efficiency

Variables	Coefficient	Standard error	P-value
Constant	0.7582	0.1143	0.0000
Share of family labour	0.1889	0.0775	0.0148**
Education	0.0381	0.0459	0.3872
Milking type	0.0397	0.0518	0.4444
Experience in dairy cattle	-0.0018	0.0016	0.2626
Herd size	0.0008	0.0003	0.0265**
Artificial insemination	-0.1128	0.0636	0.0762*
Age	-0.0781	0.0429	0.0687*

\* Important at 0.1 level; \*\* Important at 0.05.

Source: Own calculation.

Two-limit Tobit analysis calculated the relationship between the technical efficiency values obtained by DEA-VRS approach and the socioeconomic variables and the coefficients were given in Table 7.

There was a definite and statistically significant (5%) relationship between the technical efficiency scores and the ratio of the family labour force in the total labour force. It means that as the ratio of family labour increases, the efficiency scores increase. In the case of farms using the family labour because they are self-employed and therefore they were more self-sacrificing and were to obtain more efficiency. This finding collaborates with Curtis et al. [24] in Wisconsin, Hallam and Machado [40] in

Portuguese dairy farms and Zhu et al. [82] in Netherlands dairy farms. Also, Latruffe et al. [51] found that family labour was important for Poland dairy farm efficiency. On the contrary, Gül et al. [34] found an inverse relationship between labour use and effectiveness in goat production. Zhu et al. [82] declared that higher share of family labour decreased efficiency score of dairy farms in Germany and Sweden. Özden [60] determined non-family labour decrease efficiency score of dairy farms in Aydin. However, Alemdar et al. [3] found that family labour did not have a significant effect on inefficiency score of dairy farms in Adana.

In this study, the education level of the farmers was modelled as a dummy variable. The farmers with high school or higher education (1) and those with lower education level (2) were classified into two groups to investigate the effect of education level on efficiency by using limited Tobit regression analysis. The average education level was at the primary school level. Approximately 24.33% of the farmers surveyed had high school or higher education. The technical efficiency values had a positive but statistically insignificant relationship with education level. The positive correlation between education and efficiency scores shows that farmers with higher education work more efficiently than those with lower education level. Education level promotes the adoption of innovations and keeping up with latest advances.

This finding collaborated with several studies in Turkey [4] [35] [26] [34][60]. Mor and Sharma [54] found that inefficiency scores decline with the increased years of formal education in India. Latruffe et al. [51] determined lower educated farmers to be less efficient in Poland. However, some researchers ([5][21][46]) indicated a negative correlation between education level and efficiency scores. But, some researchers did not find any relationship with both variables [73][74][11][78][30][63][64][26].

The method of milking was included in the models as a dummy variable. The machine-milking enterprises were involved in one group (1), while the manual milking farms

were in the other unit (0). About 85.81% of the farms were using machinery for milking. We found that the type of milking had a positive but statistically insignificant impact on the efficiency. The positive relationship between the milking method and efficiency indicates that the enterprises using machinery work more efficiently than those using manual milking. The use of milking-machinery was higher as compared to previous studies. In fact, 8.66% of the machine-milking enterprises had fixed milking units and cooling tanks.

The effect of farmer's experience on the efficiency of dairy cattle was adverse and statistically insignificant. As the experimentation increased, the efficiency score decreased, so it can be suggested that the more experienced farmers try to maintain traditional production techniques, while the younger generation tends to increase their productivity by using new technology.

Gül [33] determined a definite relationship between experience level and efficiency score. Just as several others did, such as; Bravo-Ureta and Rieger [13], Alemdar and Işık [4], Gül et al. [35], Uzmay et al. [78], and Parlakay et al. [64]. However, Alemdar and Ören [5] reported a negative correlation between experience level and efficiency score in their work.

The impact of herd size on efficiency was positive and statistically significant at the level of 5%. It can be said that as the herd size increases, the efficiency score increases. It was widespread that the herd size affects improving productivity by making the resource usage useful.

The study conducted by Yılmaz [80] in Adana determined a positive and statistically meaningful correlation between the technical efficiency scores and the herd size of the farms by the DEA and Gül et al. [34] found a direct correlation between herd size and efficiency scores in goat production. In their study carried out in Adana, Şahin et al. [69] stated that dairy cattle farming was a profitable production area, with much higher profitability in large enterprises. Tauer and Belbase [74] claimed that the greater cow numbers would increase the efficiency score

of New York dairy farms. Similar results were found by Featherstone et al. [28] in Kansas, Bravo-Ureta and Rieger [13] in New England, Brümmer and Loy [15] in Germany, Binici et al. [11] in Burdur, Demircan et al. [26] in Burdur, Parlakay et al. [64] in Hatay. Also, Zhu et al. [82] found that larger size dairy farms increased efficiency in Germany and Sweden. However, Bravo Ureta [12] in New England; Ahmad and Bravo-Ureta [2] in New England; Dagistan et al. [25] in Adana and Hatay, Özüdoğru [63] found a negative effect between efficiency score and herd size for dairy farms. However, Alemdar et al. [3] determined herd size not have a significant effect on inefficiency score of dairy farms.

These findings show that it was necessary to take policy measures that encourage the growth of the farms.

Artificial insemination was included in the model as a dummy variable. There were two groups: enterprises that opted for artificial insemination (1) and those using no artificial insemination (0). About 90.54% of the farms were utilising artificial insemination. Artificial insemination was found to have an adverse and statistically significant (10%) effect on efficiency values, which suggests that the enterprises using artificial insemination operated less efficiently than those not using it. It could be due to the high number of insemination attempts per pregnancy, cost of artificial insemination, and its high failure rate.

Of the socioeconomic variables, the age of the farmer was also included in the model as a dummy variable. The farmers aged 40 or above were in one group (1), while those younger than 40 were included in the other unit (0). The farmers' age variable had a negative coefficient. It meant that adversely affected on the efficiency score, which was statistically significant at 10% (Table 7). The negative correlation between the age and efficiency values indicates that the farmers older than 40 were less efficient scores than younger ones. The result of this study also corroborates with Brümmer and Loy [15], Alemdar and Işık [4] and Gül et al. [35]. They found that elderly farmers were fewer efficiency scores than younger farmers.

However, Alemdar and Ören [5] and Koc et al. [46] determined that older farmers have more efficiency scores than younger farmers. However, Tauer and Belbase [74], Bravo-Ureta and Rieger [13], Tauer [73], Latruffe et al. [51], Binici et al. [11], Gelan and Muriithi [30], Uzmay et al. [78], Özüdođru [63], Özden [60] determined farmers' age not have a significant effect on efficiency score of dairy farms.

## CONCLUSIONS

This study examined the efficiency in the dairy cattle farms in the Eastern Mediterranean area of Turkey by using DEA method. The average technical efficiency score with DEA-CRS was calculated as 69%, whereas this value was 78% with DEA-VRS. The mean technical efficiency value of 78% with the DEA-VRS means that the average enterprise can save 22% (1-0.78) in the inputs if it can operate efficiently. Specific socioeconomic variables including the share of family labour, herd size, artificial insemination, and farmer's age had a significant impact on the farms' efficiency values. The results indicated that the efficiency score of production was significantly low, which suggests that producers can produce the same output using less input. Also, farmers can increase efficiency by increasing the family labour's ratio in total labour and the size of their herds while lowering the amount of artificial insemination.

Average efficiency scores calculated in the study are in line with those obtained in other studies conducted in the region. The scores obtained are not sufficient. These scores can be increased by efficient use of input combinations used in production and other measures to be taken. It has been specified that artificial insemination costs reduce efficiency. It can be said that the artificial insemination is affected more than once because it increases the costs. Improvements in this subject can improve efficiency. It is also seen that machine milking improves the efficiency. Dissemination of machine milk and replacement of the used dairy machines

with more advanced ones may provide increased yield.

Some improvements in the production techniques in the enterprises can lead to more efficient production. The businesses can reduce costs by staying at the same production level.

Especially in developing countries, the high inputs costs in production increase the importance of efficiency studies. Therefore, the results of the studies into production efficiency should be delivered to farmers through the use of agricultural publishing services so that they can streamline their production activities to achieve better efficiency.

## ACKNOWLEDGEMENTS

We would like to thank TAGEM/GDARP. This study was a part of our project (Project No: TAGEM/TEAD/12/TE/000/009) and funded by the Republic of Turkey Ministry of Food, Agriculture and Livestock TAGEM/GDARP.

## REFERENCES

- [1]Abdulai, A., Tietje, H., 2007, Estimating technical efficiency under unobserved heterogeneity with stochastic frontier models: application to northern German dairy farms. *European Review of Agricultural Economics*, Vol.34(3):393-416.
- [2]Ahmad, M., Bravo-Ureta, B.E., 1996, Technical efficiency measures for dairy farms using panel data: A comparison of alternative model specifications. *Journal of Productivity Analysis*, Vol.7(4):399-415.
- [3]Alemdar, T., Bahadır, B., Ören, M.N., 2010, Cost and return analysis and technical efficiency of small-scale milk production: A case study for Cukurova region, Turkey. *Journal of Animal and Veterinary Advances*, Vol.9(4): 744-847.
- [4]Alemdar, T., Işık, H., 2008, Technical efficiency of peanut growing farms in Turkey. *Acta Scientiarum Polonorum, Oeconomia*, Vol.7(4): 5-15.
- [5]Alemdar, T., Ören, M.N., 2006, Determinants of technical efficiency of wheat farming in Southeastern Anatolia, Turkey: a nonparametric technical efficiency analysis. *Journal of Applied Sciences*, Vol.6: 827-830.
- [6]Armađan, G., Nizam, S., 2012, Productivity and efficiency scores of dairy farms: the case of Turkey. *Quality & Quantity*, Vol.46(1): 351-358.
- [7]Banker, R.D., Charnes, A., Cooper, W.W., 1984, Some models for estimating technical and scale

- inefficiencies in data envelopment analysis. *Management Science*, Vol.30:1078-1092.
- [8] Barnes, A.P., 2006, Does multi-functionality affect technical efficiency? A non-parametric analysis of the Scottish dairy industry. *Journal of Environmental Management*, Vol.80(4): 287-294.
- [9] Battese G.E., 1992, Frontier production functions and technical efficiency: a survey of empirical applications in agricultural economics. *Agricultural Economics*, Vol.7:185-208.
- [10] Bezlepkina, I.V., Oude Lansink, A.G.J.M., Oskam, A.J., 2005, Effects of subsidies in Russian dairy farming. *Agricultural Economics*, Vol.33(3):277-288.
- [11] Binici, T., Demircan, V., Zulauf, C.R., 2006, Assessing production efficiency of dairy farms in Burdur province, Turkey. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, Vol.107(1): 1-10.
- [12] Bravo- Ureta, B.E., 1986, Technical efficiency measures for dairy farms based on a probabilistic frontier function model. *Canadian Journal of Agricultural Economics*, Vol.34(3):399-415.
- [13] Bravo-Ureta, B.E., Rieger, L., 1991, Dairy farm efficiency measurement using stochastic frontiers and neoclassical duality. *American Journal of Agricultural Economics*, Vol.73(2):421-428.
- [14] Brümmer, B., Glauben, T., Thijssen, G., 2002, Decomposition of productivity growth using distance functions: The case of dairy farms in three European countries. *American Journal of Agricultural Economics*, Vol.84(3):628-644.
- [15] Brümmer, B. Loy, J.P., 2000, The technical efficiency impact of farm credit programmes: A case study of northern Germany. *Journal of Agricultural Economics*, Vol.51(3):405-418.
- [16] Cabrera, V.E., Solis, D., Corral, J., 2010, Determinants of technical efficiency among dairy farms in Wisconsin. *Journal of Dairy Science*, Vol.93(1): 387-393.
- [17] Candemir, M., Koyubenbe, N., 2006, Efficiency analysis of dairy farms in the Province of Izmir (Turkey): Data envelopment analysis (DEA). *Journal of Applied Animal Research*, Vol.29(1): 61-64.
- [18] Ceyhan, V., Hazneci, K., 2010, Economic efficiency of cattle-fattening farms in Amasya province, Turkey. *Journal of Animal and Veterinary Advances*, Vol.9(1): 60-69.
- [19] Charnes, A., Cooper, W.W., Rhodes, E., 1978, Measuring the efficiency of decision making units. *European Journal of Operational Research*, Vol.2(6): 429-444.
- [20] Çiçek, A., Erkan, O., 1996, Agricultural economics research and sampling methods (in Turkish). Gaziosmanpaşa University, Agricultural Faculty Publications No: 12, 118p, Tokat.
- [21] Cinemre, H. A., Ceyhan, V., Bozoğlu, M., Demiryürek, K., Kılıç, O., 2006, The cost efficiency of trout farms in the Black Sea Region, Turkey. *Aquaculture*, Vol.251(2): 324-332.
- [22] Coelli, T.J., 1996, A guide to DEAP Version 2.1: a data envelopment analysis (computer) program. CEPA Working Paper 96/08, Department of Econometrics, University of New England, Armidale, Australia.
- [23] Coelli, T.J., Rao, D.S.P., O'Donnell, C.J., Battese, G.E., 2005, An introduction to efficiency and productivity analysis (Second edition). Springer Science+Business Media, Inc., New York, USA.
- [24] Curtis, J., Jackson, S., Kennedy, V.D., 2016. An evaluation of technical efficiency among heterogeneous dairy farms. *African Journal of Dairy Farming and Milk Production*, Vol.3(2):135-140.
- [25] Dagistan, E., Koc, B., Gul, M., Parlakay, O., Akpınar, M.G., 2009, Identifying technical efficiency of dairy cattle management in rural areas through a non-parametric method: A case study for the East Mediterranean in Turkey. *Journal of Animal and Veterinary Advances*, Vol.8(5): 863-867.
- [26] Demircan, V., Binici, T., Zulauf, C.R., 2010, Assessing pure technical efficiency of dairy farms in Turkey. *Agricultural Economics-Czech*, Vol.56(3):141-148.
- [27] Farrell, M.J., 1957, The measurement of productive efficiency. *Journal of the Royal Statistical Society Series A*, Vol.III: 253-290.
- [28] Featherstone, A.M., Langemeier, M.R., Ismet, M., 1997, A nonparametric analysis of efficiency for a sample of Kansas beef cow farms. *Journal of Agricultural and Applied Economics*, Vol.29(1):175-184.
- [29] Fraser, I., Cordina, D., 1999, An application of data envelopment analysis to irrigated dairy farms in Northern Victoria, Australia. *Agricultural Systems*, Vol.59: 267-282.
- [30] Gelan, A., Muriithi, B.W., 2012, Measuring and explaining technical efficiency of dairy farms: a case study of smallholder farms in East Africa. *Agrekon*, Vol.51(2):53-74.
- [31] Gözener, B., 2013. Economic analysis and technical efficiency of cattle breeding farms in the TR 83 region (in Turkish). PhD Thesis, Gaziosmanpaşa University, 175p, Tokat.
- [32] Gül, M., 2005, Technical efficiency and productivity of apple farming in Antalya province of Turkey. *Pakistan Journal of Biological Sciences*, Vol.8:1533-1540.
- [33] Gül, M., 2006, Technical efficiency of apple farming in Turkey: A case study covering Isparta, Karaman and Nigde provinces. *Pakistan Journal of Biological Sciences*, Vol.9(4): 601-605.
- [34] Gül, M., Demircan, V., Yilmaz, H., Yilmaz, H., 2016, Technical efficiency of goat farming in Turkey: a case study of Isparta province. *Revista Brasileira de Zootecnia*, Vol.45(6): 328-335.
- [35] Gül, M., Koç, B., Dağistan, E., Akpınar, M.G., Parlakay, O., 2009, Determination of technical efficiency in cotton growing farms in Turkey: A case study of Cukurova region. *African Journal of Agricultural Research*, Vol.4(10): 944-949.
- [36] Günden, C., 1999, Determination of technical efficiency in cotton production by data envelopment analysis: The case of Menemen (in Turkish). MSc. Thesis, Ege University, 140p, İzmir.

- [37]Günden, C., Şahin, A., Miran, B., Yıldırım, İ., 2010, Technical, allocative and economic efficiencies of Turkish dairy farms: An application of data envelopment analysis. *Journal of Applied Animal Research*, Vol.37(2):213-216.
- [38]Gündüz, O., 2011, Technical efficiency of dairy cattle farms: a stochastic frontier approach (in Turkish). *Harran Tarım ve Gıda Bilimleri Dergisi*, Vol.15(1):11-20.
- [39]Günlü, A., Imik, H., Tekerli, M., 2001, General characteristic of dairy cattle enterprises in Afyon province and productivity and profitability analysis (in Turkish). *Lalahan Hayvancılık Araştırma Dergisi*, Vol.41(1): 1-12.
- [40]Hallam, D., Machado, F., 1996, Efficiency analysis with panel data: A study of Portuguese dairy farms. *European Review of Agricultural Economics*, Vol.23(1):79-93.
- [41]Hansen, B. G., Hegrenes, A., Stokstad, G., 2002, Characterizing efficient dairy farms and farmers. p.123-136. In: *Farm management. Proceedings of NJF Seminar No. 345. NILF-report 2003-2*, Norway.
- [42]Hansson, H., Öhlmer, B., 2008, The effect of operational managerial practices on economic, technical and allocative efficiency at Swedish dairy farms. *Livestock Science*, Vol.118(2008): 34-43.
- [43]Johansson, H., 2005, Technical, allocative and economic efficiency in Swedish dairy farms: The data envelopment analysis versus the stochastic frontier approach. In *2005 International Congress*, August 23-27, 2005, Copenhagen, Denmark.
- [44]Kleinhanß, W., Murillo, C., San Juan, C., Sperlich, S., 2007, Efficiency, subsidies, and environmental adaptation of animal farming under CAP. *Agricultural Economics*, Vol.36(1):49-65.
- [45]Kumbhakar, S.C., Ghosh, S., McGuckin, J.T., 1991, A generalized production frontier approach for estimating determinants of inefficiency in U.S. dairy farms. *Journal of Business & Economic Statistics*, Vol.9(3):279-286.
- [46]Koc, B., Gul, M., Parlakay, O., 2011, Determination of technical efficiency in second crop maize growing farms in Turkey: A case study for the East Mediterranean in Turkey. *Asian J. Anim. Vet. Adv.*, Vol.6: 488-498.
- [47]Kompas, T., Che, T.N., 2006, Technology choice and efficiency on Australian dairy farms, *Australian J. of Agric.and Resource Econ.*, Vol.50(1): 65-83.
- [48]Koyubenbe, N., Candemir, M., 2006, Comparison of the technical efficiencies of dairy farms in Ödemiş, Tire, Bayındır and Torbalı Districts, the Basin of Küçük Menderes (in Turkish). *Hayvansal Üretim*, Vol.47(2):9-20.
- [49]Koyubenbe, N., Özden, A., 2011, Parametric efficiency measurement for dairy farms in Izmir, Turkey (in Turkish). *ADÜ Ziraat Fakültesi Dergisi*, Vol.8(2): 23-27.
- [50]Lachaal, L., Chahtour, N., Thabet, B., 2002, Technical efficiency of dairy production in Tunisia: a data envelopment analysis. *New Medit*, Vol.3:22-26.
- [51]Latruffe, L., Balcombe, K., Davidova, S., Zawalinska, K., 2004, Determinants of technical efficiency of crop and livestock farms in Poland. *Applied Economics*, Vol.36(12):1255-1263.
- [52]Latruffe, L., Bravo-Ureta, B.E., Carpentier, A., Desjeux, Y., Moreira, V.H., 2017, Subsidies and technical efficiency in agriculture: Evidence from European dairy farms. *American Journal of Agricultural Economics*, Vol.99(3):783-799.
- [53]Madau, F.A., Furesi, R., Pulina, P., 2017, Technical efficiency and total factor productivity changes in European dairy farm sectors. *Agricultural and Food Economics*, Vol.5:17.
- [54]Mor, S., Sharma, S., 2012, Technical efficiency and supply chain practices in dairying: The case of India. *Agricultural Economics-Czech*, Vol.58 (2): 85-91.
- [55]Moreira López, V.H., Bravo-Ureta, B.E., Arzubi, A., Schilder, E., 2006, Multi-output technical efficiency for Argentinean dairy farms using stochastic production and stochastic distance frontiers with unbalanced panel data. *Economía Agraria*, Vol.10:97-106.
- [56]Nehring, R., Gillespie, J., Sandretto, C., Hallahan, C., 2009, Small US dairy farms: can they compete?. *Agricultural Economics*, Vol.40:817-825.
- [57]Odeck, J., 2007, Measuring technical efficiency and productivity growth: a comparison of SFA and DEA on Norwegian grain production data. *Applied Economics*, Vol.39(20): 2617-2630.
- [58]Oğuz, C., Canan, S., 2016, Factors affecting milk production in dairy farming enterprises and effectiveness analysis: A case study in Konya province of Turkey. *Custos e @gronegocio on line*, Vol.12(3):121-136.
- [59]Ören, M.N., Alemdar, T., 2006, Technical efficiency analysis of tobacco farming in Southeastern Anatolia. *Turkish Journal of Agriculture and Forestry*, Vol.30(2): 165-172.
- [60]Özden, A., 2016, Performance level determination of dairy farms using DEA (in Turkish). *Turkish Journal of Agricultural Economics*, Vol.22 (1): 49-55.
- [61]Özden, A., Armagan, G., 2014, Efficiency analysis on cattle fattening in Turkey. *Veterinarija Ir Zootehnika*, Vol.67(89):88-93.
- [62]Özgür Kaçıra, Ö., 2007, Efficiency analysis of corn production: case of Şanlıurfa province (in Turkish). PhD Thesis, Çukurova University, 123p, Adana.
- [63]Özüdoğru, T., 2010, Analysis of economic impacts of Amasya cattle breeders association on the local farmers (in Turkish). PhD Thesis, Ankara University, 247p, Ankara.
- [64]Parlakay, O., Semerci, A., Çelik, A.D., 2015, Estimating technical efficiency of dairy farms in Turkey: A case study of Hatay province. *Custos e Agronegocio on line*, Vol.11(3): 106-115.
- [65]Paul, C.J.M., Johnston, W.E., Frengley, G.A.G., 2000, Efficiency in New Zealand sheep and beef farming: The impacts of regulatory reform. *Review of Economics and Statistics*, Vol.82(2):325-337.

- [66]Pöldaru, R., Roots, J., 2007, Modeling milk cost in Estonia: A stochastic frontier analysis approach. *Journal of Agricultural Science*, Vol.20:25-33.
- [67]Reinhard, S., Knox Lovell, C.K., Thijssen, G., 1999, Econometric estimation of technical and environmental efficiency: An application to Dutch dairy farms. *American Journal of Agricultural Economics*, Vol.81: 44-60.
- [68]Saha, A.K., Jain, D.K., 2004, Technical efficiency of dairy farms in developing countries: A case study of Haryana state, India. *Indian Journal of Agricultural Economics*, Vol.59(3): 588-599.
- [69]Şahin, K., Gul, A., Koc, B., Dagistan, E., 2001, Intensive dairy cattle production economics in Adana province (in Turkish). *Yüzüncü Yıl Üniversitesi Ziraat Fakültesi, Tarım Bilimleri Dergisi*, Vol.11(2): 19-28.
- [70]Semerci, A., Parlakay, O., Çelik, A.D. 2014, Gross margin analysis in dairy cattle: a case study of Hatay province, Turkey. *Custos e@ gronegocio on line*, Vol.10: 154-170.
- [71]Sharma, K.R., Leung, P., Zaleski, H.M., 1999, Technical, allocative and economic efficiencies in swine production in Hawaii: A comparison of parametric and nonparametric approaches. *Agricultural Economics*, Vol.20: 23-35.
- [72]Stokes, J.R., Tozer, P.R., Hyde, J., 2007, Identifying efficient dairy producers using data envelopment analysis. *Journal of Dairy Science*, Vol.90: 2555-2562.
- [73]Tauer, L.W., 2001, Efficiency and competitiveness of the small New York dairy farm. *Journal of Dairy Science*, Vol.84(11):2573-2576.
- [74]Tauer, L.W., Belbase, K.P., 1987, Technical efficiency of New York dairy farms. *Northeastern Journal of Agricultural and Resource Economics*, Vol.16(1):10-16.
- [75]Theodoridis, A.M., Psychoudakis, A., 2008, Efficiency measurement in Greek dairy farms: Stochastic frontier vs. data envelopment analysis. *International journal of economic sciences and applied research (IJESAR)*, Vol.1(2):53-67.
- [76]Terin, M., Kulekci, M., Yildirim, I., 2017, Measuring technical, allocative and economic efficiencies of dairy farms in western Turkey. *Indian Journal of Animal Research*, Vol.51(1):165-169.
- [77]TUİK, 2017, Turkish Statistical Institute, Statistical Data. Accessed on: 20.10.2017, Web page: <http://www.tuik.gov.tr>.
- [78]Uzmay, A., Koyubenbe, N., Armağan, G., 2009, Measurement of efficiency using data envelopment analysis (DEA) and social factors affecting the technical efficiency in dairy cattle farms within the province of Izmir, Turkey. *Journal of Animal and Veterinary Advances*, Vol.8(6): 1110- 1115.
- [79]Wei, X., 2014. Efficiency measurement of New Zealand dairy farms. MSc Thesis, Auckland University of Technology, 45p, Australia.
- [80]Yılmaz, H., 2010, Economic and social effects of support through cooperatives to dairy farms: Case of Adana province (in Turkish). PhD Thesis, Çukurova University, 311p, Adana.
- [81]Yılmaz, H., Gül, M., Akkoyun, S., Parlakay, O., Bilgili, M. E., Vurarak, Y., Hizli, H., Kilicalp, N., 2016, Economic analysis of dairy cattle farms in east Mediterranean region of Turkey. *Revista Brasileira de Zootecnia*, Vol.45(7): 409-416.
- [82]Zhu, X., Demeter, R.M., Lansink, A.O., 2012, Technical efficiency and productivity differentials of dairy farms in three EU countries: the role of CAP subsidies. *Agricultural Economics Review*, Vol.13(1): 66-92.



## COST AND PROFITABILITY OF GARLIC PRODUCTION IN KASTAMONU PROVINCE

Mevlüt GÜL<sup>1</sup>, Beyza BAYRAKLI<sup>1</sup>, Bahri KARLI<sup>1</sup>, Metin Göksel AKPINAR<sup>2</sup>

<sup>1</sup>University of Süleyman Demirel, Agriculture Faculty, Department of Agricultural Economics, 32260 Isparta, Turkey, Phone: +902462118588, Fax:+902462118696, Emails: mevlutgul@sdu.edu.tr, beyza3419@hotmail.com, bahrikarli@sdu.edu.tr

<sup>2</sup>University of Akdeniz, Agriculture Faculty, Department of Agricultural Economics, 07058 Antalya, Turkey, Phone: +902423106554, Fax:+902422274564, Email: mgoksel@akdeniz.edu.tr

**Corresponding author:** mevlutgul@sdu.edu.tr

### Abstract

*In this study, the aim was determined the garlic production cost and profitability of farmers in Kastamonu province. The data were obtained from 105 farmers surveyed. Data belonged to the 2014 production period. According to findings, garlic cultivation area in the average of farmers was 1.13 hectares. The garlic area accounted for 18.2% of total farmland. The level of education of farmers was usually primary school. The average garlic yields per hectare for farmers were 8,208 kg. Farmers were doing garlic producing for more than 22 years. N fertiliser use was about 187 kg per hectare, P amounted to 151 kg, and K was calculated as 105 kg per hectare. 1412 hours workforce per hectare was used for garlic production. Machine power use was calculated as 25 hours per hectare. The 80.84% of the total labour force was hired labour force. The production cost of 1 kg of garlic was calculated as 3.22 TRY. The 20% of farmers were not got profit from garlic production.*

**Key words:** garlic, cost, profit, farmer, Taşköprü, Kastamonu, Turkey

### INTRODUCTION

Garlic is a non-substitute product regarding market characteristics. Garlic has long been used for medical purposes and primarily because of its antimicrobial effect. However, garlic has been widely consumed in recent years due to its cholesterol-lowering, toxic effect inhibitor, antioxidant high-tension regulator, anti-cancer, regulating cardiovascular effects [9].

Garlic is a two-year-old scented plant. Garlic is the first year of the onion formed by a few teeth, the second year, flowers and seeds. However, since garlic is taken for cultivation, it is produced not from seed but the clove of garlic [8].

As of 2016, Kastamonu province ranks first regarding garlic production and cultivated area in Turkey. The share of Kastamonu garlic cultivation area and production is 20.6% and 22%, respectively in Turkey.

Taşköprü district was chosen as a research area. Because Taşköprü district has 2,200 hectare planting area and 22,000 tons garlic production, and the district is close to nearly

the whole production and harvested area in Kastamonu province. The share of Taşköprü district in Kastamonu province garlic cultivation area and production is 89.7% and 91.6% respectively.

Taşköprü Garlic is a high quality and storage resistant variety with white, pink - white colour, very hard and sharp scent, depending on the medium in which the shell colour is grown.

Studies on economy about garlic are very few. In this study, the technical and economic structure of the farmers' level of garlic cultivation was analysed.

### MATERIALS AND METHODS

The data of the survey were obtained by the face-to-face survey with the farmers in the village of Taşköprü, Kastamonu province. The data were taken for the 2014 production period.

A layered sampling method [13][2] was used to determine the number of farmers for the study. In all, a total of 105 garlic farmers were interviewed, and primary data were collected



using a well-structured questionnaire. Garlic farms were grouped according to their sizes with the group I ranges between 0.10-0.7499 ha (34 farmers), 0.750-1.50 ha (55) being the group II and group III 1.51 ha (16) and above. Descriptive statistics such percentages, mean, frequency distribution and tabulation were used to analyse socio-economic and farm characteristics of the respondents. We used a single Farm Budget Analysis to determine the net farm income of the garlic farmers while profitability was used to measure the production performance of the garlic farmers. In an agricultural enterprise, production activities which are carried out through the use of various inputs and services constitute the expenditure which is termed as production costs. The general administrative cost was obtained by taking three percent of the total variable costs.

The profitability analysis was calculated by calculating total production cost, gross margin, net profit and relative profit were as follows formulas [1][11][6][7]:

Total Production Cost = Variable cost (VC) + Fixed cost (FC)

Gross Margin (GM) = Gross Production Value (GPV) - Variable cost (VC)

Net Profit (NP) = Gross Margin (GM) - Fixed Cost (FC)

Relative Profit (RP) = Gross Production Value (GPV) / Total Production Cost (TPC).

## RESULTS AND DISCUSSIONS

The farmers' age was 41.98 while 48.57 percent had primary education. The mean of farming experience in garlic production amounted to 22.11 years, but group III had the highest farming experience with 25.50 and group I had the mean 20.88 years. The mean of household size was six persons per house which indicate the study area was an extended family dominated. Group III was the populated modal group with about eight persons per family. The average farm garlic size in the study area was 1.13 ha with group

III having the largest farm size of about 2.68 ha. The majority (72.13%) of the land in the study area was owned land. Group III had the highest percentage 75.69 of owned land while group I, on the other hand, had the highest rented of land with 29.31 percent. Nearly half of the farmland (48.68%) was irrigated. The 18.19% of the farmland was garlic planted. Group III had the highest percentage 26.65 of garlic cultivation land, while group I had 11.22 percent (Table 1). Erkal et al. [3] found that the farmers had an average of 8.9 hectares of land and that they produced garlic in about 7% of the land based on data obtained from 60 garlic farmers in 7 provinces of Turkey.

Approximately 1183.79 kg of seeds were used in garlic production. Yazgan [14] reported that 1,535.2 kg seeds were used for the year 2009 in the same area. The amount of seed used in hectare was 630 kg in Thrace Region [10]. This means that the amount of seeds used in Kastamonu is considerably above Thrace Region. The reason for this is that the planting was done as sprinkling because the producer was producing in the fields with scattered and fragmented soil structure. This was also the biggest obstacle in front of the machinery in production. Because when the machine was used in sowing, the distance between the rows grows, which is not very efficient for the local producer with small and scattered land and therefore not used [14].

Farms employed family labour and hired labour in garlic production. Averagely, 1,411.71 hours per hectares employed labour. The first group got the highest of family labour 26.55 percent. Only 19.16 percent employed family labour while 80.84 percent hired employed labour. The majority of the farmers in the region employed family labour and hired labour types. The mean 25.32 hours of machine power were required per hectare in garlic production. The first group had the highest with 51.80 hours while group III, on the other hand, had the smallest with 13.17 hours (Table 1).

Erkal et al. [3] determined that 1,624 labour hours and 34 hours of machine power per hectare be required for garlic production.

Güneş et al. [5] determined that the labour force for one-hectare garlic growing in Kastamonu province was 2,755.3 hours and the machine power was 49.6 hours. They reported that as the size of the enterprise increased, the labour and machine power used in the hectare decreased.

Samavatean et al. [12] reported that 1,397.21 hours of human power and 32.62 hours of machine power were required per hectare of garlic production in Iran. They found that majority of human labour in the farms was used in the harvest (39%) and planting (22%) operations. They determined that share of family labour be 14% and hired human labour was 86% in garlic production in Iran.

Table 1. Some social-economic-technical indicators of farmers

Indicators	Groups of farms			Average
	I	II	III	
Farmers age (year)	44.32	40.56	41.88	41.98
Farmers education level (primary school, %)	44.12	50.91	50.00	48.57
Household size (head)	6.41	5.93	7.88	6.38
Farmers experience on garlic production (year)	20.88	21.89	25.50	22.11
Owned land (%)	70.69	71.19	75.69	72.13
Rented land (%)	29.31	28.81	24.31	27.87
Irrigated land (%)	47.28	49.68	47.81	48.68
Garlic cultivated area (%)	11.22	17.25	26.65	18.19
Parcel numbers of garlic cultivated area (per)	1.10	1.62	3.38	1.69
Garlic cultivated area (hectares)	0.49	1.07	2.68	1.13
The seed used amount per hectare (kg)	1,120.36	1,196.38	1,191.19	1,183.79
The N used amount per hectare (kg)	185.13	185.20	191.42	187.44
The P used amount per hectare (kg)	148.63	148.70	155.35	151.10
The K used amount per hectare (kg)	102.63	102.70	109.88	105.29
Education level in family (primary school, %)	53.61	57.39	55.36	55.78
The family labour used amount in garlic production per hectare (hour)	556.65	281.70	143.59	270.45
The temporary labour used amount in garlic production per hectare (hour)	1,540.12	1,105.60	1,034.97	1,141.27
The total labour used amount of garlic production per hectare (hour)	2,096.77	1,387.30	1,178.55	1,411.71
The family labour share in garlic production (%)	26.55	20.31	12.18	19.16
The total machinery used amount of garlic production per hectare (hour)	51.80	26.66	13.17	25.32

Source: Own calculation.

A specific amount of inputs and services are required to produce garlic. Garlic farm provides a high level of gross production value per hectare. Concordantly, the amount of capital invested by the producers is also high compared to the other agricultural

production, because the demand for labour force and other inputs are high and intense.

Garlic production is high labour-absorbing activity. We defined daily labour as eight hours on the farm site. A per hour wage was calculated as nearly six TRY in the research area.

The total production costs were the monetary value of the inputs required for the garlic production. Accordingly, the production cost per hectare for garlic was given in Table 2.

The production costs per hectare in garlic were identified to range between 25,585.06 TRY to 29,846.44 TRY with 26,397.37 TRY being the mean average of production cost per hectare in the study area.

The cost items were examined under the variable and fixed cost of which variable cost had the highest modal production cost with 22,226.25 TRY while fixed cost amounted to 4,171.12 TRY (Table 2).

Table 2. Production costs per unit area for garlic productions

Cost elements	Value (TRY per hectare)			Average
	I	II	III	
Seedlings	7,490.06	7,814.21	7,968.39	7,824.35
Temporary worker cost	8,815.87	6,400.96	5,910.06	6,563.57
Marketing	1,284.52	1,836.96	2,554.20	2,018.76
Machinery rents	1,660.50	1,652.48	1,681.11	1,663.97
Fertilizers	1,980.84	1,625.13	1,577.62	1,658.06
Irrigation	872.28	827.20	775.73	814.92
Pesticides	636.77	606.52	643.64	624.22
Working capital interest	1,137.04	1,038.17	1,055.54	1,058.39
<b>Total variable costs</b>	<b>23,877.88</b>	<b>21,801.63</b>	<b>22,166.29</b>	<b>22,226.25</b>
Land tenure	2,171.19	1,972.45	1,965.67	1,998.00
Permanent-family labour	3,081.04	1,582.97	788.11	1,506.33
General administrative expenses	716.34	654.05	664.99	666.79
<b>Total fixed costs</b>	<b>5,968.56</b>	<b>4,209.47</b>	<b>3,418.77</b>	<b>4,171.12</b>
<b>Production costs</b>	<b>29,846.44</b>	<b>26,011.10</b>	<b>25,585.06</b>	<b>26,397.37</b>
<b>The share in the production costs (%)</b>				
Seedlings	25.10	30.04	31.14	29.64
Temporary worker cost	29.54	24.61	23.10	24.86
Marketing	4.30	7.06	9.98	7.65
Machinery rents	5.56	6.35	6.57	6.30
Fertilizers	6.64	6.25	6.17	6.28
Irrigation	2.92	3.18	3.03	3.09
Pesticides	2.13	2.33	2.52	2.36
Working capital interest	3.81	3.99	4.13	4.01
Total variable costs	80.00	83.82	86.64	84.20
Land tenure	7.27	7.58	7.68	7.57
Permanent-family labour	10.32	6.09	3.08	5.71
General administrative expenses	2.40	2.51	2.60	2.53
Total fixed costs	20.00	16.18	13.36	15.80
<b>Production costs</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

1 Euro = 2,911 TRY (in 2014)

Source: Own calculation.

The variable cost items in the garlic production were seedling, labour, marketing,

machinery rents, fertilisers, irrigation, pesticide and working capital interest. The variable costs are those which increase or decrease depending on the production size. Seedling cost constitutes the highest modal with 29.64 percent of the total production cost and also variable cost followed by temporary labour cost with 24.86 percent and marketing cost which amounted to 7.65 percent of the production cost (Table 2).

The fixed cost of the garlic production was administrative cost, family labour and land renting.

Land renting cost was calculated as the highest share of the production cost with 7.57 percent followed by 5.71 and 2.53 percent as family labour and administrative cost respectively (Table 2).

Samavatean et al. [12] reported that highest shares of total production costs were 45% for human labour and 19% hired machinery in Iran.

The gross production value of garlic production in the average farmers interviewed was calculated as 34,098.31 TRY per hectare (Table 3). Gross margin in garlic growers was found by subtracting the variable cost from GPV [1] [4] [7]. Gross margin was calculated as TRY 11,872.06 per hectare in the average (Table 3). Gross margin ranged from -9,214.83 TRY to 49,547.85 TRY per hectare between investigated farmers. The 8.57% of the farmers received a negative gross margin value from garlic production. That is 8.57% of the farmers could not meet the variable costs of the 2014 production season.

The net profit was found by subtracting the total production cost for garlic production from GPV [6] [7]. The main aim of the business is to make a profit and to seek ways to make the highest profit. In the production of garlic, the average net profit of farms was calculated as 7,700.94 TRY per hectare (Table 3). This value was found to vary between TRY 4,890.09 and TRY 9,805.38 in the farmers' groups. As the garlic area increased, the net profit margin also increased (Table 3). The net profit per hectare between 105 farmers interviewed ranged from -22,361.47 TRY to 43,252.23 TRY. Net profit value obtained from garlic in 20% of farmers was

the negative value. Therefore, 20% of the interviewed farms lost from garlic production.

The relative profit was found as the ratio of GPV to the total production cost. Relative profit shows proportionally how much one option is superior to the other. Relative profit measures the productivity of production activities better [7]. The relative profit for the 2014 production season in garlic production was calculated as 1.29. The relative profit value of farmer groups ranged from 1.16 to 1.38. The relative profit value also increased, garlic area increased (Table 3). The relative profit value among the 105 farmers interviewed varied from 0.47 to 2.50.

The relative profit value calculated in the average of garlic production farms for the 2014 production season indicates that the garlic production activity is profitable. The gross production value of 129 TRY is obtained against the total production cost of 100 TRY in garlic production during the review period in the region. Therefore, a profit of TRY 29 is provided for every TRY 100 production cost. However, about 20% of businesses in the region suffered losses. It is also available in high-profit farms.

The average cost of 1 kg of garlic in the study area was calculated to be 3.22 TRY. The condition for the above measure is that relative profit must be greater than one (1) and from the above result, relative profit was 1.29 which indicates that garlic production in the study area is profitable.

Özkan and Aydın [10] reported that the relative profit ranged between 0.82 and 2.09 in the Thrace Region in 1998-2012 with a mean relative profit of 1.44. Samavatean et al. [12] reported that total cost of production for 1 ha garlic production was around 6,969.11\$ and, relative profit was 1.36 in Iran.

The mean output of garlic in the study area which is recorded to be 8,208.44 kg/ha in the 2014 production season. Group III recorded the modal output of about 8,391.47 kg/ha of garlic per year followed by the first group with 8,125.75 kg/ha. Yazgan [14] reported that the average yield for the year 2009 is 7,292.8 kg in the same area. Yazgan [14] determined that fertiliser, seed use and sowing

area be effective in the model, which takes garlic yield as a dependent variable.

Table 3. Profitability indicators and unit costs for garlic productions

Indicators	Groups of farms			Average
	I	II	III	
Gross production value per hectare (TRY)	34,736.53	32,976.23	35,390.44	34,098.31
Yield per hectare(kg)	8,125.75	8,098.47	8,391.61	8,208.44
Gross margin per hectare(TRY)	10,858.65	11,174.60	13,224.15	11,872.06
Net profit per hectare(TRY)	4,890.09	6,965.13	9,805.38	7,700.94
Relative profit	1.16	1.27	1.38	1.29
Unit production cost (1 kg) (TRY)	3.67	3.21	3.05	3.22
<b>Unit sales price (1 kg) (TRY)</b>	<b>4.27</b>	<b>4.07</b>	<b>4.22</b>	<b>4.15</b>

Source: Own results.

## CONCLUSIONS

Majority of the farmers operate on the small scale less than 2 hectares producing less than eight ton of garlic per annum in the research area.

Mean average total cost per hectare was 26,397.37 TRY. The mean average gross production value amounted to 34,098.31 TRY; gross margin was 11,872.06 TRY, the mean average net profit was tantamount to 7,700.94 TRY relative profit was calculated to be 1.29 implying that garlic production was a profitable farm in the study area.

The following recommendations are made depend on the findings of this study:

Farmers should be encouraged to take advantage of economies of scale.

Private input dealers and public extension services should inform farmers on the safe and rational use of chemicals.

The government should give the more training facilities to the farmers with extension agents which will provide the farmers with needed technology improvements and facilities proper attention and consideration.

The government should ensure effective dissemination of scientific and social information to encourage the use of modern techniques by the farmers in garlic production.

As a result, the price level and the marketing background are the decisive factors in the sustainability of the garlic production. Despite the limitations in the field of production, the prevalence of consumption makes marketing activity important.

## ACKNOWLEDGEMENTS

We would like to thank TÜBİTAK (2209-A) and Suleyman Demirel University, Faculty of Agriculture for their financial support.

## REFERENCES

- [1]Açıl, A.F, Demirci, R, 1984, Agricultural economy lecture notes (in Turkish), T.C. Ankara University Agriculture Faculty Publications, Ankara.
- [2]Çiçek, A., Erkan, O., 1996, Research and sampling methods in agricultural economics (in Turkish). Gaziosmanpaşa Üniversitesi, Ziraat Fakültesi Yayınları No 12, Ders Notları Serisi No: 6, 118p, Tokat.
- [3]Erkal, S., Osmanlıoğlu, E., Şafak, A., Türkeş, T., Ergun, M.E., Yücel, A., 1989, Türkiye’de sarımsak üretimi ve pazarlamasının ekonomik yönden değerlendirilmesi üzerinde bir araştırma (in Turkish). Atatürk Bahçe Kültürleri Merkez Araştırma Enstitüsü Müdürlüğü Yayınları, 31p, Yalova.
- [4]Erkuş, A., Bülbül, M., Kıral, T., Açıl, A.F., Demirci, R., 1995, Agricultural economics (in Turkish). Ankara: T.C. Ankara Üniversitesi Eğitim, Araştırma ve Geliştirme Vakfı Yayınları, Ankara.
- [5]Güneş, T., Erkuş, A., Kıral, T., Turan, A., Tanrıvermiş, H., 1994, Kastamonu ilinde sarımsağın üretim maliyeti ve pazarlama masrafları alt projesi (in Turkish). Ankara Üniversitesi Ziraat Fakültesi, Ankara.
- [6]İnan, İ.H., 1998, Agricultural economy and management (in Turkish), Trakya University, Faculty of Agriculture publication number. 2-43, Tekirdağ.
- [7]Kıral, T., Kasnakoğlu, H., Tatlıdil, F.F., Fidan, H., Gündoğmuş, E., 1999, Tarımsal ürünler için maliyet hesaplama metodolojisi ve veritabanı rehberi (in Turkish). TEPGE Report number: 1999-13, 143p, Ankara.
- [8]Küevin, Z., Türkeş, T., 1987, Vegetable (in Turkish). İnkılap Kitapevi, İstanbul, 154p.
- [9]Lawson, L.D., Wang, Z.J., Hughees, B.G., 1991, y-Glutamyl-S-alkylesteiner in garlic and other Allium spp. Precursors of age-dependent trans-l-propenyl thiosulfonates. J. Nat. Prod., 54, 436-444.
- [10]Özkan, E., Aydın, B., 2016, Comparatively examination of the changes in cost and income indicators in onion and garlic production in Thrace Region (in Turkish). Bahçe Dergisi, Vol.2: 95-101.
- [11]Rehber, E., 1993, Agricultural management and planning (in Turkish). Uludağ Üniversitesi Güçlendirme Vakfı Yayın No:84, Bursa.
- [12]Samavatean, N., Rafiee, S., Mobli, H., Mohammadi, A., 2011, An analysis of energy use and relation between energy inputs and yield, costs and income of garlic production in Iran. Renewable Energy, Vol.36(6): 1808-1813.
- [13]Yamane, T., 2001. Basic sampling methods (in Turkish). (First edition). Translators: Alptekin ESİN, M. Akif BAKIR, Celal AYDIN and Esen GÜRBÜZSEL, Literatür Yayıncılık, İstanbul.

[14]Yazgan, G., 2010, Functional analysis of garlic production and calculation of product cost in the agricultural plants of Kastamonu province (in Turkish). Turkish Statistical Institute, Expertness Thesis, 71p,

## INTERNATIONAL EXPERIENCE IN THE FIELD OF SUPPORTING THE WINE TOURISM

**Tatiana IATISIN, Tatiana COLESNICOVA, Mihail CIOBANU**

National Institute for Economic Research, Academy of Sciences of Moldova, 45, Ion Creanga Street, Chisinau, Republic of Moldova, MD-2064, E-mail: tatianaiatin@yahoo.com, ctania@gmail.com, ciobanu.mihail.s@gmail.com

**Corresponding author:** ciobanu.mihail.s@gmail.com

### **Abstract**

*Tourism is a very important sector in the world economy. The growth of wine tourism has become an essential preoccupation for both those involved in tourism and those in the wine industry. The growth of tourist activity determines the development of some branches of the national economy, such as: industry, agriculture, construction, transport and trade. The paper presents the mechanisms for supporting wine tourism in different countries of the world. The paper also analyzes government programs and specific mechanisms for supporting and developing the wine sector in general and wine tourism in particular. For the research were utilised the methods: monographic, analysis and synthesis, comparison, etc. The results demonstrate the efficiency of measures and mechanisms to support wine tourism in different countries of the world.*

**Key words:** wine tourism, enotourism, wine sector

### **INTRODUCTION**

As an economic and social phenomenon, the tourism has known major developments in the second half of the XX<sup>th</sup> century. Deborg M. P. mentioned that “*tourism is the action, the desire, the art of traveling for your own pleasure*”. In 1880, E-Guy Frenler stated that “*tourism, in the modern sense of the word, is a phenomenon of our times, based on knowledge of the need to restore health and the change of environment, to cultivate sentiment for the natural beauty as a result of the development of trade, industry, as well as the improvement of the means of transport*” [15].

The tourism is considered to be one of the most important, profitable and prosperous branches of the economy for many states from the world. The growth of international tourism is conditioned by the purpose the tourist proposes, wanting to visit a certain country or a certain tourist destination. Countries with a tourist destination aim to promote tourist attractions that have cultural and touristic values, are recognized worldwide and represent the country's business card.

Vinitourism or “*wine tourism*” is a form of tourism of special interest, with a continuously increasing role, becoming an important component of tourism for many winemaking regions. The development of “*wine tourism*” has become an essential preoccupation for both those involved in tourism and for those in the wine industry [8].

### **MATERIALS AND METHODS**

The paper presents the mechanisms for supporting wine tourism in different countries of the world. The paper also analyzes government programs and specific mechanisms for supporting and developing the wine sector in general and wine tourism in particular. The following research methods were used in the elaboration of this research: monographic, analysis and synthesis, comparison, etc.

### **RESULTS AND DISCUSSIONS**

For the expansion of wine tourism and for the amelioration of the infrastructure the elaboration and promotion of an efficient policy are needed. Moreover, wine products

must be recognized in the world, especially in Europe, where enotourism is already well developed and sustained by the state, representing a major source of revenue for tourism activity and for the wine industry. The wine sector, including the wine tourism, faces several problems, such as:

- climate change and its impact on wine quality is one of the most serious environmental problems;
- increasing competition, consolidation of distributors and importers;
- consolidation of the role of chain stores, and, sometimes, unexpected changes in consumer demand;
- activation of the anti-alcohol lobby in some countries;
- strict visa regime for some countries;
- creation of a positive image of the country;
- few touristic marketing activities, exhibitions, promotional materials, etc.

To address these issues, as well as many others, in some countries there are government programs and specific mechanisms to support and develop the wine sector in general and wine tourism in particular. For example, to expand the wine tourism, many countries require that the best wines to be released from taxes, which allows tasting of a certain type of wine only on the territory of the state in which it was produced [2]. This is explained, by the fact, that the wine that is "gone" away from the grown place and has matured, loses its true taste. Hence the conclusion that French wines can be tasted only in France. At the same time in EU countries, the amplification of the wine sector is financially supported by the state, also there are special grants, which aren't reimbursed, but their management is strictly controlled [1].

According to the World Tourism Organization's Forecast (UNWTO), in their research «Tourism's 2020 Vision», one of the most popular types of tourism for the year 2020 will be thematic tourism. Wine tourism as "quality tourism" (durable; "soft"; qualitative; going beyond business; focusing on culture, environment, issues and human values) can be attributed to this type of tourism.

Wine tourism is actively developing in all countries of the world, especially in France - a classical country of tourism. Promoting enotourism in France is a basic element of the State Program for the improvement of the competitiveness of tourism industry. In the Strategic Plan for the years 2010-2020, wine tourism is one of the main directions [1]. The Wine Tourism Committee seeks to establish a strong relationship between winemakers, tour operators, hoteliers and restaurants in the country. France is the country where, by definition, the wine has been raised to the rank of art, culture, touristic superlative, and in some cases even religion. France has paid particular attention to winemaking not only as a beverage industry, but also as a special tradition, as an integral part of centuries old history, culture, lifestyle and identity of the French people. The quality and taste of French wines have become a reference (standard) among other wine regions of the world, such as Italy, Greece, Spain, etc.

The French researchers in the «*Tourisme et vin: les clientèles françaises et internationales, les concurrents de la France*» have listed a series of recommendations on the evolution of wine tourism, attracting tourists to wine regions:

- improving the transport problem (active use of trains, buses, bikes and cruise ships);
- to broaden the potential audience, attracting families, also women (SPAs with "wine-therapy" notes);
- reduction of travel costs (the price for three days on average costs 350-600 Euros);
- increasing interest in cultural events and wine festivals;
- extending the number of accommodation facilities, especially on wine routes (camping sites, motels, for example tourist cabins in the form of wine barrels);
- widening the dissemination of information, as examples: wineries' internet sites, virtual guides through the region, journals, booklets with winemaking destinations, also special regional navigators who are currently on the Beaujolais and Bordeaux wine routes on various media outlets, to give tourists access to tourism agencies, committees [1].

One of the most successful projects on the promotion of wine tourism in France, the Bordeaux region, can be called «Le Centre Culturel et Touristique du Vin». France ranks seven in the ranking, out of 140 countries, losing 4 positions since 2011, ranks fourth in terms of world cultural heritage items and fifth in the number of thematic events organized in the country (exhibitions, fairs) according to the data of «The Travel & Tourism Competitiveness Index», TTCI, which were presented at the World Economic Forum in Davos (Switzerland) in 2013. Due to its rich cultural heritage (including wine factories and enotourism), France continues to attract tourists from around the world.

In Italy, besides government programs that support the wine industry, there are also various tourism development programs, including for wine tourism. As an example, the state organization ENIT (Ente Nazionale Italiano per il Turismo, today renamed in the National Tourism Agency), which has offices in every region of the country, aims to promote tourism opportunities in Italy by producing and distributing free of charge in the country, at all international tourism exhibitions, specialized brochures, maps, leaflets, advertising materials. At the same time, there are free tourist information offices in every city, where you can get information about booking a hotel, booking a tour, description of wine routes, etc. In Italy, one of the four major tourist forums - BIT (Borsa Italiano Turismo) is taking place [3]. Moreover, in some areas, financial support is provided for the amplification of the tourism industry, for example in: Sicily, Campania, Calabria, Friuli-Venezia Giulia. Special tours for journalists, for tourism industry staff from abroad (potential tourist providers) are organized, there is advertising on television, radio, outside the country, publication of promotional materials, organization of exhibitions and workshops, participation in tourism exhibitions, special promotions such as week of museums, where entry tickets are free of charge.

In Bulgaria, the wine sector is one of the main pillars of agriculture. Lately, the wine sector is attracting more investments than other

sectors of agriculture. Wine legislation in Bulgaria is the best of all members of the Council for Mutual Economic Assistance (COMECON). In recent years, market relations on wine trade have changed dramatically, new regulations have emerged, and some of the provisions of the law adopted in 1978 remain valid until now [4]. In 1980 Bulgaria was the second largest exporter of bottled wine in the world, the production being carried out within a large vineyard enterprise that administered all vineyards in the country. However, due to poor publicity and the early stage in the development of wine tourism, Bulgaria is not mentioned on popular wine sites such as: World Wines (wine club) - the site where you can find information about the wine of the world, wine tasting rules, wine stories, and more [16].

Romania is an important European wine producing country with a great historical past and rich cultural traditions, much of which is related to this beverage, considered a divine elixir. Since 1927, Romania is a member of the International Organization of Vine and Wine. According to the International Organization of Vine and Wine (OIV), Romania ranks 13th in the world's top wine producers and ranks sixth in the European rankings [17].

The wine promotion measure is an instrument of the Common Agricultural Policy (CAP) implemented through the National Support Program of Romania (NSP) in the wine sector 2014-2018, financed from the European Agricultural Guarantee Fund (EAGF) budget, which refers to a set of actions that has as a general objective increasing the awareness of Romanian wines with a protected designation of origin (PDO) and geographical indication (GI) on the domestic market and in third countries, on entering new markets, leading ultimately to improvement of competitiveness and increase in wine exports with PDO/GI or for those wines for which the vine varieties are indicated [13].

Due to the impact of the National Support Program 2009 - 2013 on the wine sector, which absorbed, in proportion of 100%, the funds of the E.A.G.F. made available by the European Commission through the new



Regulation (EU) No. 1308/2013, Romania benefits from an increased financial allocation for the wine sector, amounting to 47.7 millions of euro annually [13].

Romania has a great potential for developing wine tourism, that is why more owners of wine cellars invest in accommodation, restaurants, tasting rooms, guided tours in vineyards, well-trained staff.

In order to promote Romanian wine tourism, were elaborated the following projects: CrameRomania.ro (a database of wine cellars in Romania that is in Romanian, as well as in English language), Revino.ro (a website that collects data about the wine cellars and specialized wine shops - vinoteques and restaurants - from Romania) and The Salon REVINO - Discover Romania Wines (an event, in the form of a specialized wine salon, takes place from 14 to 16 May at Novotel Bucharest and brings to the attention of wine lovers small and medium sized wine cellars in Romania to make known the vineyards of which they belong, the unique, indigenous varieties and to increase the interest for the discovery of the wine tourism) [15]. Platforms that promote wine tourism and organize cellar tours and tastings show that the number of active wine cellars that produce and sell bottled wine has reached more than 140 and of which about a quarter can support wine tourism.

Ukraine is one of the five countries in Europe, where wine tourism has great prospects. Efforts on the preparation and presentation of the wine road are being carried out from a long time ago in Ukraine. But for the first time, the wine road was developed yet in 2007 by the Winemakers and Sommeliers Association and by the "Master-Class" Sommelier School together with the Kiev Tourism Institute. This project involved enterprises in the southern area of Ukraine - "Shabo" wine factory, Odessa factory of sparkling wines, cognac factory "Shustov", TM „Guliev Wines” and TM „Colonist”, which formed a "wine road" route model in the Odessa region. Such models were also organized in other regions of Ukraine, Kherson and Mykolaiv. The total tour duration is 12 days, each tour takes 3 days.

Wine tourism in Ukraine, as practice shows, is in demand. This is not just a way of developing the tourist infrastructure, such trips allow tourists and locals to get acquainted with traditions, customs, wine production, and participate directly in the wine production process. Ukraine has something to be proud of, it is a wine country and is entitled to a worthy place on the world map of wine [12].

For spreading the wine tourism in Ukraine was registered the draft law *"on the amendments to some legislative acts of Ukraine for the development of regional wine production and natural honey drinks"*. The practical application of the main provisions of the draft law will provide favorable conditions for the extension of the terroir wine industry (wines from the region), the production of wine from fruit and berries, unique honey beverages, made from fruit, grains, grapes, honey of their own production. This will allow small businesses to create unique wines in the area, organize new jobs and increase incomes to state and local budgets [9].

For the first time in Ukraine, in 2010, the National Winemaking Holding elaborated the Ukrainian Winemaking Development Strategy for the years 2010-2020, whose purpose was to arrive at a minimum level of wine consumption of 20 liters per person per year. For this it is necessary to achieve an average annual growth of 13.6% for a period of 10 years. The main purpose of Ukraine for wine production is in 2019 to reach 102 million decaliters of wine. This Program was supported by a number of industrial associations, in particular by the Ukrainian Bureau of Vineyard and Wine [10].

In Russia, according to experts, about 40 wine factories operate in the Krasnodar region, of which only 7-8 winemaking households work in the field of wine tourism. One of the main enterprises in the territory of Krasnodar is "Abrau-Durso", that is important for the Russian enotourism [6]. A trip to "Abrau-Durso" costs 550 Russian rubles together with wine tasting. Among other winemaking households where wine tourism is cultivated are also: "Kuban-vino", JSC "Aurora", Alcoholic Production Company "Gelendzhik",

agricultural company "Myskhako" and "Fanagoria". The most visited is the "Kubanvino", with about 10,000 tourists per year, the rest of the winemaking households - each with 1,000 [14].

In general, we can say that wine tourism in the tourist market in Russia occupies a niche position. Wine tourism became known on the market in the late 2000s, especially after the formation of the tourism agencies «Simple Wine Travel» (in 2007), and afterwards, the «Alora S.M.B.A» Agency (in 2011), who have specialized in the organization of wine and enogastronomic tourism around the world [12].

In the Montenegro in 2006, a State Program on the development of wine tourism was elaborated, with the support of Germany and Austria. Priority had only some regions in supporting small producers, in the development of the wine route, infrastructure and wine promotion. The wine route was developed by the National Association of Winemakers, which was formed as a part of the project, in support of winemaking enterprises and job creation. Since the beginning of its activity, 16 new businesses have emerged in the area. The wine region is promoted as "The Wine Land" [7].

Countries such as Australia, USA (California) have obtained great achievements in viticulture due to the use of the cluster principle, where the state and branch organizations played an important role in the formation and coordination, as well as the administration of cluster activity.

Cluster - an association of interconnected enterprises, located in geographic proximity, as a rule, belonging to a sector or related sectors, as well as scientific research institutions, universities and other organizations, whose activity is focused on innovation, and their cooperation allows to increase the competitive advantages of businesses.

In the United States, the most developed wine region is California, where the world's largest producer, Gallo, can be found. In California, are actively developing wine tourism development programs related to the growth of direct sales, attracting new customers and

keeping the old ones, wishing to raise the prestige of winemakers/viticulturists' craftsmanship by direct contact with customers and also to receive additional income and to cooperate with tourism agencies. On average, per year, vines and wineries are visited by about 20 million tourists, including Napa Valley - about 5 millions. By the number of tourists in the state of California, the first place is occupied by Disneyland and Napa Valley occupies the second place. The most famous winery is «Mondavi winery», which annually receives 300 thousand tourists, the price being about 25 US dollars per person. If on average about 30-50 workers are implicated in the production of wine, about 60 workers serve the tourists [6].

From the point of view of winemaking and wine tourism development, Argentina's experience is interesting, although historically it didn't belong to exporters of wine and didn't develop wine tourism, but has become so in the last 15-20 years. The wine sector in this country is growing fast and occupies a quite important place on the world wine market [11]. Even today, the country is positioned as the main competitor in this world of exporters such as France, Spain and Italy. The most interesting thing is that Argentina has created a unique winemaking on the basis of small winemaking households. Exports of wine products from this country grow year after year. Argentina's wine tourism received a boost after 2005 when, following the initiative of the Wine Industry Association of Argentina (which includes 200 wine factories), was developed the Strategic Plan for Wine Sector Development until 2020, where a special focus was given to wine tourism. At present, in Argentina 167 winemaking households in 8 provinces are open to tourists. 16 wine routes were elaborated and conceived, which in 2011 were visited by about 1 million tourists - 70% of local tourists and 30% of foreign tourists (of which 68% of tourists are from USA, Brazil, Chile, United Kingdom and France) [5].

Thus, wine tourism for its development needs state support and very hard work to promote this direction. At present, in many countries of

the world for the development and assistance of the wine sector, as well as for the advancement and amplification of wine tourism, special attention is paid by both central authorities and local authorities. In some countries this process is at the beginning and is at an early stage.

However, according to experts - today very few tourists would want to travel only to explore the local cuisine or wine map. Therefore, in order to obtain some stable guaranteed economic results and a stable inflow of tourists, the trips must be multi-directional and should include all the elements. As was mentioned by Alessio Kavikki, a professor at the Chair of Tourism from the University of Macerata (Italy), a person has to come to the designated destination, informed and "mentally" mature. With the support of the mass media and other available sources, the desire of tourists to visit a particular region needs to be cultivated, but it is important to provide an appropriate proposal. If there is no such correlation, the tourist will not return to this place again.

## CONCLUSIONS

Development of the wine sector and wine tourism will contribute to attracting a large number of consumers of the production of this branch. However, the wine tourism is not possible to be developed only on attracting tourists or on the experience of other countries. First of all, it is necessary to improve the consumption culture, to adjust the winemaking and to provide the guests with the required quality of the product. For the development of wine tourism it is necessary to elaborate and implement the government programs and specific mechanisms for the support and development of the wine sector in general as well as for the wine tourism in particular.

Attracting a large number of tourists will turn the wine tourism into a generator of economic, social and cultural benefits.

## REFERENCES

- [1] A new communication model in wine tourism. Tendencies ENOTUR. May-Dec. 2012 Issues 2 and 4. Available at: [http://www.pct-turisme.cat/intranet/sites/default/files/Tendencies\\_ENOTUR\\_3\\_4\\_eng\\_web.pdf](http://www.pct-turisme.cat/intranet/sites/default/files/Tendencies_ENOTUR_3_4_eng_web.pdf), Accessed February 3, 2018.
- [2] Blumer, A., 2013, Ghid pentru managementul vizitatorilor și dezvoltarea turismului în interiorul și în jurul ariilor protejate din Republica Moldova/Andrei Blumer; UNDP-GEF /MSP Rep. Moldova, Fortificarea capacităților instituționale și a reprezentativității sistemului de arii protejate din Rep. Moldova, Min. Mediului.-Chișinău: UNDP Moldova, 2013. Tipogr. "Nova Imprim". - 62 p.
- [3] Cinelli Colombini, D., 2015, Wine tourism in Italy. International Journal of Wine Research, V. 7, Available at: <https://www.dovepress.com/wine-tourism-in-italy-peer-reviewed-article-IJWR>, Accessed February 3, 2018.
- [4] Cosciug, C., 2012, Tendințe moderne ale dezvoltării turismului vitivinicol. În: Conferința Științifică Națională „Tendințe moderne de dezvoltare economică și financiară a spațiului rural”. Vol. 31. UASM, 27.04.2012, Chișinău.
- [5] Dabija, N., Miron, V., 2001, Dezvoltarea durabilă a turismului. Proiectul PNUD Moldova. Chișinău.
- [6] Darii, T., Sverdlic, V., 2010, Concepte și modele traseelor turistice vinicole. Meridian Ingineresc. Publicație tehnico-științifică și aplicativă. Nr.2. Editura UTM.
- [7] Drumurile vinului, 2012, Revista Travel Advisor. Nr. 11./2012. Available at: <http://www.vinland.ro/prin-lumea-vinurilor/drumurile-vinului/>, Accessed February 3, 2018.
- [8] Kharchenko K. 2012, Enoturism for beginners.(Харченко К. Энотуризм для начинающих), 06.04.2012. Available at: <https://web.archive.org/web/20120702174223/http://o-svobode.ru:80/2012/enoturizm-dlya-nachinayuschih.htm>, Accessed February 3, 2018.
- [9] Law No. 6693 on Amending Certain Legislative Acts of Ukraine for the Development of the Production of Terroir Wines and Natural Honey Drinks (Законопроект № 6693 О внесении изменений в некоторые законодательные акты Украины по развитию производства терруарных вин и натуральных медовых напитков). Available at: <https://uteka.ua/publication/Otnositelno-razvitiya-proizvodstva-terruarnix-vin-i-naturalnyx-medovyh-napitkov>, Accessed February 3, 2018.
- [10] Litvak, V., Gallagher, L., 2013, Global viticulture and winemaking, Journal of Viticulture and Winemaking, no. 6/2013 p. 10 (Литвак В.; Галлагер Л. Глобальное виноградарство и виноделие – 2012 г. Журнал Виноградарство и виноделие, нр. 6/2013 стр. 10)oi
- [11] OIV Statistical report on World VitiViniculture, 2017. Available at: <http://www.oiv.int/public/medias/5479/oiv-en-bilan-2017.pdf>, Accessed February 3, 2018.
- [12] Petrusenko, O., 2013, Young vine of wine tourism: Prospects of development in Ukraine. The World of

Products. June 2013, pp. 48-49 (Петрусенко О. Молодая лоза винного туризма: Перспективы развития в Украине. Мир Продуктов. Июнь 2013, стр. 48-49), Available at: <http://library.nuft.edu.ua/inform/mirprod48.pdf>, Accessed February 3, 2018.

[13] Programul Național de Sprijin al României în sectorul vitivinicol 2014 – 2018. Available at: <http://www.madr.ro/horticultura/viticultura-vinificatie.html>, Accessed February 3, 2018.

[14] Pugachev, A., 2011, Wine tourism in the Kuban: wine and tourism exist, but there is no culture. 16.08.2011, the Krasnodar Krai. (Пугачев А. Винный туризм на Кубани: вино и туризм есть, культуры нет. 16.08.11, Краснодарский край). Available at: <http://www.yuga.ru/articles/economy/6117.html>, Accessed February 3, 2018.

[15] Soare, I., 2007, Turism-tipologii și destinații. Editura Transversal, Târgoviște, 452 pag.

[16] Tourism in Bulgaria - Wine. About Bulgaria in Russian. (Туризм в Болгарии – Винный. О Болгарии по-русски). Available at: <http://www.aboutbulgaria.biz/tourism/wine/>, Accessed February 3, 2018.

[17] Wine tourism. Excursion to the Loisiium museum of grapes and wine. Great Trip. Professional branch association NPO Union of wine growers and winemakers of Russia (Винный туризм. Экскурсия в музей винограда и вина Лоизиум. Большое путешествие. Профессиональное отраслевое объединение НО Союз виноградарей и виноделов России). Available at: [http://www.svvr.ru/Ekskursiya\\_v\\_muzei\\_vina\\_i\\_vinograda\\_Loisiium](http://www.svvr.ru/Ekskursiya_v_muzei_vina_i_vinograda_Loisiium), Accessed February 3, 2018.V.



## ANALYSIS OF THE COMPETITIVENESS OF THE VEGETABLE SECTOR OF THE REPUBLIC OF MOLDOVA

Anatolie IGNAT, Sergiu TIRIGAN, Eugenia LUCASENCO

The National Institute for Economic Research, 45 Ion Creanga str., Chisinau, Republic of Moldova, Phone: +37322501100, Emails: anatolie.ignat@gmail.com, sergiu.tirigan@gmail.com, eugenia\_lucasenco@yahoo.com

**Corresponding author:** eugenia\_lucasenco@yahoo.com

### **Abstract**

*This paper presents a general overview and analysis of the Moldovan vegetable sector. The purpose of the article is to obtain a comprehensive picture of the Moldovan vegetable sector's value chain. The results of the paper are based on the primary and secondary information collected from different data sources. The primary tool for collecting the information was the individualized interview with different categories of participants on the Moldovan vegetable market, as well as the questionnaires made on a sample of 65 consumers. Thus, 65 consumers were questioned both in supermarket chains and in agricultural markets to identify their consumer preferences. Discussions were also held and 10 persons responsible for procurement from commercial units have been interviewed in order to analyze the model for integrating distribution units into the value chain in the vegetable sector. Conclusions on the competitiveness of the sector allow us to note that most of the analyzed vegetables sold on the market are produced by agricultural enterprises and peasant farms with areas over 10 ha and the access of domestic vegetable producers to the supermarket market is affected by a series of problems.*

**Key words:** vegetable sector, agricultural producers, consumption, value chain.

### **INTRODUCTION**

Vegetable production, including the categories of analyzed vegetables (carrots, potatoes, onions, table beet and pumpkin), is a seasonal one, largely dependent on natural factors and markets.

According to data from 2015, the area occupied by vegetables and potatoes represents 3.8% of the total area sown in the Republic of Moldova [3]. The potato and vegetable sector is characterized by a poorly developed organizational structure of the vegetable producers as well as the insufficiency of the institutionalized cooperation culture on the product, in order to improve access to the input and product market and to the post-harvest infrastructure.

In the sectoral field, compared to fruit growers, there is a lower dynamic of professional integration of producers, which is based on a greater flexibility in changing the product portfolio (in case of the lack of investment in post-harvest infrastructure), the specificity of the marketing of production mainly focused on the local market,

insufficient awareness of the importance of establishing group marketing strategies in contrast to the use of momentary marketing opportunities.

At the same time, the trade balance of the vegetable sector is negative for the period 2011-2015. The value of the vegetable products exported in 2011 amounted to approximately 25 mil. USD, while in 2015 this value diminished to about 9 mil. USD. The same decreasing trend was seen in imported vegetables, from 38 mil. USD in 2011 to 25.5 mil. USD in 2015 [6]. Several factors have conditioned such a trend, the main being restriction of Moldovan products access to the Russian market by embargo and introduction of export taxes.

Therefore, the paper aims to present a comprehensive analysis of the Moldovan vegetable sector's value chain.

### **MATERIALS AND METHODS**

The Results of the carried out research are based on the primary and secondary information collected from different data

sources. Therefore, documentation represents the main research method used. Individualized interviews with different categories of participants on the Moldovan vegetable market, as well as the questionnaires made on a sample of 65 consumers represent the primary tool for collecting the information. Thus, 65 consumers have been questioned both in supermarket chains and in agricultural markets to identify their consumer preferences. Discussions were also held and 10 persons responsible for procurement from commercial units have been interviewed in order to analyze the model for integrating distribution units into the value chain in the vegetable sector.

## RESULTS AND DISCUSSIONS

**Market structure.** According to the research on consumer preferences, for all categories of analyzed vegetables, except for pumpkins, consumers tend to buy 34-38% of them from supermarket chains. Among the main supermarket chains can be mentioned: Fourchette, Nr. 1, Fidesco, Metro Cash & Carry, IMC Market, Linella and Green Hills, etc. [1].

In most of cases, supermarket chains have agreements with distribution companies that are responsible for supplying supermarket chains with vegetable products. On the other hand, depending on the supply chain, supermarkets buy vegetables directly from wholesale markets.

In order to have a clear vision on the procurement process in the most competitive supermarkets, the purchasing managers of the most important supermarkets were interviewed and questioned. As a result of this exercise we can draw the following points:

-Most of the marketed vegetables are of local origin. However, some products are imported (e.g. Fidesco - all vegetable products are local and only 10% of carrots are imported, referring to cleaned carrots; in the case of Fourchette, the ratio of imported carrots to local ones is about 60 to 40, and the ratio of other products is 90 to 10, with the exception of pumpkin, which are totally of local origin;

Linella also is oriented to vegetables of local origin, however, about 60% of potatoes, 20% of onions, 30% of pumpkins are of import origin, etc.); at the same time it is noted the lack of such products as garlic, which in most of cases it is imported in a ratio of 90-95%.

-Supermarket networks purchase vegetables both directly from the local producers and through intermediaries. The results of the questionnaires present us a ratio of 55 to 45 in the favour of contracts with intermediaries. The main findings show that the preference of supermarkets to negotiate with intermediaries arise from the low technical capacities of producers as well as their reduced quantities of products. Also, the payment method (cash money) that producers require represents another factor for the supermarkets' preference to intermediaries.

**Price formation and developments.** The usual flow of fresh vegetables consists of: producer – wholesaler / intermediary – retailer – consumer.

A wholesaler / intermediary will usually get an add-on of 0.5-1.0 MDL / kg in order to make a decent profit, regardless of the overall price. When there is a product deficiency and the product is sold for a higher price, his / her profit also increases. The profit made by the intermediary (wholesaler) varies depending on the year and market conditions.

Vegetable prices have a year-by-year dynamics determined by the production cycle. This is characterized by a decrease in the prices during the harvest period, especially of field production, and their increase during the harvesting of the products in the period of extension of the season by delivery of crops grown in protected land, and delivery on the market products held for storage.

Domestic vegetables are marketed without packaging, or in bags. For lightly perishable vegetables boxes are used, reused from other products or wooden cases. Potatoes, onions, carrots and red beets are packed exclusively in bags, from 5 kg and more. Imported products, mainly from Poland and Germany, which are not only sorted but also washed, are packed in individual packages of 1-3 kg, as a rule.

The sorted and washed products (potato and carrot) are sold, as a rule, with a minimum

price of 30-40% higher than other similar products.

**Demand of vegetables and consumption preferences.** Potato, onion, carrot, beet and pumpkin vegetables are part of the basic food products, therefore their consumption is relatively stable and inelastic depending on the price [5].

Analysing the volumes of vegetables consumption for the years 2011-2015, there can be observed a continuous decrease with some more pronounced accents in 2012 when the decline in production and consumption volume was caused by unfavourable climatic conditions. Although in the years 2013-2014 the situation was little restored, in 2015, which in fact was a relatively good year in terms of agriculture, the level of production and consumption decreased significantly.

Table 1. Total consumption of selected vegetables, 2011-2015, thousands tons

	2011	2012	2013	2014	2015
Potato	341	192	264	286	184
Onion	60	41	54	60	39
Carrot	24	21	25	26	21
Pumpkin	54	33	46	59	48

Sources: [2, 3]

Based on the average value of the consumption of vegetables calculated over the last five years and the average number of 3.5 mil. people in the Republic of Moldova for the same period, the consumption volume of these vegetables per capita was calculated. Thus, we can see a potato consumption of about 71 kg per year per capita. This indicator is lower than potato consumption in Ukraine (140 kg), Russia (111 kg), Belarus (188 kg) or Romania (98 kg), but is comparable to many European countries such as Austria and Hungary (61 kg), the Czech Republic and Finland (67kg) [4]. Onion and pumpkin consumption is significantly lower compared to potato and reaches about 14 kg per capita, and carrot consumption is about 7 kg per capita per year.

**Consumer psychology.** Consumer psychology was identified as a result of the questioning of a group of 65 people. The average age of interviewees is about 42 years.

Of the total number of interviewees, 72% are men and 28% women. Most respondents (56%) have higher education, 34% have specialized secondary education and 10% secondary education. Most interviewees are employed, of which 42% have a stable service, and 18% are temporary employed.

From the analysis of the structure of the families of the interviewed persons it can be seen that the size of these families is predominantly made of two, three or four persons. Only 8% of respondents mentioned that their family consists of only one person, and another 8% mentioned that their families are made up of more than five members.

Final consumers of vegetables usually have monthly incomes between 1,100 and 6,000 lei, including incomes between 2,000 and 4,000 lei - 36% of the respondents, with incomes of 1,100 and 2,000 MDL - 28 respondents and with incomes of 4,000-6,000 MDL - 22% of interviewees. Only 12% of respondents mentioned that they have monthly incomes of over 6,000 MDL, and 2% have incomes lower than 1,100 MDL.

The frequency of purchasing vegetables for domestic consumption denotes certain trends for all types of analyzed vegetables. Thus, most respondents purchase vegetables once a week (19% of respondents), once every two weeks (13% of respondents), or once a month (17% of respondents).

At the same time, each type of vegetables also has certain peculiarities regarding the frequency of shopping. Carrots, potatoes and onions are bought in most cases once a week. The frequency of buying table beets is smaller, being bought once every two weeks or once a month. In the case of pumpkins, such trends have not been identified, with purchases being made predominantly during the season, or in many cases it was mentioned that these vegetables are collected from their own gardens or other non-commercial sources.

There are also peculiarities in terms of the quantity of purchased vegetables. Most respondents prefer to buy relatively small quantities of vegetables such as 1 kg, 2 kg or 3 kg. In the case of potatoes, quantities of more than 50kg are often purchased and



onions are often purchased in the amount of 20kg.

The seasonal factor has a certain impact on the consumption pattern of vegetables, but it is not decisive in the case of pumpkins and table beet that are fairly stable in sales throughout the year. In the case of potatoes, onions and to a lesser extent carrots, there is an increase in sales volumes in October, which can be explained by purchases in the preparations for the winter season.

There are also some patterns regarding the places where vegetables are purchased. Thus, no respondent reported purchasing vegetables directly from the producer or from the street sellers. About half of the respondents mentioned the "Neighbourhood Agro-Food Markets", followed by "Neighbourhood Supermarkets" or "Other Supermarkets" as the places to buy domestically-grown vegetables.

The overwhelming majority of those interviewed prefer vegetables of local origin. These preferences are motivated by the fact that "They are tastier" - 77% of the respondents, "They are cheaper" - 30% of the respondents, from the patriotic feelings - 24% of the respondents. Among other arguments for the purchase of local vegetables, it has been mentioned that they are cleaner from the ecological point of view compared to the imported ones. It is significant the fact that no respondent mentioned among the advantages of local vegetables that they are "cleaner" or that "they are packed more comfortably" and only 2% of the respondents mentioned that the local vegetables "have a more attractive exterior appearance". From here it can be concluded that the local buyer prefers local vegetables primarily because of taste, price and patriotism.

**The main places of purchase of consumer goods.** As a rule, retail networks acquire about half of the vegetables marketed through contracts concluded directly with local producers and the other half through intermediaries. The fact that only half of the vegetables are purchased on the basis of a contract concluded directly with local producers is explained by the fact that local producers do not have the necessary logistics, such as warehouses and refrigerators, and as a

rule do not have sorting and packaging equipment.

A critical issue is the lack of continuity of quality, the products being not standardized and properly packaged with the requirements of distribution networks. As a rule, vegetable producers do not have the opportunity to deliver vegetables throughout the year, preferring to sell products that can be easily purchased from wholesale markets. Another problem is that domestic producers prefer being paid with cash. In many cases, such as table beets, it has been mentioned that local production cannot assure the necessary volumes of deliveries.

At the same time, in the opinion of the representatives of the retail networks, there are certain advantages of purchasing vegetables from the local producers, namely that they are closer to the point of sale, are always fresh, have an external aspect and taste better compared to imported ones. Another advantage is flexibility in negotiating purchase prices with the local vegetable producers.

**Production and cultivated areas.** The largest areas of potatoes, vegetables and pumpkins in agricultural enterprises and peasant households with a surface area of more than 10 ha are located in the North region, with a share of about 69% of the total area. The share of households in the Centre region was about 22 percent and those in the South region of 9 percent of the total area occupied by potatoes, vegetables and edible pumpkins.

Most of the vegetables grown in the Republic of Moldova are open field. The proportion of vegetables grown in greenhouses is not significant. The area occupied by vegetables and potatoes in the Republic of Moldova denotes a stable trend of reduction. Thus, between 2006 and 2014, the area occupied by vegetables decreased from 42.4 thousand ha to 31.9 thousand ha or by about 25% and the areas occupied by potatoes decreased during the same period from 34.4 thousand ha to 22.8 thousand ha or by about 34%.

Taking into account the fact that agricultural enterprises and peasant farms with a surface area of more than 10 ha produce predominantly vegetables for trade, and

auxiliary households predominantly for their own subsistence consumption, the focus of the analysis is on agricultural enterprises and peasant farms with the larger surface area sea of 10 ha.

The largest reductions in the areas occupied by potatoes, vegetables and pumpkins in agricultural enterprises and peasant farms with a surface area of more than 10 ha were registered in the Centre region, where they decreased in the period 2011-2015 by about 51%. In the North region these areas decreased by about 40% and in the South region by about 35%.

**(a)Potato:** The potato sown area has decreased from 29.2 thousand hectares in 2011 to 22.1 thousand hectares in 2015 or by about 25%. At the level of agricultural enterprises and peasant farms with an area of more than 10 ha, the largest areas of potatoes in the Republic of Moldova are found in the North region, where about 86% of the potato areas are concentrated, according to data from 2015. About 10% of the total potato areas in 2015 were in the Centre region and about 3% in the South. Global potato production declined more than half in 2011-2015, from 350.8 thousand tonnes in 2011 to 158.2 thousand tonnes in 2015.

**(b)Onions:** The onion-sown area decreased from 6.5 thousand hectares in 2011 to 5.1 thousand hectares in 2015 or by about 22%. The largest area of onions in 2015 was registered in the North region - about 48%, followed by the Centre - about 28% and the South - about 24%. Global onion production declined from 58.3 thousand tons in 2011 to 38.1 thousand tons in 2015 or by approx. 35%.

**(c)Carrot:** Carrot had a more or less constant trend compared to other crops analyzed, both in terms of sown area and global production. Thus, the area planted with carrots diminished from 1.6 thousand hectares in 2011 to 1.5 thousand hectares in 2015, or only by about 8%. The largest carrot areas are in the Centre region - 43%, followed by the North - 33% and South - 24% of total carrot areas in 2015. Global carrot production has shrunk from 14.3 thousand tons in 2011 to 13.8 thousand tons in

2015 or by about 3%, maintaining a quite constant level.

**d)Table beet:** The sown area of table beet has registered a slight decrease from 1.2 thousand hectares in 2011 to 1.1 thousand hectares in 2015 or about 19%. As in the case of carrot, the largest area of table beet is in the Centre region - 46%, followed by North - 45% and South - 9% of the total area of table beet in 2015. Despite a modest reduction in sown areas, global beet production declined from 13.2 thousand tonnes in 2011 to 10.1 thousand tonnes in 2015 or by about 23%.

**e)Pumpkin:** The area planted with pumpkin increased from 2.4 thousand hectares in 2011 to 3.2 thousand hectares in 2015 or by about 33%. Although the area has been increased, global production has shrunk from 33.8 thousand tonnes in 2011 to 31.7 thousand tonnes in 2015 or by as much as 6%. In the middle of 2011-2015, the largest areas were in the Centre region - 36%, followed by Gagauzia ATU and the Northern region with 21% and the South region - 19% of the total area during the period 2011-2015.

**Processing industry.** The vegetable processing sector of the Republic of Moldova includes both small-scale processing (households, farmers), which are designated for own consumption or commercialization through the nearby agricultural markets; intermediate processing which is carried out either on the basis of the use of its own production or on the basis of contractual relations of production acquired from agricultural producers and is characterized by a relatively narrow specialization over a defined range of products; and large-scale processing, characterized by a high degree of complexity of the raw material supply system.

## CONCLUSIONS

The activity of the vegetable production sector is affected to a large extent by the specific climate conditions of the Republic of Moldova;

The vegetable sector is dispersed and fragmented, which does not contribute to the concentration of commercial quantities, homogeneous according to the variety criteria,

quality, etc. The largest quantities of vegetables are produced in households and peasant farms. The specialization of agricultural producers only in the production of vegetables from the subgroup of analyzed vegetables is a very rare phenomenon for the agricultural sector of the Republic of Moldova.

From 2006 to 2014, the area occupied by vegetables decreased from 42.4 thousand ha to 31.9 thousand ha or by about 25% and the areas occupied by potatoes decreased during the same period from 34.4 thousand ha up to 22.8 thousand ha or by about 34%. Respectively, there are also significant reductions in production volumes.

Most of the vegetables in the nominated group that are marketed on the market are produced by agricultural enterprises and peasant farms with areas over 10 ha. Auxiliary households and peasant farms of less than 10 hectares, although producing most of these vegetables are using them predominantly for non-commercial use.

Most of consumers prefer home-grown vegetables. These preferences are motivated by the appreciation of the taste qualities, the price factor and patriotic reasons.

#### **Recommendations:**

- Local production has to meet the quality, packaging and labelling requirements of the end-users and intermediaries. It is absolutely necessary that the price-quality ratio be in favour of local vegetable production;
- Stimulating the implementation of advanced technologies in the field of vegetable production in order to extend the production season;
- Supporting the implementation of irrigation systems for the production of vegetables;
- Support the implementation of modern technologies for post-harvesting, storage and packaging operations;
- Promotion of public-private partnerships for the creation of regional centres for information and wholesale trade with vegetable products.

#### **ACKNOWLEDGEMENTS**

This research work was carried out with the support of IFAD, developed within the Inclusive Rural Economic & Climate Resilience Programme.

#### **REFERENCES**

- [1]ACED, 2011, Studiu de piață privind fructele și legumele proaspete în Moldova. Proiectul competitivitatea agricolă și dezvoltarea întreprinderilor
- [2]BNS, 2014, Anuarul Statistic al Republicii Moldova, Chișinău
- [3]BNS, 2016, Statbank database. <http://statbank.statistica.md/pxweb/pxweb/ro/40%20Statistica%20economica/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774>, Accessed on: 22.02.2018.
- [4]FAO, 2016, Statistical database. <http://faostat3.fao.org/browse/Q/QC/E>, Accessed on: 09.01.2018.
- [5]MAIA, 2014, Strategia națională de dezvoltare agricolă și rurală pentru anii 2014-2020
- [6]ONU, UN Comtrade Data Base, <http://comtrade.un.org/>, Accessed on: 09.01.2018.

## RISK MANAGEMENT, A MORE EFFICIENT ABSORPTION METHOD FOR THE EUROPEAN STRUCTURAL AND INVESTMENT FUNDS

Robert-Anton V. ION, Dorina Nicoleta MOCUTA

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Emails: dorinamocuta@yahoo.com, ion.robert.anton@gmail.com

*Corresponding author:* dorinamocuta@yahoo.com

### **Abstract**

*An extremely important subject but often superficially approached nowadays, risk, has become a serious obstacle in the process of development and implementation of any investment project considering the fact that without the elaboration and implementation of a coherent program for an efficient way of managing risk, the intended measures won't be able to ensure protection against the negative consequences that might arise. Against all expectations, risk management should not be perceived as a complex process that complicates or makes it more difficult for the teams involved in the investment project to deliver the expected results, but instead it should be seen as one of the most simple and natural methods of making the process of project implementation more effective and efficient. It is also the only instrument that gives pertinent and realistic answers to what is expected, what could affect the achieving of the intended objective and what would be the impact on the project overall. Furthermore it also presents what measures should be taken in order to avoid minimizing or on the contrary maximizing the effects and nevertheless it provides conclusions to whether the implemented measures were efficient and what did they change in the project's economy. Either way, specialized literature together with the obvious increasing interest of experts on the matter shows at least in theory that risk management implies a wide range of situations and domains, with general focus on achieving the intended objective in optimal conditions.*

**Key words:** risk; management; objectives; methods; process; absorption of EU funds

### **INTRODUCTION**

Considering what Robin S. Sharma, a Canadian writer and leadership lecturer, said „When we stop taking risks we stop living life”, we can agree that risk is a concept we meet on a daily basis in all our actions, no matter if it implies personal matters, elements of an investment project or any other type of decision we should make in our personal life or as part of an organization. In this context, together with the rising need of safety and predictability, risk and risk management became in the last years more and more present in people's lives, ideas, objectives and aspirations. For these reasons all the above said are perfectly reasonable and true. As a result, we can see that risk, which is such a common and spread concept, is far more complex and wide than previously thought due to all the challenges that come with it, derived from different approaches and

difficulties that might appear during the identification and control activities.

As far as the etymology of the term „risk” is concerned, there is no clear information regarding the period when the word appeared nor the context in which it appeared. Throughout time, related words came to use in various writings and according to Prof. Dr. Ioan Tofan, these words date back to Homer, who used the term „rizikon” when he referred to Ulysse's journeys, more specifically when travelling from Scila to Caribda. Later, in 1193, in the book „Carta Picena”, the word „risicu” is used to describe the challenges to which the characters were exposed to. In the XII –XVII century, the expression commercial risk comes to use in Italy and in the XVII century, the term risk is also used in France and is associated with the sea navigation vocabulary [11]. Ever since, the word extended its use in various domains and it became common, developing new meanings until present days.

As a matter of fact, the purpose of presenting these historical landmarks in the evolution of the word is not to state this concrete information but to point out the fact that people have always been preoccupied with the necessity of defining risk in order to identify, quantify, evaluate, monitor and control it efficiently.

Considering this, it is more than obvious that „risk” has a variety of definitions, some simpler, some wider and vast, others more complex, but even so, it is impossible to gather general approaches and specialists vision altogether. In this article, the main focus is on two of the most common definitions of „risk” – the one we can find in any dictionary and the one that was approved by a series of experts in the risk management area.

The Romanian dictionary defines risk as a word that has its roots in the French word „risqué” and means „a possible danger, inconvenient or the probability to suffer damage” [10], and the Shorter Oxford Dictionary of the English Language defines it as „danger; the possibility of loss or injury” [9].

On the other hand, according to the definition promoted by the International Standardisation Organization (ISO) in the ISO 31000 document posted on 13th December 2009 – „Principles and directing lines” and ISO Guide 73:2009, risk is defined as a concept which describes „the effect (positive or negative) of uncertainty on objectives” [4] and it seems that this approach was the work result of an international committee formed by a couple thousands experts in the field related to risk, from over 30 countries. [12] Moreover it is estimated that this particular form of definition is the one that suggested another dimension, the one that implies risk being considered an uncertainty which gives us sufficient information and so must include certain negative aspects of a process as well as positive ones. Considering all these aspects we can assume that risk management is a process whose purpose is to identify, quantify, evaluate, monitor and control risks no matter if they have a negative or positive effect on the actions themselves.

## MATERIALS AND METHODS

The purpose of the present article is to bring your attention to a new, modern and efficient method to managing risk in a process of development and implementation of any European funded investment projects. We certainly believe that implementing a risk management system as the one described in this article could lead to a better coordination and implementation of project activities and, at the same time, can generate a better absorption of European structural and investment funds.

Regarding the studied materials, we have to mention that we started our process of identifying new techniques and methods of using risk management in the EU funded projects by reading the European Union’s legislation together with the national one and we continued the effort by studying several specialized papers that are mentioned in the references section of this article.

During the above mentioned process we proceeded to collect data from official documents and reports of the authorities that manage EU funds, because within them we were able to identify the correct values of the indicators referred to in the article, such as the level of absorption, budgetary allocations or others.

Given that the proposed method is not completely defined, no analysis, synthesis or interpretation of results has been performed at the level of the article as these can only be achieved after the implementation of the measures proposed at the level of a program.

## RESULTS AND DISCUSSIONS

### **Romania, risk management and European structural and investment funds**

Through regional and cohesion policies adopted over time, European Union has constantly consolidated its economic, social and territorial position with the purpose to promote a sustainable and harmonious development of all member countries and reduce demographic disparities. Romania, as a member state benefits from constant support in the process of socio-economic development

since early '90 and so, has at her disposal a series of instruments and financial mechanisms called European structural and investment funds, which help, among other things, to create a viable transport infrastructure, to find solutions to specific problems in the urban and rural area, to qualify workforce to standards comparable to other member states, to modernize public institutions and education system, reinforce business environment and research institutes. Due to the fact that all these financial instruments are implemented by applying the concept based on own contribution of the member state, the EU supports most of the expenses, and so, European funding is a great opportunity for Romania and also a real gain when funds are used properly and accordingly with the thematic and specific development objectives.

For the 2014 – 2020 allocations, Romania can still benefit from European funds worth 30.8 billion Euro, through nine operational programmes which means that there is still available, until the end of the period, an allocation of 1.546 Euro per capita from different European funds [1], as pictured below in Figure 1.

Taking into account all the aspects previously debated, Romania's experience gained with the last multiannual financial frame 2007 – 2013, the recorded results, the need to continuously improve the process of accessing European funding. Also to overcome all the difficulties and challenges that the relevant participants to this process had to face throughout time. This article tackles the

subject of increasing the absorption of European structural and investments funds by upgrading the risk management process during the projects.

In order to elaborate a series of hypotheses and proposals regarding the improvement of the risk management process in European funded projects, we start by studying the European Union's legislation together with the national one as well as pacts or any other strategic documents in which Romania and the EU are parts. Obviously this type of instrument doesn't need to be regulated by Community or national legislation, but unfortunately even though risk management is considered to be an extremely important part of the financial mechanisms dedicated to supporting Romania's development process and has continuously contributed to ensuring reaching national and Community objectives, the subject is not highly debated. In some strategic documents such as The Partnership Agreement 2014 – 2020 concluded by Romania and the European Union, there are paragraphs which mention the fact that through risk management instruments direct beneficiaries can receive support and so the economic impact of interventions would be better accounted for [5]. There are no concrete elements to recommend certain procedures to use in order to bring value to interventions, a better coordination and also an upgraded monitoring of the thematic objectives assumed by our country and related to the vision and regional strategy adopted in the Community space.

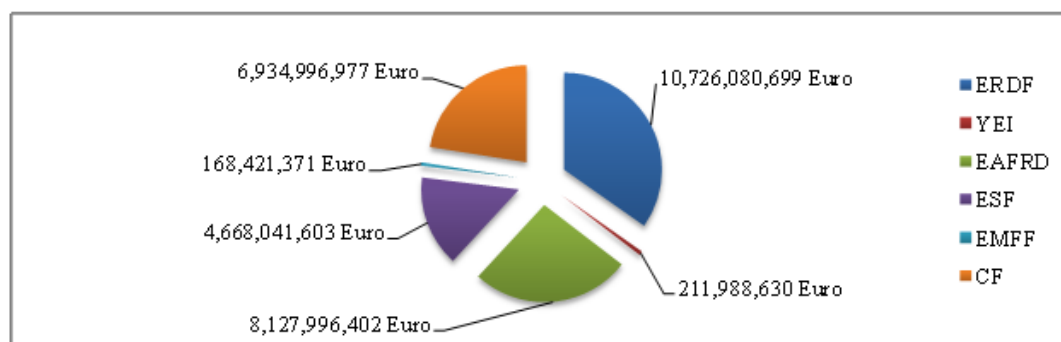


Fig. 1. EU Budget by Fund - Romania

Source: <https://cohesiondata.ec.europa.eu/countries/RO> – Refresh Date: 21.08.2017, Accessed on 30.11.2017

Regarding the agreement concluded by Romania and the European Union, things are clear in what the means of implementing risk management are concerned, but for the European funded projects the situation is somehow different in some aspects concerning the collaboration between the management authorities or intermediary national organisms that are authorized to handle the financing programmes and potential beneficiaries of such non-refundable funds. By going through the solicitation for financing guide and the annexes integrated in the financing programmes one can observe there is a real interest regarding the way of approaching the risk and risk management concepts in such projects.

It must be pointed out that no matter the financing programme, there is a special section dedicated to risks and their management process included in the financing solicitation guides, where every solicitor must fill the available fields with information about the identified risks that might affect the implementation of the project in connection with the conditions, activities, results, objectives, budget or acquisition plan and also they must suggest a series of measures in order to diminish or eliminate the negative effects that those risks might generate during

the development of the project. For example, in the Regional Operational Programme 2014-2020, Priority Axes 2 – „Improvement of competitiveness for small and medium enterprises”, the aspects mentioned above are present in the online financing solicitation form for project proposals, MySMIS and look exactly as presented below in Figure 2 [6].

As a conclusion, based on all the information presented, we can state the fact that including these elements in the solicitation application for non-refundable funds at the moment of registration of applications is not enough without having a mechanism of continuous update throughout the eligibility evaluation steps, technical and financial evaluation and during the entire implementation and monitoring process of the investment. Furthermore we consider crucial that for the risk management process to be handled and coordinated by both parties – the management authority or the intermediary organisms at national level and the entity that benefits from the financial help. Such solution would allow a continuous reporting of the identified risks and measures to diminish such risk, to the specific objectives of the financing programme and also to the output indicators of the investment project.

The screenshot shows a web form titled "Adaugă Risc". It contains two large text input areas. The first is labeled "Risc identificat" and has a character count of "768 caractere rămase". The second is labeled "Măsuri de atenuare a riscului" and has a character count of "1750 caractere rămase". At the bottom right, there are two buttons: "Renunță" (Renounce) and "Confirmă" (Confirm).

Fig. 2 .The risk section in the grant application form  
Source: <https://2014.mysmis.ro/> – accessed on 30.11.2017

Regardless of the complexity of different approaches and various opinions concerning the subject, we can say without doubt that risk management is often associated with a process responsible with identifying possible

risk in investment projects, quantifying and evaluating, monitoring and controlling efficiently the positive or negative impact which might appear during the development of the investment. Another generally valid

element of the working methods refers to the cyclic character of the risk management process, which repeats itself, going through the same stages, until it reaches the final phase of the investment project and the objectives are met. This is otherwise an important moment which is often disregarded even though it weighs a lot in the entire process of improving practices and techniques in risk management. It is the moment when the ones responsible with the management

part of the project should evaluate objectively the implementation measures, actions and to come to a conclusion by delivering some proposals that could improve the risk management process in the future [3]. In order to present an accurate image of the entire risk management process, the information has been structured in Figure 3, which is an interpretation of such logical schemes promoted in different scientific papers mentioned in the bibliography

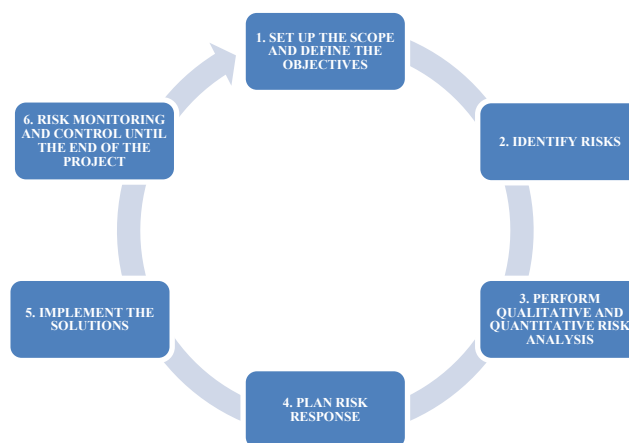


Fig. 3. Risk management process

Source: Interpreted after Hillson D. – Managing Risk in Projects, 2009, Gower Pub. Ltd, Aldershot, United Kingdom

As in these article we started from the idea that risk management is not a part of a European financed investment project and it doesn't make the beneficiaries entirely responsible for it, we will continue by going through each stage of such a process, previously described and illustrated above, presenting the relationship that should exist between the authorised entities in Romania delegated to manage the financing programmes and the beneficiaries of the non-refundable help in order to encourage European structural and investment funds absorption. This can be motivated and supported by a variety of elements but the most representative consist of the fact the specific objectives formulated by the beneficiary should focus on the personal interest and at the same time to ensure the fulfilment of the thematic objectives at national levels. Given these facts one can wonder why can't we follow this principle and apply it to the entire chain of action

responsible of managing and making the absorption of European funds possible, meaning beneficiary – financing authority at national level (financier and administrator of funding programs) – European level financing authority (financier). The answer is relatively simple as the relationships between those entities are completely different from a functional point of view, and they should be treated separately at first in order to generate a risk management integrated system as follows: beneficiary – national financing authority (financier and administrator of funding programs) – European financing authority (financier).

The first stage of the risk management process consists in answering the following question: „what do we intend to do?”. In order to answer the question, first we must know the purpose of the investment project and its specific objectives. After studying various solicitation guides for non-refundable financing, we came to the conclusion that



there are no reasons to worry about this activity as it is closely supervised by the management authorities and the intermediary organizations who set the development lines for the outputs by stating the purpose and the defining objectives of the financing programme, priority axes, measures of intervention etc. As presumed, these elements are considered defining factors in the evaluation of eligibility for the solicitors as they must be connected and included in the beneficiary's objectives.

To sum up, in order to avoid any situations that might lead to contact dissolution, withdrawals of funding and blockages in the process of accessing European funds, the aspects regarding purpose and objectives are strongly outlined in the documentation for funding solicitation and they are also continuously monitored and evaluated by authorities until the end of the durability stage of the investment with the help of progress reports and monitoring visits.

The second stage of the process – „Identifying risks” consists in determining all the aspects of the investment plan or the changes that might occur under the influence of internal or external factors. This stage is poorly presented in the solicitation documents and does not include the interests of both parties implicated in the investment, but it only addresses the beneficiary. As a consequence this article

suggests the endorsement and implementation of measures in order to make this activity possible under the lines of the same procedure mentioned in the first stage of the process – the supervision and coordination of financing authorities at national level.

After completing these stages it is recommended to be taken into account identifying the risk factors in a natural order, chronologically, depending on the stages of the investment project [2], as shown in Figure 4.

It is believed that experience and expertise of the management authorities and intermediary organizations is wider than the one of the potential beneficiaries, who might face for the first time the challenges of creating a risk management plan when completing the financing solicitation documentation. In that case, the intervention of the authorities managing the funding programs in Romania would be beneficial for both parties and should be translated into inclusion in the funding guidelines of clear procedures to be followed by applicants in risk management. This would allow a better organising of the activities included in the following phases of a risk management process and would also increase efficiency in monitoring investments projects by the representatives of the financing authorities [7].

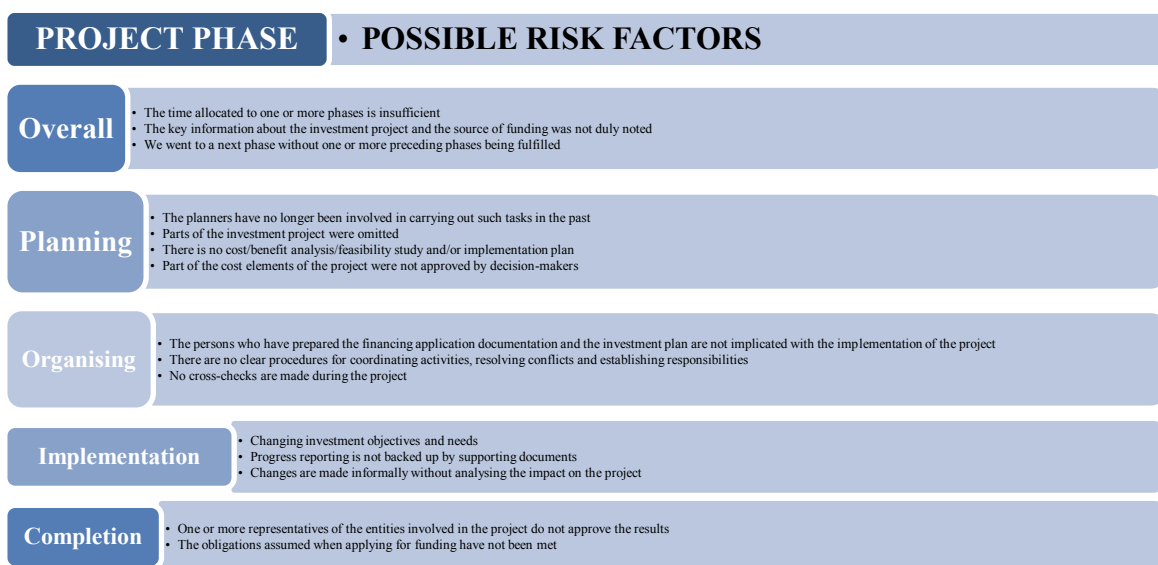


Fig. 4. Possible risk factors depending on the project phases

Source: Interpreted after Guvernul României – Manual expert implementare fonduri structurale, 2015, București, România

The next three phases of the risk management process are closely linked with the second phase. We consider that the responsibility for the qualitative and quantitative risk assessment, the drafting of the proposed measures to mitigate their impact as well as the implementation of the adopted solutions is to a great extent the beneficiary's of the non-reimbursable financial aid accessed through European programs. This is supported by the fact that the management, coordination and implementation of a risk management plan in such a project is mandatory within the beneficiary entity, which alone is responsible for the good or faulty implementation of investment.

As far as the last phase of the risk management process is concerned, the one regarding monitoring and controlling risks, it must be said that according to current practices, it is divided into two activities – one which implies reporting the progress made by the beneficiary and one consisting in the audit and control conducted by the representatives of the financing authorities.

At a simple consultation of the assessments and analyses carried out on the experiences of managing such projects, we note that over the last few years financial and institutional efforts have been enormous in this direction [7, 8]. Very many monitoring visits, with no concrete results describing the situation, have proven to be useless considering the problems that inefficient risk management can generate in the course of investing. These are the reasons why monitoring and control visits by the competent organizations should be included in the risk management plan from the start of the second phase and, at the same time, correlated with the identified risks, the measures proposed to remedy the situation, and mitigating the effects that may adversely affect the smooth running of the investment project. In fact, the reasons for such controls are clear: identification of projects in difficulty related to the duration of implementation, with the result and realization indicators; also the fulfilment of specific objectives assumed at the moment of conclusion of the financing contracts.

In the absence of a truly significant risk management plan in the project, the fact that the focus is set on the amount of reported information and less on its quality represents a big problem that we encounter at all investment projects funded under this scheme. The tendency of the experts responsible for conducting check-ups is to request as much information as possible, many of which having a repetitive and insignificant character at certain stages of investment realization. Obviously, under these conditions, the risk management process becomes, alongside the project implementation process, a heavy burden on the implementation teams on the part of the beneficiaries and at the same time an inefficient and totally irrelevant tool or mechanism for the authorities managing these funding programs.

The proposals submitted through this article have the role of supporting a method that would make the absorption of European funds more efficient and simplify the reporting, monitoring and control methodologies.

## CONCLUSIONS

Finally, by invoking the title of this article, namely „Risk management, a more efficient absorption method for the European structural and investment funds", we conclude by agreeing that it is necessary to adapt and correlate the mechanisms for granting and managing European financing to the risk management process provided at the level of the investment projects.

The reasons for the implementation of such measures are obvious as they would, among other things, lead to relaxation and simplification of the relationship between beneficiaries and management authorities or intermediary organizations, better coordination and implementation of project activities by directly reporting to the objectives pursued and, ultimately, by improving the efficiency of national results by increasing the absorption of European funding.

## REFERENCES

- [1] Country data for Romania, Cohesion data, Europe EU, <https://cohesiondata.ec.europa.eu/countries/RO> – Refresh Date: 21.08.2017, Accessed on 30.11.2017
- [2]Expert Textbook for implementing European Funds, 2015, Interpretation of the Romanian Government, Bucharest, Romania
- [3]Hillson, D., 2009, Managing Risk in Projects, Gower Publishing Limited, Aldershot, United Kingdom, page 62.
- [4] ISO/GUIDE73:2009/en, <https://www.iso.org/obp/ui/#iso:std:iso:guide:73:ed-1:v1:en>, Accessed on 02.12.2017
- [5]MFE 2014-2020, Partnership Agreement Romania 2014RO16M8PA001.1.2, pages 26, 201, 204, 417, 434, Ministry of European Funds, <http://www.fonduri-ue.ro/acord-parteneriat#varianta-in-engleză>, Accessed on 30.11.2017
- [6]MFE 2014-2020, MySMIS, Ministry of European Funds, <https://2014.mysmis.ro/>, Accessed on 30.11.2017
- [7]Ministry of Agriculture and Rural Development, 2017, Study of ex-post assessment of the National Programme for Rural Development 2007-2013, final version, Bucharest, Romania
- [8]Ministry of Regional Development and Public Administration, 2015, Report on the results of the impact assessment of POR interventions, Final version, Bucharest, Romania
- [9]Oxford University, 2007, Shorter Oxford English Dictionary (SOED), Oxford University Press, United Kingdom
- [10]Romanian Academy, „Iorgu Iordan-Al. Rosetti” Institute for Linguistics, 2009, Explicative dictionary of the Romanian language (in Romanian) Universul Enciclopedic Gold Press House, Bucharest, Romania.
- [11]Tofan, I., Gontineac, M., Rusu, D., 2011, The theory of risks and applications, Points in the risk theory (In Romanian) No. 1, Alexandru Myller Press, Iasi, Romania, page 2.
- [12]Wikipedia, Risc, [https://ro.wikipedia.org/wiki/Risc#cite\\_note-UAIC-1](https://ro.wikipedia.org/wiki/Risc#cite_note-UAIC-1), Accessed on 01.12.2017

## THE EVOLUTION OF AGRICULTURAL HOLDINGS IN MACRO-REGION FOUR (SOUTH WEST-OLTENIA) AFTER ROMANIA'S INTEGRATION INTO THE EUROPEAN UNION

Niculina IONIȚĂ, Liviu MĂRCUȚĂ, Alina Gabriela MĂRCUȚĂ

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40744 6474 10, Emails: nicoletta\_ionita@yahoo.com, liviumarcuta@yahoo.com, alinamarcuta@yahoo.com

**Corresponding author:** nicoletta\_ionita@yahoo.com

### Abstract

*The year 2007, the moment of Romania's integration into the European Union, was the beginning of a new era of the agriculture economy of our country. In this framework, the Romanian agriculture must quickly conform and to adopt to the European Union's agricultural measures and political (Common Agricultural Policy). The present study describes the evolution of agricultural holdings since 2007 after integration into the European Union, till present because the integration was and still is a powerful pressure factor for the rapid reform of the Romanian agriculture. Oltenia region is a significant agricultural region in Romania and is one of the most sensitive regions of the country in terms of extreme weather combined with the natural and socio-economic conditions.*

**Key words:** agricultural region, macro-region four, agricultural holdings, European Union, evolution

### INTRODUCTION

The agricultural holding is representing a complex of labor means, objects of labor and labor force, interconnected into a unitary system, based on labor division and labor cooperation, in order to obtain certain agricultural products, to execute works or provide services. [2]

The agricultural holding is a unitary (territorial, technical, productive, legal, economic) system which has the main purpose to capitalize the agricultural land/or animal breeding in terms of economic efficiency and in good environmental conditions.

Member States of the European Union show a structure of agriculture that varies according to different geological, climatic, and topographic factors, different natural resources and regional activities, lifestyle and social habits.

At European Union level, our country occupies the 6<sup>th</sup> place of the agricultural area used, so in the recent years with a very high agricultural potential, Romania became an

important player on the European agricultural market.

Unfortunately, the large agricultural area used do not mean the existence of big size dimension farms on contrary in Romania indicates large numbers of agricultural holdings represented by many small subsistence farms. Romania present one third of the number of holdings at EU level in 2013 (33.5%)[3]. In this context, Romania integration into the European Union is an economic, social and political necessity, the main objective of integration being represented by the problem of agrarian structures and organization [7]

### MATERIALS AND METHODS

This study has data collected and correlated from various sources of information, both quantitative and qualitative, such: official statistics available on territorial, national and international, documents published by Ministry of Agriculture and Rural Development, National Institute of Statistics, and Eurostat.

In order to provide an ample image of the evolution of agricultural holdings in Oltenia region, were used the following indicators: type of legal status, the agricultural area used, classes and size.

## RESULTS AND DISCUSSIONS

The Macro-region was established in Romania in 1998 and is representing a type of regional division Macro-regions have been created to collect regional statistic, and they do not have legal administrative status.

There are four macro-regions in Romania, each of them are formed by two development regions. Macro-region four is made up of the southern and eastern regions of the country.

Oltenia Region is located in the South-West of Romania, in the North is delimited by the Carpathian Mountains, in South and West by Danube River, in East by Olt River.

The region is covering an area of 29,212 km<sup>2</sup>, representing 12.25% of Romania's surface area and consists of 5 counties: Dolj, Gorj, Mehedinti, Olt, and Valcea.

The fundamental transformation in the agricultural structure, in the technical and material resources, in the farm set-up is necessary in order to ensure a modern agriculture and its enrolment in the general strategy for the transition of the entire Romanian economy to the market economy. [9]

Table 1. The evolution of agricultural holdings after 2007-2016 (thousand)

Indicators	2007	2010	2013	2016
Total agricultural holdings	3,931	3,859	3,630	3,422
Agricultural holdings without legal status	3,913	3,828	3,602	3,396
Agricultural holdings with legal status	17	31	28	26

Source: Farm Structure Survey, 2013;  
<http://www.insse.ro>. [5, 8]

In Romania, since the moment of integration into the European Union, the number of agricultural holdings registered a decrease, from 3,931 thousand units in 2007 to 3,422 units in 2016 meaning 12.94% of the total agricultural holdings.

At the regional level in Oltenia, making a comparison with the year 2007, the number of agricultural holdings decreased very much in 2016 with more than 41,000 units, this decrease is the result of the merger process.

Table 2. Total agricultural holdings in Oltenia region (number)

Indicators	Total agricultural holdings			
	2007	2010	2013	2016
South West Oltenia	580,606	576,603	557,850	539,545
Dolj	157,018	147,184	137,080	129,630
Gorj	95,788	97,585	97,017	94,607
Mehedinți	75,271	77,383	76,286	72,436
Olt	133,338	134,911	130,223	126,647
Vâlcea	119,191	119,540	117,244	116,225

Source: Farm Structure Survey, 2007; Agricultural Census, 2010; Farm Structure Survey, 2016. [1, 4, 6]

Agricultural holdings were classified into two large categories according to their legal status: holdings without and with legal personality.

The agricultural exploitations without legal status are represented by individual agricultural holdings, authorized natural persons, individual companies, and family companies.

The agricultural exploitations with legal personality are represented by autonomous administrations, companies/ agricultural associations, commercial companies with private majority capital, commercial companies with state majority capital, institutes or research station, co-operatives units.

Table 3. The Agricultural holdings based on legal statut in Oltenia region (number)

Indicators	Agricultural holdings without legal status			Agricultural holdings with legal status		
	2007	2010	2016	2007	2010	2016
South West Oltenia	578,843	573,968	536,788	1,763	2,635	2,757
Dolj	156,519	146,473	128,764	499	711	866
Gorj	95,541	97,247	94,325	247	338	282
Mehedinți	75,048	76,958	72,020	223	425	416
Olt	132,835	134,307	125,906	503	604	741
Vâlcea	118,900	118,983	115,773	291	557	452

Source: Farm Structure Survey, 2007; Agricultural Census, 2010; Farm Structure Survey, 2016 [1, 4, 6]

Agricultural holdings without legal status, present the biggest proportion of the total

number of holdings, reaching both 99.70% and 99.54% in 2007 and in 2010, which means the existence of many small subsistence farms.

However, after the merger process in 2013, there was a subtle decrease reaching 96.22% in 2016.

In 2016, according to the Structural Agriculture Survey, there were 2,757 holdings with legal status in 2016 meaning an increase with 994 units compares to 2007, the year of European integration. The majority of the holdings with legal status are located in Dolj county, accounts 31.41% of the total number of farms with legal personality but which represents a very small percentage of 0.16 % of the total holdings.

At the national level, not only the number of agricultural holding decrease, also the agricultural area used by them so in 2016 it was recorded an area with 6% less 2010 and 4.2% less 2013.

Table 4. The total of the agricultural area used of the farmers between 2007-2016 (ha)

Indicators	Total agricultural holdings			Agricultural holdings without legal status			Agricultural holdings with legal status		
	2007	2010	2016	2007	2010	2016	2007	2010	2016
South West Oltenia	1,629,400	1,607,752.66	1,479,930.68	1,292,262	2,772,192.7	968,198.77	337,229	502,953.02	511,731.91
Dolj	553,349	534,392.05	477,324	445,885	923,209	274,721.58	107,464	186,344.64	202,602.81
Gorj	225,498	219,050.52	188,1	186,588	374,688	156,820.46	38,91	55,075.61	312,804.43
Mehedinti	271,218	259,169.99	221,122	238,639	459,761	176,699.33	32,579	52,698.73	44,423.07
Olt	360,794	405,831.23	406,304	234,091	640,395	209,011.84	126,703	171,242.57	197,292.91
Valcea	218,631	189,308.87	187,078	187,059	374,137	150,945.56	31,572	37,591.47	36,132.69

Source: Farm Structure Survey, 2007; Agricultural Census, 2010; Farm Structure Survey, 2016 [1, 4, 6, ]

In Oltenia, as presented in table 4, the area used by agricultural holdings decreased by 1.33% in 2010 compared to 2007 and by 9.17% in 2016.

Agricultural holdings without legal status used 65% of the total agricultural surface in 2016, although the agricultural area used, decreased compared to 2007.

Even though the area used by farms with legal status is smaller than those of without legal status, there is an increase in 2016 of the surface area used compared to 2007 with 174,502 hectares, supported by the surface increases in Dolj and Olt.

In Oltenia region, the average area per hectare used by agricultural holdings in the analyzed period recorded a slight decrease from 2.81 hectare in 2007 to 2.72 hectare in 2016.

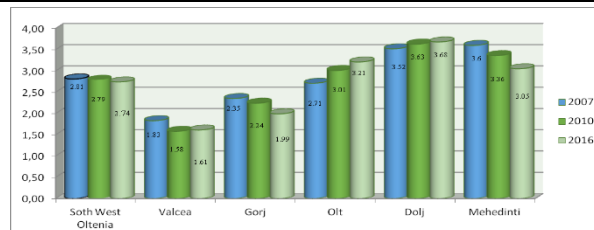


Fig. 1. The average of the utilized area (hectares) per holding between 2007 -2016

Source: own processing

Dolj counties show the highest average area used in the whole Oltenia region, registering small increases from 3.52 hectares in 2007 to 3.63 hectares and reaching in 2016 at 3.68 hectares.

At the national level, the average of agricultural area utilized per agricultural holding did not change significantly, 3.65 ha in 2016 from in 3.60 ha 2013. As can be seen in Fig. 2 many agricultural holdings use the land that they have in their own property which is evidenced by the fact that are many numbers of farmers with small farms in size less than 1 ha.

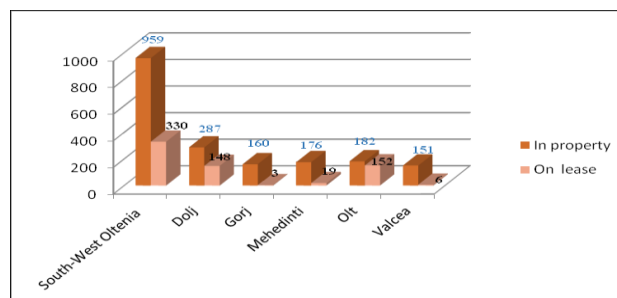


Fig. 2. Utilised agricultural area (thousand hectares) in Oltenia by type of tenure in 2016

Source: own processing.

An important classification of the structure of agricultural holdings in Romania is by the size classes. In 2016, more than half of the total number of agricultural holdings (53.00%) was owned by farms smaller than 1 ha, but the agricultural area used by them present a low percentage of total agricultural area used only 5.1%.

Very frequent are also the farms with the size between 1 and 5 hectare accounting 38.6% of the total number of farms and 23.6% of the utilized area.

A very low share of numbers of holdings are recorded by farms over 50 ha, but they



utilized more than half of agricultural are (51.1%).

Table 5. The classification of agricultural holdings without legal status in Oltenia by size classes in 2016

Indicators	Oltenia South West	Dolj	Gorj	Mehedinti	Olt	Valcea
under 1	254,001	60,349	43,010	22,556	65,122	62,964
1 - 5	241,061	56,034	45,393	38,553	53,061	48,020
5 - 10	25,620	8,740	3,506	6,731	3,872	2,771
10 - 20	3,835	1,063	511	1,057	978	226
20 - 30	767	275	94	130	234	34
30 - 50	387	148	25	74	101	39
50 - 100	254	85	24	37	94	14
over 100	191	89	12	20	56	14

Source: Farm Structure Survey, 2016. [6]

At the level of Oltenia, most agricultural holdings without legal status are the one less than 1 hectare, recording 48.27% of the total holdings and using 6.14% of the area ( more than 91,000 ha).

Significant numbers of agricultural holdings without legal personality (45.81% of the total number of holdings) are represented by farms with the size between 1 and 5 ha. This type of farms presents the largest share of the surface used by them about 38% of the total area used.

Large agricultural holdings without legal personality with surface over 100 hectares have a very low share of the number (0.03%), but they represent 35.9% of the area used in Oltenia. Most of them are located in Dolj , with 14.80% of the area used.

At the county level, in the Olt county are found most of the agricultural holdings without legal status with size smaller than 1 ha, representing 25.64% of the total holdings, followed closely by Valcea county with 62,964 farms. The two counties together share of about 50% of farms under 1 ha.

Table 6. The classification of agricultural holdings without legal status in Oltenia by size classes in 2016

Indicators	Oltenia South West	Dolj	Gorj	Mehedinti	Olt	Valcea
under 1	223	23	57	22	33	88
1 - 5	597	140	86	119	127	125
5 - 10	335	104	24	88	66	53
10 - 20	149	52	13	32	27	25
20 - 30	83	36	5	8	23	11
30 - 50	122	45	7	19	31	20
50 - 100	222	82	16	14	82	28
over 100	1014	381	72	111	350	100

Source: Farm Structure Survey, 2016 [6].

In terms of the numbers of farms with legal status, it can be noticed that the Oltenia region recors a very low number of farms with legal status compared with farms without legal personality. Most of the agroholdings with legal status are found in Dolj and Olt counties, but they represent an extremely small

percentage of the total number of agroholdings.

## CONCLUSIONS

Despite the fact that in the recent years there has been a tendency to decrease the number of agricultural holdings, Romania accounts 33% of the total number of farms, remains the country with the largest number of holdings at European level. This agglomeration of small farms emerged as a result of the land restitution process that took place in the 1990s and lasted until 2005.

At the level of Oltenia as well as in Romania, the decrease in the number of agricultural holding with small sizes less 1 ha is due to the merger process in 2013, which is a benefit for farmers, as they can better apply improved and upgraded technologies.

In order to improve the productivity of agriculture, therefore to increase the economic efficiency in Oltenia, a series of measures must be taken regarding the support and stimulation the farmers association, the introduction of new technologies, the training of specialist in this area, registration the properties in the national cadastre system and last but not least to optimize the size and area used of agricultural holdings.

## REFERENCES

- [1]Agricultural Census, 2010.
- [2]Alec I., 2001, The management of agricultural holdings, Ceres Publishing House, Bucharest, pp.15.
- [3]Eurostat Statistics Explained, <http://ec.europa.eu/eurostat>, Accessed March 5, 2018.
- [4]Farm Structure Survey, 2007 .
- [5]Farm Structure Survey, 2013.
- [6]Farm Structure Survey, 2016.
- [7]Marcuta L, Anghelescu A., Jordan T.,2006. Backing modalities of Romania agriculture with the view of adhesion to E.U., The national symposium with international participation: "Perspectives of the development of agriculture in competition for integration into the European Union".
- [8]National Institute of Statistics, <http://www.insse.ro>, Accessed March 5, 2018.
- [9]Tindeche C., Marcuta A., Marcuta L., 2014. Importance of the agricultural sector as a branch of the National economy, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.14. Issue 1.

## ASPECTS OF GENDER EQUALITY IN ROMANIA

**Adina Magdalena IORGA**

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40721 6492 15, Emails:iorga\_adinam@yahoo.com

**Corresponding author:** iorga\_adinam@yahoo.com

### *Abstract*

*The article aims to highlight the discrepancies in the education, employment and income of men and women in Romania during the period between 2008-2016. We analyzed the main indicators of gender equality provided by statistical surveys such as schooling levels, employment rates of the working age population, unemployment rate, wage income by gender, age, residence. The study of the evolution of these indicators showcases the accentuation of structural differences that maintain and perpetuate gender inequality*

**Key words:** gender equality, structural differences, Romania

### **INTRODUCTION**

Gender equality based on reducing gender gaps is a necessary condition for the economic and social development of a country. [2] The effects of gender inequality are shown in both the social and the economic status of women but they also indirectly affect the entire population, regardless of age or gender, by restricting overall access to necessary resources (sanitary, economic, education, etc.). [3]

In the European Union, according to the latest report on gender equality (2017), the gap in income, employment and hours of work has been capped. As a result, women's greater responsibilities when it comes to family life will continue to affect their career, income and eventual retirement. In this context, some member states are going to great lengths to speed up the achievement of gender equality and women's economic independence, while other states have a much slower progress. [1]

In Romania gender policies aim at promoting equal opportunities between women and men in order to eliminate any forms of discrimination in both their public and private lives. [6] Society offers social and cultural patterns through which it promotes social values and norms concerning the division of labor and of the roles and attitudes of both men and women based on gender.[4]

Effective equality between women and men occurs when they enjoy equal and fair opportunities in reaching their full individual potential. [5]

### **MATERIALS AND METHODS**

We analyzed the discrepancies in the education, employment and income between men and women in Romania based on the statistical data provided by the labor force in the household inquiry for the 2008-2015 timeframe, following the evolution of the subsequent statistical indicators: the level of education, the occupancy rate of the population of working age, unemployment rate, wages in regards to gender, age and residence. In analyzing the employment rate of women and men in the European Union, we used the data provided by the Labor Force Survey (Eurostat).

### **RESULTS AND DISCUSSIONS**

#### **Gender and education**

Gender equality in education aims at making the most of an individual's potential through equal access to all forms of education that will lead to educational improvement, regardless of gender, religion, residence, etc.

The schooling level of the population is balanced from the stance of gender, especially



on the primary, gymnasium and high school levels. However, the percentage of males that follow a professional form of education is extremely high (71.2% in 2016) and keeps rising (Fig. 1).

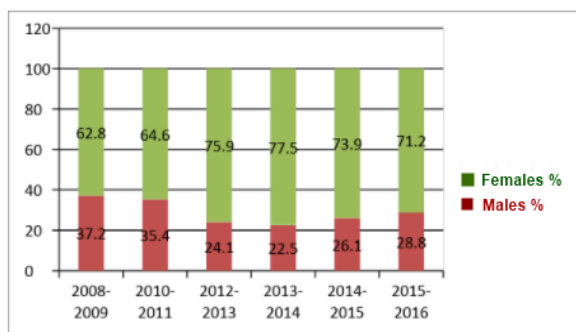


Fig. 1. Structure of professional training between 2008-2016, in regards to gender  
 Source: NSI, Tempo online series

The rate of females that follow a form of higher education is above that of the males. In 2016, they reached a 53.9 % percentage compared to the 46.3% of higher educated males (Fig. 2).

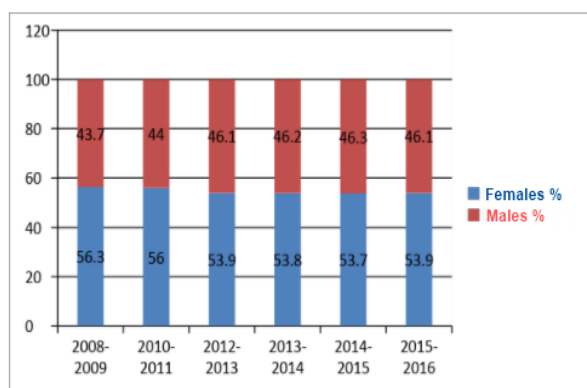


Fig. 2. Structure of higher education, between 2008-2016, in regards to gender  
 Source: NSI, Tempo online series.

The number of students, between 2008-2016, has constantly dropped, to 53.5218 students in 2016, so a decrease rate of 51.26% compared to 2008 (Table 1).

Table 1. The number of students evolution, between 2008-2016

Higher education	2008-2009	2010-2011	2012-2013	2013-2014	2014-2015	2015-2016
<b>Total</b>	1,098,188	871,842	618,157	578,705	541,653	535,218
<b>Females (%)</b>	56.3	56	53.9	53.8	53.7	53.9
<b>Males (%)</b>	43.7	44	46.1	46.2	46.3	46.1

Source: NSI, Tempo online series.

The education level of a population is an important premise for social and economic development within any country. Even with the slight increase (17.2% in 2016) of higher educated population, the vast majority still has a medium education level (57.8% ). Lesser educated women outnumber the men of equal footing (27.6% to 22.4% respectively), while the men tend to follow the medium education level the most (61.2%) (Table 2).

Table 2. Structure of adults (25-64 years old) in regards to the level of education, between 2008-2015 (%)

Level of education	2008	2010	2012	2013	2014	2015
<b>TOTAL</b>						
low	25.5	26.2	24.6	24.3	27.2	25.0
medium	61.5	60.2	60.1	60.1	56.9	57.8
high	13.0	13.6	15.3	15.6	15.9	17.2
<b>MALES</b>						
low	20.6	21.6	20.7	20.7	24.5	22.4
medium	66.0	64.7	64.3	64.3	60.2	61.2
high	13.4	13.7	15.0	15.0	15.3	16.4
<b>FEMALES</b>						
low	30.3	30.6	28.5	27.9	30.0	27.6
medium	57.2	55.9	55.9	56.0	53.6	54.5
high	12.5	13.5	15.6	16.1	16.4	17.9

Source: NSI, labor force in the household inquiry

### Occupancy rate

The occupancy rate of the population aged between 15 and 24 years old is in a constant descent, with the exception of 2015, when it reached a value of 24.5% (Fig. 3).

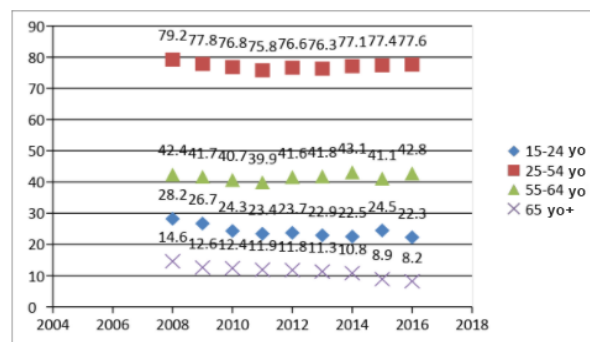


Fig. 3. Evolution of the occupancy rate, on a population between 15 years old and beyond, on age groups, between 2008-2016

Source: NSI, Labor Force in the Household Inquiry

The occupancy rate of the population fit to work (15-64 years old), between 2008-2016, kept slowly decreasing until 2014, point from which it continuously grew up to the present. In 2016, the occupancy rate of the population fit to work was 61.6%, derived in 69.7% for males and 53.3% for females (Table 3).

Table 3. Occupancy rate of the population aged between (15 - 64 years old)(%)

Gender	2008	2010	2012	2013	2014	2015	2016
TOTAL	62.6	60.2	60.2	60.1	61	61.4	61.6
MALES	70.9	67.9	67.6	67.6	68.7	69.5	69.7
FEMALES	54.3	52.5	52.8	52.6	53.3	53.2	53.3

Source: NSI, Labor Force in the Household Inquiry

The lowest disparities between the two can be found in Sweden (-4.1%) and Finland (-3.1%), as shown in Table 4.

Table 4. Women and men’s employment rate (20-64 years old), 2010, 2015 and 2016 (%)

Country	Males			Females		
	2010	2015	2016	2010	2015	2016
EU 28	75.1	75.8	77.4	62.1	64.2	65.5
Austria	79	78.4	80	68.8	70.2	71.1
Belgium	73.5	71.3	72.3	61.6	63	62.6
Bulgaria	68.6	70.4	72	60.8	63.8	65
Croatia	67.9	65.2	68.5	56.4	55.8	57.5
Cyprus	81.7	72.3	74.3	68.8	64	64.5
Czech Republic	79.6	83	85	60.9	66.4	68.7
Denmark	78.6	80.2	81.5	73	72.6	73.8
Estonia	67.8	80.5	83	65.9	72.6	71.9
Finland	74.5	73.9	76.4	71.5	71.8	72.5
France	74	73.2	74.3	64.9	66	66.4
Germany	80.4	82.3	82.9	69.7	73.6	74.7
Greece	76	64	66.8	51.8	46	47.7
Hungary	65.5	75.8	79.3	54.6	62.1	65.2
Ireland	69.1	75.1	77.3	60.2	62.6	64.3
Italy	72.7	70.6	72.2	49.5	50.6	51.7
Latvia	64	74.6	74.6	64.5	70.5	71.7
Lithuania	63.5	74.6	77.1	65	72.2	74.5
Luxembourg	79.2	76.7	74.9	62	65	64.9
Malta	78.2	81.4	83.4	41.6	53.6	56.4
Netherlands	82.8	81.9	82.9	70.8	70.8	72
Poland	71.3	74.7	77	57.3	60.9	62.5
Portugal	75.4	72.6	75.2	65.6	65.9	67.8
Romania	73.1	74.7	76.8	56.5	57.2	58.5
Slovakia	71.9	75	77.2	57.4	60.3	62.9
Slovenia	74	73.3	74.3	66.5	64.7	66.4
Spain	69.2	67.6	70.3	56.3	56.4	58.6
Sweden	81.1	82.5	84.1	75	78.3	80
United Kingdom	79.3	82.5	83.3	67.9	71.3	72.2

Source: Eurostat, Labor Force Survey.

The highest occupancy rate, in 2016, among males, is noted in the Czech Republic (85%), Sweden (84.1%), Great Britain (83.3%), The Netherlands (82.9%) and Germany (82.9%).

When it comes to females, Germany ranks highest, with 74.7%, followed by Lithuania (74.5%) and Denmark (73.8%). The biggest discrepancies between male and female occupancy rates are in Italy (-20.5%), Greece (-19.1%), Romania (-18.3%) and the Czech Republic (-16.3%).

From a location (residence) point of view, in 2016 we witnessed a higher occupancy rate in the urban areas (62.6%) compared to the rural ones (60.2%). On age groups, the occupation rate is higher in the rural environments when it comes to the 15-24 years old (28.9%) and 55-64 years old age groups (49.2%) (Table 5).

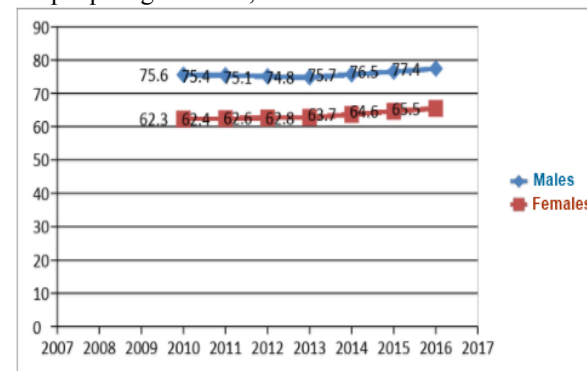
Table 5. Occupancy rate, on age groups and residential environments, in 2016 (%)

Total	Urban	Rural
	62.6	60.2
20-64 years old	66.9	65.6
15-24 years old	15.2	28.9
25-54 years old	80.7	73.3
55-64 years old	38.3	49.2

Source: NSI, Labor Force in the Household Inquiry

The occupancy rate encompassing all 28 states of the European Union when it comes to males has reached 77.4%, while that of women is at 65.5%, in a steady increase. Despite this progress, there is a stable difference between the two rates based on gender, spanning 12 percentage points (Fig. 4).

Fig. 4. EU-28 trends in the employment rate by gender, for people aged 20-64, between 2010-2016



Source: Eurostat, Labor Force Survey

### Unemployment rate

The unemployment rate in 2015 was higher by 6.8 % when it came to males (7.5%) than

that of females(5.8%). Unemployment among the youth (15-24 years old) is high (21.7%) and affects females the most, with 23.4%, compared to the 20.6% in the case of males. For the 25 years old and over age group, the number of males affected by unemployment is significantly higher than that of females (6% compared to 4.9% respectively)( Table 6).

Table 6. BIM\* unemployment rate, on gender and age groups, between 2008-2015 (%)

	Total			15-24 years old			25 years old and over		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
2008	5.6	6.5	4.4	17.6	17.7	17.3	4.3	5.2	3.2
2010	7.0	7.6	6.2	22.1	22.1	22.1	5.6	6.1	4.9
2012	6.8	7.4	6.1	22.6	22.2	23.0	5.4	6.0	4.7
2013	7.1	7.7	6.3	23.7	23.2	24.6	5.7	6.3	4.9
2014	6.8	7.3	6.1	24.0	23.6	24.7	5.5	6.0	4.8
2015	6.8	7.5	5.8	21.7	20.6	23.4	5.6	6.4	4.6

Source: NSI, Labor Force in the Household Inquiry.

### Incomes

Gender equality between women and men also means income equality for the same type of work. The differences in income, especially due to work done, have several causes:

- Females tend to work to a higher degree in sectors with lower salaries, such as: education, health, administration;
- A weak representation of women in leadership positions;
- Women's working time is lower than that of men (various causes including child-raising leave up to 2 years of age);
- Professional status leading to income segregation;
- Involvement of men predominantly in areas with higher pay levels.

The professional status of the Romanian population has the following characteristics:

- A higher percentage of men are employed (56.05% in 2015);
- The amount of people with the status of business owner or self-employed is very high among males (75% and 71.22% respectively);
- A high percentage of women have the status of unpaid family worker (67.32%)(Table7).

Table 7. Working population on genders and professional status

	2008	2010	2012	2013	2014	2015
<b>MALES (%)</b>						
Employee	55.97%	55.48%	55.81%	55.95%	56.02%	56.05%
Business owner	77.95%	76.52%	71.96%	73.15%	72.73%	75.00%
Self-employed	71.66%	72.28%	70.70%	70.79%	71.20%	71.22%
Unpaid family worker	28.87%	29.13%	29.51%	29.92%	30.75%	32.68%
<b>FEMALES (%)</b>						
Employee	44.03%	44.52%	44.19%	44.03%	43.98%	43.95%
Business owner	22.05%	23.48%	28.04%	27.78%	27.27%	25.00%
Self-employed	28.34%	27.72%	29.30%	29.21%	28.80%	28.78%
Unpaid family worker	71.13%	70.87%	70.49%	70.08%	69.25%	67.32%

Source: NSI, Labor Force in the Household Inquiry.

When it comes to the gender structure in regards to national economic fields of work, we can highlight the following aspects:

- An increase noted in male employment in the agricultural sector (from 53.64% in 2008 to 56.82% in 2015);
- The industry and construction sector is also occupied by men to a large proportion (69.66% in 2015);
- The service sector is dominated by women (rising from 50.70% in 2008 to 51.17% in 2015) (Table 8).

Table 8. Working population on genders and fields of work within the national economy

Genders	2008	2010	2012	2013	2014	2015
<b>Fields of work<sup>1)</sup></b>						
<b>MALES</b>						
Agriculture	53.64%	54.11%	53.85%	54.42%	54.79%	56.82%
Industry and construction	67.14%	69.11%	68.69%	68.82%	68.74%	69.66%
Services	49.30%	48.36%	48.49%	48.65%	48.72%	48.83%
<b>FEMALES</b>						
Agriculture	46.36%	45.89%	46.15%	45.58%	45.21%	43.18%
Industry and construction	32.86%	30.89%	31.31%	31.18%	31.26%	30.34%
Services	50.70%	51.64%	51.51%	51.35%	51.28%	51.17%

1)CAEN Rev. 2

Source: NSI, Labor Force in the Household Inquiry.

The average gross monthly wages in 2015 were 2,550 lei and the net 1,856 lei, with a constant growth, during 2008-2015, both for men and for women.

The wage gap is maintained in favor of men, when it comes to both the gross salary (193

lei) as well as the net salary (145 lei) (Table 9).

Table 9. Monthly earnings, averaged, both gross and net, on genders (lei)

2012		2013		2014		2015	
Gross	Net	Gross	Net	Gross	Net	Gross	Net
MALES							
2,163	1,581	2,246	1,640	2,412	1,761	2,646	1,928
FEMALES							
1,948	1,424	2,070	1,509	2,234	1,627	2,453	1,783

Source: NSI, Labor Force in the Household Inquiry.

## CONCLUSIONS

The school population is balanced from the gender perspective, especially at the primary, gymnasium and high school level. However, the percentage of boys following a vocational education is extremely high and rising while the proportion of girls getting a higher education is greater than that of boys taking the same path.

Although the proportion of the population with a higher education is increasing slightly, most of the population has an medium level of education. Women with a low level of education are more numerous than men, while the medium level of education is mostly followed by men.

The occupancy rate of the working-age population (15-64 years) in 2008-2016 declined slightly until 2014, gaining a steady increase from then on up to present times. The gap between male and female occupancy rates consists of 16, 4 percentage points.

From the point of view of residence, in 2016, the occupancy rate was higher in urban areas than in rural ones. By age groups, the occupancy rate is higher in rural areas for people between 15 and 24 years old and 55 to 64 years old respectively.

The highest occupancy rate in 2016 among males is seen in the Czech Republic, Sweden, the UK, the Netherlands and Germany, while among women we find it in Germany, Lithuania and Denmark. The largest disparities between female and male employment rates are recorded in Italy, Greece, Romania and in the Czech Republic. The lowest disparities between women's

employment rate compared to men's rates are registered in Sweden and Finland. The employment rate of the 28 EU countries for women is steadily increasing. Nevertheless, there is a constant difference between the employment levels of males and females of about 12 percentage points.

The unemployment rate in 2015 was higher for males than for women. Unemployment among young people (15-24 years) is high, affecting girls in particular. For the age group of 25 years and over, the percentage of males who are affected by unemployment is significantly higher than in the case of females.

The professional status of the Romanian population has the following characteristics:

- A higher percentage of men are employees;
- The amount of people with the status of business owner or self-employed is very high among males;
- A high percentage of women have the status of unpaid family worker.

Average gross earnings per month recorded an ascending trend for both men and women. The pay gap remains in favor of men, both in gross salary and in net wages.

## REFERENCES

- [1]European Union, 2017, Report on equality between women and men
- [2]Fagerberg, J., Srholec, M., Verspagen, B., 2009, Innovation and Economic Development, MERIT Working Papers 032, United Nations University - Maastricht Economic and Social Research Institute on Innovation and Technology (MERIT).
- [3]Institutul National de Statistica, Femeile si barbati. Parteneriat de munca si de viata, Editia 2016.
- [4]Metcalfe, B. D., Marianne A., 2005, Gender, work, and equal opportunities in Central and Eastern Europe, Women in Management Review, 20/6, pp. 397-411
- [5]Pascall, G., Lewis, J., 2004, Emerging Gender Regimes and Policies for Gender Equality in a Wider Europe. Journal of Social Policy, 33(3), 373-394.
- [6]Stoian, E., Dinu, T. A., Vlad, I. M., 2015. The Quality of the Educational Programs in Romania. A Case Study of Masters Degree in Agriculture. Agriculture and Agricultural Science Procedia, 6, 696-703.



## YOUNG PERSONS INSERTION ON THE LABOR MARKET. CASE STUDY IN ROMANIA AND BULGARIA

Andrei Radu IOVA, Daniela CREȚU

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40740 2079 85, Emails: andrei\_anglia@yahoo.com, danielacretu5@yahoo.com

*Corresponding author:* andrei\_anglia@yahoo.com

### Abstract

*The labor market in Romania and Bulgaria is influenced by the economic and social, political system, as well as the environment, that is why the supply and demand on the labor market has many times different trends. The desired labor force must be highly satisfactory and skilled, flexible and efficient, stable and loyal. The supply is influenced by the factors such as education system, vocational training, social area, even the family. The issue on the young graduates insertion on the labor market is present not only in Romania and Bulgaria, but the unemployment rate in Europe is much higher as unemployment rate in USA. The statistics regarding the unemployment shoed, in 2016, that the number of unemployed continues to increase in Europe, it is much higher than the unemployment rate in the United States of America, the image is tough especially for the young under 25 years old. Starting from aspects, the present study aims at making an analysis of the degree of young insertion on the labor market from the two neighbouring countries, and the proposal of some solutions to lead to the increase of the insertion degree and the unemployment decrease among the young graduates. The most marginalized group of young persons is the group formed of those who not only they do not have a job, but also no studies. For both countries, one of the education system priorities is the achievement of the interdependency between different components of the education system, as each individual starts in his educational path from the primary education, and passes to the following levels, or chooses other types of education (vocational).*

*Key words:* Bulgaria, labor market, Romania, national employment strategy, young unemployed

### INTRODUCTION

In the European Union, the analysis of the process of young graduates absorption by the labor market as well as the specific characteristics of this process is a priority in the formulation of employment policies and of those with educational profile, which pay more attention to increase the employability of those entering the labor market for the first time [2]. An assessment of the level of socio-professional insertion of the young graduates, according to their specialization and qualification level, leads to a conclusion on the transition of young persons from the pupil/student status to that of employee, the concordance between the supply and demand on the labor market, to conclusive information on the effectiveness of the educational act on all levels of the system [6]. Both in Romania and in Bulgaria, the insertion of young graduates in the labor market is a problem that has grown in recent years as a result of

restructuring in various fields of activity, economic development, the proliferation of new forms of employment, increase of unemployment among young persons, the prolongation of the study period, changes in the social protection system, migration to West Europe and geographic mobility [5]. As youth unemployment is a social problem with multiple implications in the two analyzed countries, facilitating the transition of young persons from study to the labor market must become a national priority [7]. It was observed that the degree of insertion in the labor market depends on one hand on the graduates' skills and aptitudes, his/her specialization and also his/her personality, the attitude towards work, the way of "selling" on the labor market, plus the concrete conditions, the opportunities, the general constraints of the labor market at some point when seeking for a job [1]. The specialists unanimously accept the idea that the integration of young persons on the



labor market is a factor of economic growth with a major role in creating their economic welfare and social comfort with consequences in their further development [12].

## MATERIALS AND METHODS

The present study aims at identifying some opportunities for increasing the socio-professional insertion of young persons on the labor market in Bulgaria and Romania, starting from the fact that in both countries the statistics show that the number of young unemployed is increasing. In terms of employment and youth unemployment, the factors and characteristics of the labor market generally apply, but there are also specific issues for the two countries where young persons are one of the most disadvantaged groups because most employers prefer not to hire persons without experience and without work experience [10]. In addition, a large proportion of young unemployed do not have qualifications and specialties, requested by the labor market, making it more difficult for them to enter the labor market. From this perspective, the present study is a qualitative research, which is based on an analysis of the specialized literature, but also on the interpretation of quantitative data derived from the analysis of statistical information, compared in evolution between the two countries. As research methods, we used documentation, analysis and data processing from a secondary analysis. These methods are based on the processes of synthesis, induction and deduction, analogy and comparative analysis [12]. Once the information has been defined, known and interpreted, the next step was the detailed documentation of the field of interest. In the analysis, the study of the available documentation for the field or for the analyzed system is a starting point for obtaining the first knowledge and information. The documentation also involves the analysis of legislation and the comparative analysis of different specialized sources. Documenting, analyzing and processing of data and information from the following sources: Europe 2020 Strategy; the National Employment Strategy 2013-2020, analyzed

comparatively for the two countries; the National Institute of Statistics of Romania and Bulgaria; scientific works in the field; sites with specialized studies; Specialty literature.

## RESULTS AND DISCUSSIONS

In recent years, the economies of the European countries to which the economy of Romania and Bulgaria align, have been affected by profound changes. Over the last two decades, the European countries have had to face with various challenges, such as: rapid international economic integration - a fact well known by the term "globalization"; segmentation of the labor market, namely the dual existence of protected and less protected sectors; accelerated development and implementation of new technologies; reducing the working age population due to an aging population trend [5]. In this context, employers, in their desire to remain competitive, have an obligation to adapt to new technologies and organizational methods [11]. At the same time, employees must also adapt to these changes by acquiring permanently new skills needed to use new technologies [9]. In 2016, the active population in Romania was 8,979 thousand persons, of which 8,449 thousand employed and 530 thousand unemployed [8]. By age and gender, the feminine population was 15-24 years old, respectively 65 years of age and over, the largest deficit of inactive people. The feminine population aged 35-44 and 45-54 is the most active in the labor market (Figure 1.).

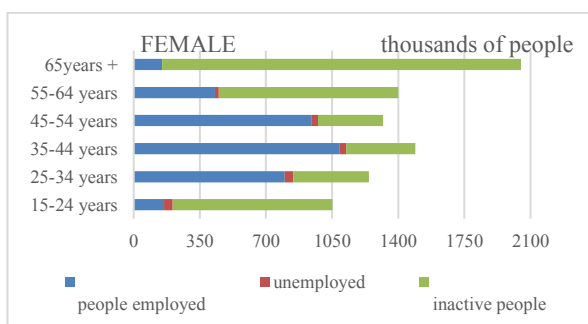


Fig. 1. Distribution of masculine population of 15 years and over, according to the participation in the economic activity and age group, in 2016, in Romania  
Source: Own calculation, data provided by I.N.S.-Romania Statistical Yearbook, 2016[8].

The masculine active population on the labor market records an increase in the 15-24 age group compared to the feminine population of the same category and a decrease in the occupied population in the age group of 65 and over. The most active masculine age categories on the labor market are those aged 35-44 and 45-54 respectively, as is the case for women (Fig. 2). The employment rate of young persons (15-24 years old) was 22.3% and that of the old persons (55-64 years) of 42.8%. (Fig. 3).

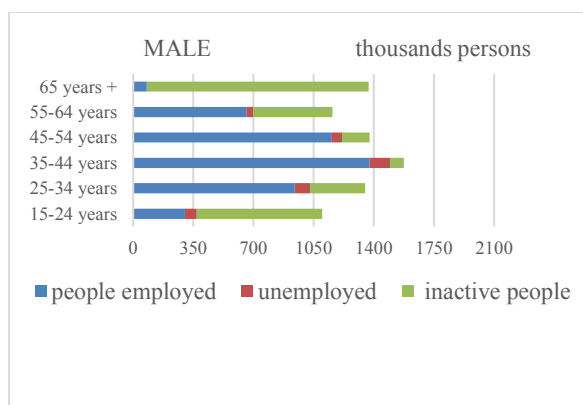


Fig. 2. Distribution of feminine population of 15 years old and according to participation in economic activity and age groups, in 2016, in Romania  
Source: Own calculation, data provided by I.N.S.-Romania Statistical Yearbook, 2016 [8].

The highest level of employment rate for older workers was recorded among graduates of higher education (86.2%). 65.2% of persons with college education were employed and 41.0% of those with low education.

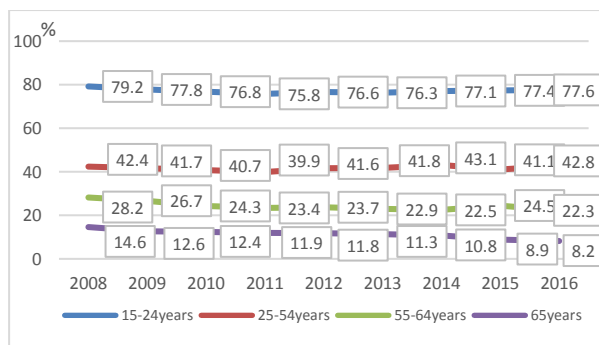


Fig. 3. Evolution of employment rate of 15 years old and over, on age groups, in Romania  
Source: Own calculation, data provided by I.N.S.-Romania Statistical Yearbook, 2016 [8].

The employment rate of the working age population (15-64 years) was 61.6%. This

indicator had higher values for men (69.7% compared to 53.3% for women) and values closer to the two residence areas (62.6% in the urban area and 60.2% in the rural area). (Table 1.). Higher values were recorded for the masculine population (75.0% compared to only 57.4% for the feminine population) and for the urban population (66.9% compared to 65.6% for the persons in the rural area). The analysis according to level of training (Table 2) reflects the fact that the employment rate of older workers (15-64 years) with *higher education* level was 86.2%. By sex, the employment rate of men with higher education exceeded by 5.5 percentage points that of women with the same level of education, and by areas, there were +2.5 percentage points in favor of persons in urban area, compared to rural area. 65.2% of persons with *college education* were employed, with differences between sexes (16.4 percentage points in favor of men) and between residence areas (4.5 points more for persons in rural area compared to urban area).

Table 1. Employment rate of working population according to level of education, gender and areas, in 2016, in Romania

	Total	Male	Female	Urban	Rural
TOTAL	61.6	69.7	53.3	62.6	60.2
High education (university master, doctorate, post doctorate and post university studies)	86.2	89.1	83.6	86.6	84.1
college (post high school vocation, complementary or apprentice)	65.2	72.9	56.5	63.3	67.8
Low (secondary, primary No education)	41.0	52.1	31.1	28.1	47.8

Source: Own calculation, data provided by I.N.S.-Romania Statistical Yearbook, 2016 [8].

With *low level education*, only 41.0% were employed, in this case the highest discrepancy (21.0 percentage points) was recorded by gender: for women, the employment rate was only 31.1 %, compared to 52.1% for the men. In Romania, in 2016, the employment rate of the population aged 20-64 was 66.3%, at a distance of 3.7 points from the national target of 70% set in the context of the Europe 2020 Strategy. The rate of unemployed young persons who do not attend any form of education or training (calculated for the 15-24



age group) was 17.4% in 2016, higher for women (20.8% compared to 14.1% for men) and in the case of residents in rural area (20.7% compared to 13.8% for young persons in urban area) (Table 2.).

Table 2. Unemployed young rate who do not attend any form of education or training, in 2016, in Romania

	Total	Male	Female	Urban	Rural
<b>TOTAL</b>	<b>20.8</b>	<b>14.7</b>	<b>27.3</b>	<b>17.0</b>	<b>25.3</b>
<b>15-24 years</b>	<b>17.4</b>	<b>14.1</b>	<b>20.8</b>	<b>13.8</b>	<b>20.7</b>
15-19 years	11.1	10.6	11.7	7.7	13.9
20-24 years	23.6	17.6	30.0	19.2	28.2
25-29 years	24.7	16.9	33.1	20.4	30.9
30-34 years	22.3	13.2	13.2	17.7	29.2

Source: Own calculation, data provided by I.N.S.- Romania Statistical Yearbook, 2016 [8].

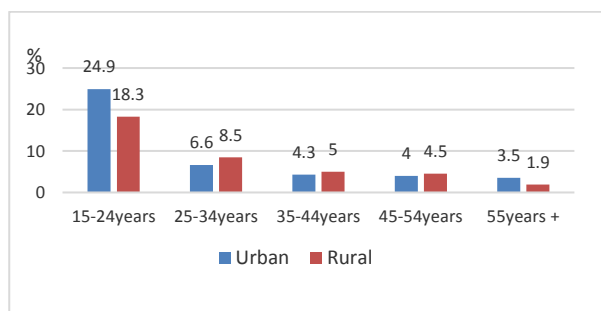


Fig. 4. Unemployment rate on age groups and areas, in 2016, in Romania

Source: Own calculation, data provided by I.N.S.- Romania Statistical Yearbook, 2016 [8].

The unemployment rate was 5.9%, decreasing from the previous year (6.8% in 2015). By gender, the difference between the two unemployment rates was 1.6 percentage points (6.6% for men compared to 5.0% for women), and for residence areas by 0.7 percentage points (6.3% in rural area compared to 5.6% in urban area). The unemployment rate was the highest (21.6%) among young persons (15-24 years) (Fig. 4). The unemployment affected the graduates of low and medium education, whose unemployment rate was 7.6% and 6.2%, respectively. The unemployment rate was only 3.1% for persons with higher education. By 2020 - the period of implementation of the updated Employment Strategy 2013-2020 in Bulgaria, some threats can improve the correlation between labor supply and supply and the functioning of the labor market [4]: the slower exit from the recession and low economic growth in the EU and the slow

recovery of the economy in Bulgaria, which, together with the insufficient competitiveness of the economy, threaten to create more and better jobs; Globalization, which hides the risks of job reduction, economic activity and loss of income for certain professions, regions and industries [10]; unfavorable demographic trends - by reducing the number and aging of the labor force, which limits job supply; Deterioration of the quality of the labor force due to the emergence of highly qualified labor force and access to low-skilled and low-education persons; External migration processes, as well as delays in the quality and adequacy of education, low participation of the population in lifelong learning can also have an impact; regional disparities and disproportions, limited mobility, etc [2]. At the same time, there are certain favorable conditions, such as the country financial stability and the use of significant financial resources in the operational programs and other EU programs. Together with the main objective of employment, Bulgaria also defined two sub-objectives in the priority areas of labor market development: getting a job among the old persons (55-64) from 53% in 2020 ; reducing youth unemployment for the 15-29 age group to 7% in 2020 [3]. In 2016, in Bulgaria, the active population was 3,264 thousand persons, respectively 53.3%, of which 3,199.6 thousand employed and 64.4 thousand unemployed [3]. The employment rate of the working age population (15-64 years) was 68.7%. This indicator was higher for men (72.7%, compared to 64.6% for women) and different values for the two residence areas (71.6% in the urban area and 52.8% in the rural area) (Table 3.). The highest level of employment rate for older workers was recorded among graduates of higher education (87.1%). It should be noted that the persons with professional qualification have a higher employment level than the persons with secondary education, respectively 78.6% compared to 72.8% the category with secondary education. As the level of education decreases, the employment rate decreases also. Thus, 39.8% of persons with education level - secondary school and only

31.2% of those with low education or without studies (Table 3) were employed. The activity rate of 15-64 year-old population was 68.7% at a distance of 7.3 percentage points from the national target of 76% set in the context of the Europe 2020 strategy.

Table 3. Employed population and employment rate of population aged between 15 and 64, in 2016 in Bulgaria

Indicator	Labor force – thousand persons	Employment rates - %
<b>TOTAL</b>	<b>3,264.0</b>	<b>53.3</b>
<b>On gender</b>		
Men	1,749.3	59.5
Women	1 514.7	47.7
<b>Residence area</b>		
Urban	2,563.6	57.4
Rural	700.4	42.3
<b>Age</b>		
15-24	161.1	23.9
25-34	732.2	76.5
35-44	904.8	85.4
45-54	822.5	83.7
55-64	579.0	58.8
65 and over	64.4	4.4
<b>Education level</b>		
Higher	1,013.5	73.7
College	1,849.4	59.6
Including with vocational qualification	1,148.1	66.1
Secondary school	339.0	25.4
Primary school and no education	62.2	20.2

Source: Own calculation, data provided by Bulgaria's strategy on the Europe 2020 horizon (Преглед на напредък)

The rate of young persons who do not attend any form of education or training (calculated for the 15-24 age group) was 16.8% in 2016, higher for women (18.3% compared to 15.3% for men) and in rural area (19.5% compared to 14.1% for youth in urban area) (Table 4).

Table 4. Rate of Young persons who do not attend any form of education and training in 2016, in Bulgaria

	Total	Male	Female	Urban	Rural
<b>TOTAL</b>	<b>19.7</b>	<b>15.3</b>	<b>24.1</b>	<b>16.2</b>	<b>23.2</b>
<b>15-24 years</b>	<b>16.8</b>	<b>15.3</b>	<b>18.3</b>	<b>14.1</b>	<b>19.5</b>
15-19 years	13.1	11.2	15.0	10.8	15.4
20-24 years	21.6	16.9	26.3	19.2	24.0
25-29 years	23.7	15.8	31.6	20.4	27.0
30-34 years	23.3	17.3	29.3	17.7	28.9

Source: Own calculation, data provided by Bulgaria's strategy on the Europe 2020 horizon (Преглед на напредък)

At the end of 2016, Bulgaria recorded 200,000 unemployed with an unemployment rate of 5.8% (close to Romania -5.9%) higher among women with 0.6 points compared to unemployment in men population (Table 5.).

Table 5. The unemployed and unemployment rate on gender, age, level of education and areas, in 2016, in Bulgaria

Indicators	Unemployed-thousand persons	%
<b>In total</b>	<b>200.2</b>	<b>5.8</b>
<b>Gender</b>		
Men	112.4	6.1
Women	87.8	5.5
<b>Residence</b>		
In towns	134.8	5.1
In villages	65.4	8.5
<b>Age</b>		
15-24 years	26.3	13.9
25-34 years	51.2	6.8
35-44 years	46.6	5.0
45-54 years	40.5	4.8
55 and over	35.5	5.0
<b>Education level</b>		
Higher	35.2	3.4
College	99.6	5.1
Vocational school	60.7	5.2
Secondary school	48.8	13.3
Primary school and no education	16.5	24.1

Source: Own calculation, data provided by Bulgaria's strategy on the Europe 2020 horizon (Преглед на напредък)

The urban-rural distribution is 3.4 points for the rural area. By age category, the highest percentage is recorded among young persons, so that in the age group of 15-24 years the percentage of 13.9% exceeds by 8.1 the percentage of unemployment recorded in the total population. According to the level of education, the highest percentage of unemployed persons is recorded among the persons without education or just primary school graduates (24.1%), compared to the graduates of higher education, where the unemployment rate reaches 3.4% similar situation with that recorded in Romania.

## CONCLUSIONS

In the current economic context, both in Romania and Bulgaria, efforts are made to facilitate the insertion of young persons on the labor market, given that the 15-24 age group

is aware of increases in unemployment both generally and in particular depending on the youth specialization obtained through studies. This problem can find its solution by creating and diversifying jobs, but also by adapting the specializations of the educational system to the labor market requirements as important elements in facilitating the insertion of young persons on the labor market. In both countries it is needed to diversify the job offer, especially for young persons who are not adequately trained and for whom the offer comes from commerce, catering, construction, tailoring, etc. Institutionally, it is required and available to each organization, ways of intervening to support access for young graduates to the labor market, such as: counseling and individual career guidance on seeking and job search sources, according to skills, attitudes and competences; job qualification - as a useful and necessary measure for young persons who want to specialize in a particular profession as required by the market; facilitating, through the local public administration, the participation of young persons, especially rural ones, in the Job Fair to meet employers, other young graduates, unemployed, and employees looking for a professional change, to find out what are the market trends, the availability of jobs and the employment requirements, what is sought, what profile of employee; institutional information, even in the education institution graduated regarding the dynamics of the labor market, the employment situation, the market trends required for graduates to pass more easily for changing their social status; enhancing the partnership of the educational institutions with media, which has a fundamental role to inform young persons about legislation on labor and social protection, the dissemination of new professional models and good practices that will lead to change the attitude of young persons regarding the professional requirements of the employee status, to the skills and aptitudes required by the employer; organizing the job fair on specializations, which will bring about the harmonization of the interests of the two categories specific to the labor market, namely, willing employers -

suitable candidates with reduced financial and time costs - who have the opportunity to compare and choose the desired job; the possibility of a flexible work program for the young mother who, during the study period, have access on the labor market

## REFERENCES

- [1]Alexe, I., 2016, Immigration on the labor market in Romania: youth and women, Association Novapolis-Centre of Analysis and Initiatives for Development, 11-12<sup>th</sup> April, pp 65-92.
- [2]Assessment of the status and analysis of the profile of adolescents and young people who do not work, do not study or do not study (Оценка на състоянието и анализ на профила на подрастващите и младежите, които не работят, не учат и не се обучават) (2016)-UNICEF, available on [https://www.unicef.bg/assets/Conferences/NEETs/NEETs\\_BG\\_Summary.pdf](https://www.unicef.bg/assets/Conferences/NEETs/NEETs_BG_Summary.pdf) , Accessed on 12th December, 2017
- [3]Bulgaria's strategy on the Europe 2020 horizon (Преглед на напредък) (2014)-[http://www.bednostbg.info/var/docs/reports/Europe2020\\_June2014.pdf](http://www.bednostbg.info/var/docs/reports/Europe2020_June2014.pdf) на България по стратегия Европа 2020, Accessed on 10th December, 2017
- [4]Bulgaria's updated employment strategy up to 2020 (Хрико оагуолизироното строткгия пе зоктестто но България де 2020 г). (2016), available on <https://www.24chasa.bg/Article/2349799> , Accessed on 12th December, 2017
- [5]Europe 2020 An European strategy for an intelligent, ecologic and favourable increase for inclusion, (2016), [https://www.mae.ro/sites/default/files/file/Europa2021/Strategia\\_Europa\\_2020.pdf](https://www.mae.ro/sites/default/files/file/Europa2021/Strategia_Europa_2020.pdf), Accessed on 12th December, 2017
- [6] Petroff, A., 2016, From the Brain Drain to the Brain Circulation: Typology of a Romanian Brain Network, Impact of Circular Migration on Human, Political and Civil Rights. Springer International Publishing, pp 217-221.
- [7]Prisacariu, R.M., 2016, Steps in Identifying the Romanian Needs for Labour Force Available to Third-Country Nationals, paper presented at the International Conference of CDCDI, Changing migration policies: national perspectives and supra-national strategies, Bucharest, 10 – 11<sup>th</sup> November 2016, pp 165-175.
- [8]Romania Statistical Yearbook, 2016, NIS.
- [9]The National Strategy on Labor Force Employment 2014-2020, (2014), M.M. [[http://www.mmuncii.ro/j33/images/Documente/Munca/2014-DOES/2014-01-31\\_Anexa1\\_Strategia\\_de\\_Ocupare.pdf](http://www.mmuncii.ro/j33/images/Documente/Munca/2014-DOES/2014-01-31_Anexa1_Strategia_de_Ocupare.pdf)], Accessed on 07<sup>th</sup> January, 2018
- [10]Updated Employment Strategy of the Republic of Bulgaria 2013-2020 (Актуализирана стратегия по заетостта на Република България 2013 - 2020

година) (2012) available on  
<http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=858>- Accessed on 05th January, 2018

[11] Vlad, V.I. coord., 2015, The national development strategy of Romania for the next 20 years, 2016-2035. The Romanian Academy. available on <http://www.academiaromana.ro/bdar/strategiaAR/doc11/Strategia.pdf>, Accessed on 12th December, 2017

[12] Zaharia, R.M.(coord.), 2016, Studies of strategy and policies - SPOS 2016 the European Institute in Romania, Bucharest 2017 pp 35-42.



## INFLUENCE OF DAILY SUPPLEMENTATION OF CARIB PODS (*Ceratonia Siliqua* L.) AS POLYPHENOL RICH PLANTS ON RUMEN FERMENTATION AND LAMBS GROWTH PERFORMANCE

Mohamed Samir KHALEL<sup>1</sup>, Mohamed Helmy YACOUNT<sup>1</sup>,  
Ayman Abdel-Mohsen HASSAN<sup>1</sup>, Amr Mohamed SHWERAB<sup>1</sup>,  
Dorina MOCUTA<sup>2</sup>, Adrian TUREK-RAHOVEANU<sup>2</sup>

<sup>1</sup>Animal Production Research Institute, Agriculture Research Center, Department of by-products Utilization, Dokki, Giza, Egypt, Emails: drmohamedes@yahoo.com; helmy\_yacout555@hotmail.com; aymanan19@hotmail.com; amr.shwerab@yahoo.com

<sup>2</sup>University of Agricultural Sciences and Veterinary Medicine, Faculty of Management and Economic Engineering, Bucharest, 59 Marasti Boulevard, District 1, 011464, Romania, Email:dorinamocuta@yahoo.com

**Corresponding author:** aymanan19@hotmail.com

### Abstract

*This study was conducted to evaluate the influence of daily supplementation of carob Pods (*Ceratonia Siliqua* L.) at the rate of 0, 25, 50 and 100 gm on digestibility coefficients, rumen fermentation, degradation kinetics, microbial protein synthesis, some blood parameters, antioxidant activity and lambs growth performances. Three rams were consigned for the digestibility trials, while other three females with rumen fistula were used for the in situ trials. Fourty lambs (6-8 months) were used for feeding trials (90 days). Data showed that daily supplement with 50gm carob pods had higher digestion coefficients, lower rumen NH<sub>3</sub>-N, but higher TVFA's concentration, and microbial-N synthesis compared with other supplementation rats. In addition to more effective degradability of DM and CP, feed and economic efficiencies and daily weight gain. Supplementation with 100 g carob pods was the worst one. Insignificant differences were found for almost blood constituents among the experimental diets, they were in the normal ranges. So, it could be concluded to daily supplement sheep with 50gm of carob pods in order to achieve good productive performance of lambs. However, it still needs to carry long term trials on the field of meat or milk production.*

**Key words:** carob pods, digestibility, rumen fermentation, degradation kinetics growing lambs, blood constituents

### INTRODUCTION

Carob tree (*Ceratonia siliqua* L.) is native to the Mediterranean area, the main producers of carob fruits are Spain, Italy, Portugal, Morocco and Greece [23]. Traditionally, carobs were cultivated for human and animal nutrition, while nowadays carob seeds and pods have a wide application as natural food additives and stabilizer agents in the food industry, e.g. cocoa substitute, gums, sugars, beverages or pharmaceutical and cosmetic industries [55]. However, the presence of tannins in carob pods with their properties such as antidiarrheal, antibacterial, antioxidant and free-radical scavenging and antiproliferative activity in liver cells may have some beneficial effects on human and

animal health [12] [16]. Carob pods have been a wide used in animal nutrition, for sheep [33], lambs [47], rabbits [26], and poultry [44].

Tannins, can be divided according to their chemical structure into four major groups: condensed tannins, hydrolysable tannins, phlorotannins and complex tannins [50]. They had the ability to form insoluble complexes with proteins or digestive enzymes which reduce digestibility of dietary proteins [31]. On the other hand, dietary tannins appear to have some other beneficial effects in ruminants, they mainly prevent excessive ruminal degradation of dietary proteins, reduce the activities of microbial proteases [8]. The present paper aimed to evaluate the effect of four supplementation rates (0, 25, 50

and 100 gm.) of carob pods on digestibility, rumen fermentation, degradation kinetics, some blood constituents and lambs performance.

## MATERIALS AND METHODS

A total of 40 male growing lambs (8 months) with an average weight of 24.56±0.13 kg were randomly allotted into 4 groups (10 animals each) to study their growth performance. Four experimental concentrate feed mixtures (CFM) were formulated with 14 % CP. Lambs were fed the CFM's and rice straw (RS) and daily supplemented with 0 or 25, 50 or 100 mg carob pods for 90 days according to [42]. A digestibility trial was conducted by 12 adult rams (3 rams for each group), they were individually allotted in metabolic cages for 3 weeks as adaptation period followed by 7 days for collecting urine and feces. Animals were fed as above at 8.00 am and 4.00 pm., while water was available all over the day. Table 1 illustrated composition of CFM and its chemical composition and carob pods.

Feces and urine were collected quantitatively once a day before the morning meal at 8.00 am and weight fresh. Daily samples representative 20 % of fresh feces and urine, then the seven days combined collection of samples were stored at - 20 °C and kept for routine analysis. Feeds and fecal samples were analyzed for crude protein (CP) by Kjeldahl, crude fiber (CF), ether extract (EE) and ash, while urine was analyzed for nitrogen (N) according to AOAC [4]. Cell wall (neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), cellulose and hemicelluloses content was determined by [58] procedure. Values of the total digestible nutrients (TDN) were calculated according to the classic formula of Cheeke on a dry matter basis [15].

Live body weight (g) and daily feed consumption (g) were individually recorded. Feed conversion was calculated as feed consumption (g) / weight gain (g). Economical efficiency (Y) was calculated according to the following equation:  $Y = (A - B) / B \times 100$ , where (A) is the selling cost of

the obtained gain and (B) is the feeding cost of this gain.

Table 1. Composition of CFM & its chemical analysis and carob pods (on DM basis).

<b>Ingredients (g/kg)</b>	<b>CFM</b>	<b>Carob pods</b>
Yellow corn	330	
Barley grain	200	
Wheat bran	170	
Soybean meal (44 % CP)	140	
Olive cake	70	
Molasses	50	
Limestone	20	
Sodium chloride	15	
Mineral-vitamin premix <sup>2</sup>	5	
<b>Chemical analysis (g/kg DM):</b>		
Dry matter	891.5	942.6
Organic matter	941.6	963.7
Crude protein	138.5	61.6
Crude fiber	67.9	75.8
Ether extract	31.1	47.6
NFE <sup>1</sup>	704.1	778.7
Ash	58.4	36.3
NDF	341.5	315.5
ADF	166.3	261.3
ADL	41.4	36.8
Hemicellulose	175.2	54.2
Cellulose	124.9	224.5
Neutral detergent soluble	658.5	68.4
Total phenolic	9.5	87.9
Total tannins	0.9	29.7

One kilogram of premix contain: Vit. A 12000 000 IU, Vit. D3 2200 00 IU, Vit. E 1000mg, Vit. B1 1000 mg B2 4000 mg, Vit. B6 100 mg, Vit. B12 10 mg, Pantothenic acid 3.33 g, Biotin 3mg, Folic acid 0.83 g, Zn 11.79 g, Mn 5 g, Fe 12.5 g, Cu 0.5 g, Se 16.6 mg and Mg 66.7 g.

<sup>1</sup>NFE = 100 – (% CP+ % EE + % Ash + % NDF)

Source: Own results.

### Rumen fermentation trials

Three fistulated Barki female sheep (45.5±0.5kg BW) were used for rumen fermentation trials. Samples of rumen liquor were taken at 0, 1, 3 and 6 h post feeding from for each treatment, to be analyzed for pH using Orion 680 digital pH meter. Rumen fluid samples were preserved for ammonia nitrogen (NH<sub>3</sub>-N) determination according to Preston [46], total volatile fatty acid

(TVFA's) by using steam methods [61]. Microbial counts (bacteria and protozoa) in the ruminal fluid were determined using a counting cell (Hawksley, UK) as described by Demeyer [17]. Rumens volume was determined by the colorimetric method using Cr-EDTA according to El-Shazly [22]. Synthesized microbial protein (MP g/day) in the rumen was calculated according to Borhami [13].

Nylon bags technique was used to determine degradability kinetics of DM and CP. Two polyester bags (7x15 cm) with pore size of 45  $\mu\text{m}$  were used for each incubation time. Approximately 5 g of air-dried diet (ground to 2 mm) were placed in each bag. All bags were incubated in the rumen, then they were withdrawn after 3, 6, 12, 24, 48 and 72 h; rinsed in tap water until the water became clear, then they were squeezed gently. Microorganisms attached to the residual sample were eliminated by freezing at  $-20^{\circ}\text{C}$  [32]. Zero-time washing losses (a) were determined by washing 2 bags in running water for 15 min. The degradation kinetics of DM and CP were estimated (in each bag) by fitting the disappearance values to the equation  $p=a + b(1-e)$  as proposed by McDonald [35]. The effective degradability (ED) for tested rations were estimated from the equation of McDonald [35],  $ED = a + bc/(c + k)$ , where ED (effective degradability), a (rapidly degraded fraction), b (slowly degraded fraction), c (rate of degradation) and k is the out flow rate assumed to be 0.05/h for concentrate under the feeding condition in this study.

Blood samples were collected at the end of the experimental period from all lambs. Blood samples were obtained from the jugular vein of the lambs in the morning before access to feed and water. Serum was obtained by centrifugation of blood and stored at  $-20^{\circ}\text{C}$  until the analysis time. Glucose concentration was determined according to Trinder [54]; serum cholesterol [53]; serum total protein (TP) according to Henry [29], albumin (A) concentration according to Doumas [20]. Kidney function was evaluated by measuring blood urea using the colorimetric methods of Henry and Todd [30]. Liver function was

assessed by measuring the activities of aspartate aminotransferase (AST) and alanine amino transferase (ALT) by the method of Reitman and Frankel [48].

#### ***Antioxidant enzyme activities***

The concentration of SOD was determined as described by Ogbunugafor [43]. The catalase activity (CAT) was determined as described by Usuh *et al.*, (2005) [57]. The activity of glutathione peroxidase (GPx) and reduced glutathione were determined by the method of Beutler [10]. Lipid peroxide concentration measured as thiobarbituric acid reactive substances (TBARS) according to Trota [56].

#### **Statistical Analysis**

The obtained data were subjected to statistical analysis using general linear models (GLM) procedure of SAS [49]. Significant differences among means were separated using LSD test according to Duncan [21] and significance was declared at  $P<0.05$ .

## **RESULTS AND DISCUSSIONS**

#### ***Digestibility coefficients***

All values of digestibility coefficient were significantly increased ( $P<0.05$ ) for sheep supplemented with 50 gm carob pods compared to other groups (Table 2). Insignificant differences were found between the 25 and 50gm groups, while less ( $p<0.05$ ) values were shown by 100 gm group. These could mainly be related to the effect of tannins in carob pods on DM intake whereas less DM intake could be found. Waghorn reported that condensed tannins could reduce fiber, CP and OM digestibility due to their binding properties and inhibition of rumen microbes and also they are ruminally indigestible [60]. Consequently, digestibility of dietary components will be affected and alter the end products of fermentation [37]. In this study digestibility of CP and CF was increased with the supplementation of carob pods (50 g/h/d). However, the action of tannins on animals probably depends on their solubility, in the gastrointestinal tract [9]. But this effect was in a certain level, as [52] and [59] indicating no adverse effect of dietary inclusion of CT below 5% level on nutrient intake and utilization. This was confirmed by the finding



in this study, for group fed 50 g/h/d. Group supplemented with 50gm carob pods had the highest ( $P<0.05$ ) total digestible nutrients (TDN) and digestible crude protein (DCP) values than other groups. On the other hand

100 gm s0upplement was the less ( $P<0.05$ ) value of TDN and DCP (Table 2). Other groups had intermediate values with insignificant effect ( $P>0.05$ ). These results were agreed with the finding of Dey [18].

Table 2. Apparent digestibility coefficients, nutritive values and nitrogen utilization of the experimental diets

Items	Control	Carob pods			SEM	P value
		25	50	100		
DM intake (g/h/d):						
CFM	668.63	673.97	698.05	625.83	74.98	0.684
RS	363.79 <sup>ab</sup>	373.55 <sup>a</sup>	377.10 <sup>a</sup>	354.03 <sup>b</sup>	10.44	0.033
Total DMI, g	1032.42 <sup>a</sup>	1047.52 <sup>a</sup>	1075.15 <sup>a</sup>	979.86 <sup>b</sup>	44.14	0.042
Digestibility coefficients (%):						
DM	60.16 <sup>b</sup>	60.59 <sup>b</sup>	63.25 <sup>a</sup>	56.68 <sup>c</sup>	0.65	0.008
OM	62.96 <sup>b</sup>	63.36 <sup>b</sup>	65.84 <sup>a</sup>	59.72 <sup>c</sup>	0.49	0.001
CP	61.68 <sup>b</sup>	62.17 <sup>b</sup>	65.14 <sup>a</sup>	58.23 <sup>c</sup>	0.66	0.001
CF	57.09 <sup>b</sup>	57.88 <sup>b</sup>	60.47 <sup>a</sup>	54.04 <sup>c</sup>	0.98	0.006
EE	70.88 <sup>b</sup>	71.09 <sup>b</sup>	73.17 <sup>a</sup>	66.08 <sup>c</sup>	0.54	0.021
NFE	64.62 <sup>b</sup>	64.94 <sup>b</sup>	67.26 <sup>a</sup>	61.44 <sup>c</sup>	0.48	0.037
<b>Nutritive values (%):</b>						
TDN	60.60 <sup>b</sup>	60.96 <sup>b</sup>	63.34 <sup>a</sup>	57.41 <sup>c</sup>	0.50	0.018
DCP	6.34 <sup>b</sup>	6.37 <sup>b</sup>	6.71 <sup>a</sup>	5.93 <sup>c</sup>	0.11	0.021
<b>Nitrogen utilization (g/h/d):</b>						
N-intake (g/d)	16.99 <sup>a</sup>	17.16 <sup>a</sup>	17.72 <sup>a</sup>	15.98 <sup>b</sup>	0.87	0.031
Urine-N (g/d)	5.81 <sup>a</sup>	5.64 <sup>b</sup>	5.44 <sup>b</sup>	5.94 <sup>a</sup>	0.33	0.028
Fecal-N (g/d)	6.51 <sup>b</sup>	6.49 <sup>b</sup>	6.18 <sup>c</sup>	6.68 <sup>a</sup>	0.04	0.037
N-digested (g/d)	10.48 <sup>b</sup>	10.67 <sup>b</sup>	11.54 <sup>a</sup>	9.31 <sup>c</sup>	0.25	0.001
N-balance (g/d)	4.67 <sup>b</sup>	5.03 <sup>b</sup>	6.11 <sup>a</sup>	3.36 <sup>c</sup>	0.44	0.042
N- balance as % of N-digested	44.61 <sup>b</sup>	47.18 <sup>b</sup>	52.91 <sup>a</sup>	36.17 <sup>c</sup>	3.15	0.022

<sup>abc</sup> means in the same row with different superscripts are significantly differ ( $P<0.05$ ).

N-intake was lower ( $P<0.05$ ) for group daily received 100 gm/h, while other groups had insignificant differences. Although all groups of animals had positive N balance, those receive 100 gm/h/d was the less ( $P<0.05$ ) one. So, it was reflected the worst utilization one.

Source: Own results.

It is clear that the group received 50 gm carob pods group was the better ( $P<0.05$ ) one in their N utilization compared with all groups. The less N utilization of that group daily received 100 gm/d, could be related to the tannin effect on reducing digestibility of dietary proteins by their ability to form insoluble complexes with proteins or digestive enzymes [10]. However, with increasing level of carob pods, NI decrease and both FN and UN increase, which resulted in less N utilization. So, the more ( $P<0.05$ ) CP digestibility and N-utilization of rams daily supplemented with 50 gm./h, was within the level suggested by Bhatta et al. (2000) [11] and Dey et al. (2008) [19] as it appeared from the increase number of bacteria in the rumen as well.

### Ruminal fermentation

Ruminal pH values were not significantly affected by different levels of carob pods supplementation (Table 3). So, no any phenomenon of acidosis was noticed, as carob pods have a potentiality to prevent ruminal acidosis by reducing rapid starch hydrolysis. Concentration of ruminal metabolites ( $\text{NH}_3\text{-N}$  and VFA's) was significantly ( $P<0.05$ ) varied among the experimental rations. Supplementation with 100 mg carob pods had the lower  $\text{NH}_3\text{-N}$  and TVFA's concentrations; while 50 mg was recorded the highest value of TVFA's compared with other groups. However, tannins had limited effects on the values of pH, VFA production but resulted in a noticeable decrease in  $\text{NH}_3$ . Molar proportion (%) of propionic (P) acid was not

significantly affected by different levels of carob pods supplementation, while acetic (A) acid, A:P ratio and rumen volume (L) were higher ( $P<0.05$ ) with 50 mg supplementation. In the same mane, Beauchemin reported that increasing supplementation levels of quebracho CT resulted in decreasing total VFA concentration, but in contras acetate and A:P ratio were also reduced [6]. On the other hand, Carulla observed no change in total VFA concentration in sheep supplemented with black wattle tree CT, but acetate was decreased, while propionate increased [14]. Benchaar and Aguerre found that total concentrations of VFA and molar proportions of individual VFA were not affected by feeding quebracho CT [7] [1]. So, the effect of carob pods on total VFA concentration and VFA pattern have been variable among studies depending on the dosage rate and the consists of condensed tannin in carob pods

source [38], [24] and [41]. Microbial nitrogen synthesis (MN) was ranged from 14.95 to 17.51 (g/d) for 100 and 50 mg supplementation respectively, which reflected by the rate of out flow, as it considered as suitable for efficient ruminal cellulolytic bacteria and MN synthesis with the dose of 50 mg in this study. However, ruminal  $\text{NH}_3$ - N levels for sheep fed 50 gm carob pods in this study, were higher than the critical level (25mg) suggested by Satter & Slyter [51] for microbial protein synthesis. Supplementation of carob pods significantly ( $P<0.05$ ) decreased population of total Protozoa as compared with control. So, these results could end out that carob pods could change population of rumen microorganism. However, ruminal protozoa count is variable due to the tannins effects as it had been reported in many assays carried out in vivo [46].

Table 3. Effect of different levels of carob pods on rumen parameters of Barki sheep

Items	Control	Carob pods			SEM	P value
		25	50	100		
pH	6.35	6.41	6.49	6.47	0.21	0.639
$\text{NH}_3$ -N concentration (mg/100mlR.L)	15.16 a	14.88 ab	14.66 b	13.76 c	0.53	0.001
TVFA concentration (meq/100 mlR.L)	10.51 b	10.98 b	11.77 a	9.76 c	0.49	0.002
Acetic acid, %	54.88 b	55.17 b	56.74 a	52.54 c	0.58	0.001
propionic acid, %	23.73	23.89	23.97	23.15	1.12	0.659
Butyric acid, %	11.65 a	11.72 a	11.85 a	11.04 b	0.24	0.004
Acetic : propionic ratio	2.31 a	2.31 a	2.37 a	2.27 b	0.08	0.022
Rumen volume (L)	3.11 c	3.32 b	3.45 a	3.00 d	0.07	<0.0001
Rate of out flow (%h)	6.04 b	5.97 c	5.58 d	6.24 a	0.03	0.0001
Microbial N yield (g /d).	16.19 c	16.64 b	17.51 a	14.95 d	0.17	0.0001
Total bacteria counts, $\times 10^8$ cfu/ml	1.21 b	1.24 b	1.31 a	1.08 c	0.04	<0.0001
Total protozoa counts, $\times 10^6$ cfu /ml	4.53a	3.83 b	3.71 b	3.40 c	0.15	0.001

a, b, c and d: means in the same row with different superscripts are significantly ( $P<0.05$ ) different.

Source: Own results.

### Degradation kinetics

It was illustrated in (Table 4) that washing loss fraction “a” for DM, and CP among groups was insignificantly different ( $P> 0.05$ ) among groups. while, degradable fraction “b” and rate of degradation “c” was higher ( $P<0.05$ ) for the control group than other groups. The effective degradability “ED” of DM or CP was lower ( $P<0.05$ ) for group supplemented with 100 gm. carob pods.

While, it was higher for control group. These could be related to the less nutrients digestibility of 100 gm carob pods group, and as tannins are capable in binding with dietary proteins, resulted in less degradable nutrients in the rumen [9], [25], [45] and [40]. Although, CT could decrease ruminal degradability of CP, it increases amount of CP reaches the abomasums and small intestine [40].This could be confirmed in the present

study as RUP was less ( $P < 0.05$ ) for group with 100 mg. carob pods.

Table 4. Degradation kinetics of DM and CP in the rumen of sheep fed the experimental diets

Items	Control	Carob pods			SEM	P value
		25	50	100		
DM						
A	23.25	23.28	23.31	23.30	0.38	0.638
B	52.84 <sup>a</sup>	50.42 <sup>b</sup>	49.78 <sup>b</sup>	45.63 <sup>c</sup>	0.76	0.003
C	0.043 <sup>a</sup>	0.040 <sup>b</sup>	0.039 <sup>b</sup>	0.036 <sup>c</sup>	0.01	0.0001
EDDM	46.57 <sup>a</sup>	46.32 <sup>a</sup>	46.40 <sup>a</sup>	44.97 <sup>b</sup>	0.44	0.004
CP						
A	21.53	21.46	21.40	21.31	0.29	0.589
B	57.77 <sup>a</sup>	55.98 <sup>b</sup>	54.11 <sup>b</sup>	51.88 <sup>c</sup>	0.24	0.004
C	0.076 <sup>a</sup>	0.066 <sup>b</sup>	0.064 <sup>b</sup>	0.056 <sup>c</sup>	0.004	0.0001
EDCP	56.85 <sup>a</sup>	52.67 <sup>b</sup>	51.38 <sup>b</sup>	48.44 <sup>c</sup>	1.36	0.001
RUP	43.15 <sup>c</sup>	47.33 <sup>b</sup>	48.62 <sup>b</sup>	51.56 <sup>a</sup>	1.41	0.002

a, b and c: means in the same row with different superscripts are significantly ( $P < 0.05$ ) different.

ED: effective degradability =  $a + [bc/c + k]$ , where k is passage rate (assumed to be 0.05/hr.).

RUP = 100 - ED (Orskov and McDonald, 1979).

a = soluble fraction (%). b = potentially degradable fraction (%).

c = rate of degradability (% h<sup>-1</sup>). RUP = ruminally undegradable protein

Source: Own results.

### Growth performance

Highest ( $P < 0.05$ ) final body weight and average daily weight gain were recorded with lambs daily fed 50 gm carob pods, while the lowest values were recorded with the group fed 100 gm. Other groups had intermediate values without significant differences ( $P > 0.05$ ). These could be due to the more feed intake of 50 gm carob pods followed by other groups and the less intake of 100 gm group.

Although that dietary CT generally tend to decrease DMI when it is in high level, but there are exceptions [42]; [47], the first two reported that no adverse effect on DMI, BW or ADG, while the second found that there is an increase in DMI. So, the last could be supported our finding with 50 gm supplementation of carob pods. However, this was reflected in more economic efficiency with 50 gm carob pods group.

Table 5. Growth performance of lambs fed experimental diets

Items	Control	Carob Pods			SEM	P value
		25	50	100		
Initial body weight, kg	24.64	24.58	24.39	24.61	1.36	0.7440
Final body weight, kg	37.45 <sup>b</sup>	38.03 <sup>b</sup>	40.65 <sup>a</sup>	34.26 <sup>c</sup>	1.08	0.0001
Daily weight gain, g/d	142.33 <sup>b</sup>	149.44 <sup>b</sup>	180.67 <sup>a</sup>	107.22 <sup>c</sup>	7.44	0.0001
Daily feed intake, g/d	1027.64 <sup>a</sup>	1033.16 <sup>a</sup>	1045.66 <sup>a</sup>	989.73 <sup>b</sup>	25.21	0.0172
Feed conversion ratio	7.22 <sup>b</sup>	6.91 <sup>b</sup>	5.79 <sup>c</sup>	9.23 <sup>a</sup>	0.46	0.0040
Economic efficiency:						
Average daily feed cost (L.E)	2.090 <sup>b</sup>	2.150 <sup>b</sup>	2.235 <sup>a</sup>	2.250 <sup>a</sup>	76.29	0.022
Price of daily gain(L.E)	5.27 <sup>b</sup>	5.53 <sup>b</sup>	6.68 <sup>a</sup>	3.97 <sup>c</sup>	0.3T2	0.005
Economical return (L.E /h/d)	3.18 <sup>b</sup>	3.38 <sup>b</sup>	4.45 <sup>b</sup>	1.72 <sup>a</sup>	0.21	0.029
Economic efficiency (%)	2.52 <sup>b</sup>	2.57 <sup>b</sup>	2.99 <sup>a</sup>	1.76 <sup>c</sup>	0.26	0.021
Relative economic efficiency	100.00 <sup>b</sup>	101.98 <sup>b</sup>	118.65 <sup>a</sup>	69.84 <sup>c</sup>	0.16	0.004

a,b,c different letters within a row denote significant differences between treatments ( $P < 0.05$ ).

Source: Own results.

These results agreed with the finding of Alonso-Diaz who reported decline in body weight gain of goats with increasing concentrations of CT in their feed. He added that concentrations of CT beyond 6% tended to relate negatively on body weight gain

which supports with the observations of [2]. Lizardo and Andres-Elias reported that dietary carob (contained CT) did not affect the growth of weaned piglets [36] and [3]. However, many mammals, especially browsers, are able to produce proline-rich

salivary proteins (PRP) that are able to bind to dietary CT to inactivate them [5].

**Blood parameters**

The blood parameters are presented in Table 6. Daily supplementation of carob pods (100 gm) was resulted in less (P<0.05) blood glucose, total protein (TP) and urea-N, while other carob pods groups was shown more (P<0.05) concentration of TP and globulin, this could be due to the feed intake and digestibility coefficients for these groups.

On the other hand, control had the more concentration of glucose and cholesterol. Higher (P<0.05) concentration of albumin and urea-N was found for control and that supplemented with the less level of carob pods (25 and 50 gm/h/d).

However, all groups had insignificant different for liver and kidney functions (AST, ALT and creatinine). So, nothing unexpected phenomena happened in the present study.

Table 6. Blood serum biochemical components of lambs fed experimental diets

Items	Control	Carob pods			SEM	P value
		25	50	100		
Glucose (mmol/L)	1.16 <sup>a</sup>	<b>1.08</b> <sup>ab</sup>	0.99 <sup>b</sup>	0.83 <sup>c</sup>	0.09	0.001
Cholesterol (mmol/L)	<b>1.87</b> <sup>a</sup>	1.62 <sup>b</sup>	1.51 <sup>b</sup>	1.46 <sup>b</sup>	0.18	0.003
Total protein (g/L)	65.89 <sup>b</sup>	66.79 <sup>a</sup>	67.26 <sup>a</sup>	58.37 <sup>c</sup>	0.51	0.001
Albumin (g/L)	31.99 <sup>a</sup>	32.11 <sup>a</sup>	32.19 <sup>a</sup>	28.86 <sup>b</sup>	0.66	0.002
Globulin (g/L)	33.90 <sup>b</sup>	34.68 <sup>a</sup>	35.07 <sup>a</sup>	29.51 <sup>c</sup>	0.52	0.004
Urea N (mmol/L)	4.76 <sup>a</sup>	4.67 <sup>a</sup>	4.55 <sup>a</sup>	3.97 <sup>b</sup>	0.21	0.001
Creatinine (µmol/L)	96.77	96.89	97.11	97.44	0.88	0.647
AST (IU/L)	55.87	55.94	56.06	56.23	0.97	0.852
ALT (IU/L)	12.21	12.07	12.17	12.15	0.27	0.775

<sup>a, b and c:</sup> means in the same row with different superscripts are significantly (P<0.05) different.

Source: Own results.

**Antioxidant enzymes activity**

Data in Table (7) indicated that supplementation with different levels of carob pods significantly (P<0.05) increased SOD, CAT, GPx and GST activities and decreased TBARS in plasma compared to the control group.

This revealed that carob pods could prevent the lipid peroxidation by enhancing the SOD, CAT and GPx activities. So, the phenolic compounds in carob exert powerful

antioxidant effects and inhibit lipid peroxidation by antioxidative enzymes [35], [34] and [28].

The antioxidant activity caused by the presence of these compounds could have additional effects, sparing other antioxidants and protecting molecules from oxidative damage during digestion and preserving the intestinal epithelium from potential oxidative damage caused by dietary factors or bacterial metabolism [27].

Table 7. Changes in the plasma antioxidant activities in lambs supplemented with different levels of carob (*Ceratonia siliqua L*)

Items	Control	Carob pods			SEM	P value
		25	50	100		
TBARS	0.41 <sup>a</sup>	0.29 <sup>b</sup>	0.25 <sup>b</sup>	0.22 <sup>b</sup>	0.07	0.004
GPx	12.63 <sup>b</sup>	14.87 <sup>a</sup>	15.88 <sup>a</sup>	15.52 <sup>a</sup>	1.38	0.001
GST	1.33 <sup>b</sup>	1.52 <sup>a</sup>	1.57 <sup>a</sup>	1.66 <sup>a</sup>	0.16	0.001
CAT	50.68 <sup>b</sup>	54.76 <sup>a</sup>	56.89 <sup>a</sup>	57.48 <sup>a</sup>	2.88	0.002
SOD	2.59 <sup>b</sup>	3.67 <sup>a</sup>	3.86 <sup>a</sup>	4.11 <sup>a</sup>	0.58	0.001

<sup>a and b:</sup> means in the same row with different superscripts are significantly (P<0.05) different.

Source: Own results.

**CONCLUSIONS**

From this study it can be concluded that daily supplement with Carob Pods especially at 50

gm could improve the productive performances of the growing Lambs and achieved better feed efficiency, economic efficiency and relative economic efficiency.

Moreover, the hematological and biochemical parameters investigated in this study did not reveal any signs of illness in lambs due to daily consumption of 50 gm Carob Pods. However it needs more investigation for long term feeding in the field of beef or dairy milk production.

## REFERENCES

- [1] Aguerre, M. J., Wattiaux, M. A., Capozzolo, M. C., Lencioni, P., Cabral, C., 2010, Effect of quebracho-chestnut tannin extracts at two dietary crude protein levels on performance and rumen fermentation of dairy cows. *J. Dairy Sci.* 93(Suppl. 1):445.
- [2] Alonso-Díaz, M.A., Torres-Acosta, J.F.J., Sandoval-Castro, C.A., Hoste, H., 2010, Tannins in tropical tree fodders fed to small ruminants: A friendly foe? *Small Ruminant Research* 89: 164-173.
- [3] Andres-Elias, N., Pujols, J., Badiola, I., Torrallardona, D., 2007, Effect of nucleotides and carob pulp on gut health and performance of weanling piglets. *Livest. Sci.* 108:280-283.
- [4] AOAC, 2007, Official Method of Analysis. (18<sup>th</sup> ed), Association of Official Analytical Chemists. Washington, DC, USA.
- [5] Austin, P.J., Suchar, L.A., Robbins, C.T., Hagerman, A.E., 1989, Tannins-binding proteins in saliva of deer and their absence in saliva of sheep and cattle. *J. Chem. Ecol.* 15, 1335-1347.
- [6] Beauchemin, K. A., McGinn, S. M., Martinez, T. F., McAllister, T. A., 2007, Use of condensed tannin extract from quebracho trees to reduce methane emissions from cattle. *J. Anim. Sci.* 85:1990–1996.
- [7] Benchaar, C., McAllister, T. A., Chouinard, P. Y., 2008, Digestion, ruminal fermentation, ciliate protozoal populations, and milk production from dairy cows fed cinnamaldehyde, quebracho condensed tannin, or *Yucca schidigera* saponin extract. *J. Dairy Sci.* 91:4765–4777.
- [8] Bengaly, S., Mhlongo, S., Nsahlai, I. V., 2007, The effect of wattle tannin on intake digestibility, nitrogen retention and growth performance of goats in South Africa. *Livestock Research for Rural Development* 19(4): Article 50.
- [9] Ben-Salem, H., Nefzaoui, A., Ben-Salem, L., Tisserand, J.L., 1999, Different means of administering polyethylene glycol to sheep: effect on the nutritive value of *Acacia cyanophylla* Lindl. Foliage *Anim. Sci.* 68:809–818.
- [10] Beutler, E., Dixon, O., Kelly, B.M., 1963, Improved method for the determination of blood glutathione. *J. Lab. Clin. Med.* 61: 882-890.
- [11] Bhatta, R., Krishnamoorthy, U., Mohammed, F., 2000, Effect of feeding tamarind (*Tamarindus indica*) seed husk as a source of tannin on dry matter intake, digestibility of nutrients and production performance of crossbred dairy cows in mid-lactation. *Anim. Feed Sci. Technol.* 83:67–74.
- [12] Biagi, G., Cipollini, I., Paulicks, B.R., Roth, F.X., 2010, Effect of tannins on growth performance and intestinal ecosystem in weaned piglets. *Arch. Anim. Nutr.* 64:121.
- [13] Borhami, B.E.A., Fahmy, W.G., El-Shazly, K., 1992, Rumen environment microbial protein synthesis and nitrogen balance in sheep. In: A Proceeding of "Manipulation of rumen micro-organisms". Inter. Confe. From. 20-23 Sept. 1992.
- [14] Carulla, J. E., Kreuzer, M. Machmüller, A., Hess, H. D., 2005, Supplementation of *Acacia mearnsii* tannins decreases methanogenesis and urinary nitrogen in forage-fed sheep. *Aust. J. Agric. Res.* 56:961–970.
- [15] Cheeke, P. R., Patton, N. M., Tempelton, G. S., 1982, Rabbit production. 5<sup>th</sup> Edition, Interstate Printers and Publishers, Danville 11.
- [16] Custodio, L., Fernandes, E., Escapa, A. L., Fajardo, A., Aligue, R., Albericio, F., Neng, N. R., Nogueira, J. M. F., Romano, A., 2011, Antioxidant and cytotoxic activities of carob tree fruit pulps are strongly influenced by gender and cultivar. *J. Agric. Food Chem.* 59:7005-7012
- [17] Demeyer, I., 1981, Rumen microbes and digestion of plant cell walls. *Agriculture and Environment*, 6, 295-337.
- [18] Dey, A., Dutta, N., Sharma, K., Pattanaik, A. K., 2007, *Livestock Research Rural Development*. 19 (12): 295.
- [19] Dey, A., Dutta, N., Sharma, K., Pattanaik, A.K., 2008, Effect of dietary inclusion of *Ficus* performance of lambs. *Small Rum Res.*, 75:105–114.
- [20] Doumas, B.T., Watson, W.A., Biggs, H.G., 1971, Albumin standards and measurement of serum with bromocresol green. *Clin. Chem. Acta.*, 31(1): 87-96.
- [21] Duncan, D.B., 1955, Multiple ranges and multiple F- test. *Biometric* 11: 1-42.
- [22] El-Shazly, K. Ahmed, E.I.A., Naga, M.A., Borhami, B.E.A., 1976, A calorimetric technique using chromium-ethylen diamins tetracetate for measuring rumen volume. *J. Agric. Sci. Camb.*, 87: 369.
- [23] FAO. 2009. FAOSTAT statistical database. Rome (available at faostat.fao.org).
- [24] Frutos, P., Hervás, G., Giráldez, F.J., Fernández, M., Mantecón, A.R., 2000, Digestive utilization of quebracho-treated soya bean meal in sheep. *J. Agr. Sci.*, 134, 101-108.
- [25] Frutos, P., Hervás, G., Giráldez, F.J., Mantecón, A.R., 2004, Review. Tannins and ruminant nutrition. *Spanish Journal of Agricultural Research* 2: 191-202.
- [26] Gasmi-Boubaker, A., Bergaoui, R. Khaldi, A. Mosquera-Losada, M. R., Ketata, A., 2008, First attempt to study carob pulp utilization in rabbits feeding. *World J. Agric. Sci.* 4(1):67-70.
- [27] Goñi, I., Serrano, J., 2005, The intake of dietary fiber from grape seeds modifies the antioxidant status in rat cecum. *J. Sci. Food Agric.*, 85: 1877-1881.
- [28] Harborne, J.B., Baxter, H., 1999, *The Handbook of Natural Flavonoids*, Vol 2. John Wiley and Sons, New York.
- [29] Henry, R.J., Cannon, D.C., Winkelman, J.W., 1971, *Clinical chemistry: Principles and Techniques*.



- (11<sup>th</sup> ed.), Happer and Row Publishers, New York, USA, pp. 1629.
- [30] Henry, J.B., Todd, S.D., 1974, Clinical Diagnosis and Measurement by Laboratory Methods. (16<sup>th</sup> ed.), WB Saunders and Co. Philadelphia, PA, USA, pp. 260.
- [31] Jansman, A. J. M., Enting, H., Verstegen, M. W. A., Huisman J., 1994, Effects of condensed tannins in hulls of faba beans (*Vicia faba* L.) on the activity of trypsin and chymotrypsin in digesta collected from the small intestine of pigs. *Brit. J. Nutr.*, 71:627-641.
- [32] Kamel, H. Sekine, J. Suga, T., Morita, Z., 1995, The effect of frozen-rethawing technique on detaching firmly associated bacteria from in situ residues. *Can. J. Anim. Sci.*, 75:481.
- [33] Karabulut, A., Canbolat, O., Kamalak, A., 2006, Evaluation of carob, *Ceratonia siliqua* pods as a feed for sheep. *Livest. Res. Rural Dev.* 18(7): 277.
- [34] Klenow, S., Jahns, F., Pool-Zobel, L., Gleis, M., 2009, Does an extract of carob (*Ceratonia siliqua* L.) have chemopreventive potential related to oxidative stress and drug metabolism in human colon cells. *J. Agriculture and Food Chemistry* 57; 2999–3004.
- [35] Kumazawa, S., Taniguchi, M., Suzuki, Y., Shimura, M., Kwon, M., Nakayama, T., 2002, Antioxidant activity of polyphenols in Carob pods. *J. Agric. Food Chem.* 2002; 50: 373-377.
- [36] Lizardo, R., Canellas, J., Mas, F., Torrallardona, D., Brufau, J., 2002, Utilization of carob powder in piglet diets and its influence on growth performance and health after weaning. 34emes Journées de la Recherche Porcine, sous l'égide de l' Association Française de Zootechnie, Paris, France, 5-7 Fevrier.
- [37] Lowery, R.S., Bowman, M. C., Knox, F. E., 1969, Effect of Bidrin on the metabolism of dietary components by bovin. *J. Dairy Sci.*, 52:1463.
- [38] Makkar, H.P.S., 2003, Effects and fate of tannins in ruminant animals, adaptation to tannins, and strategies to overcome detrimental effects of feeding tannin-rich feeds. *Small Ruminant Research* 49: 241-257
- [39] McDonald, I. 1981, A revised model for the estimation of protein degradability in the rumen. *J. Agric. Sci. Camb.*, 96(1): 251-252.
- [40] Min, B.R., Barry, T.N., Attwood, G.T., McNabb, W.C., 2003, The effect of condensed tannins on the nutrition and health of ruminants fed fresh temperate forages: a review. *Anim. Feed Sci. Technol.*, 106:3–19.
- [41] Mueller-Harvey, I., 2006, Unravelling the conundrum of tannins in animal nutrition and health. *J. Sci. Food Agric.* 86(13):2010-2037.
- [42] NRC, 2007, Nutrient requirements of small ruminants: sheep, goats, cervids, and New World camelids. National Research Council of the National Academies, National Academies Press, Washington, DC, USA.
- [43] Ogbunugafor, H.A., Sofidiya, O., Okpuzor, J., Kemdilim, M., Anajekwe, B. and Ekechi, A., 2010, Effect of extracts of *Hymenocardia acida* Tul (*Hymenocarpaceae*) on rats. *Journal of American Science* 6: 143-146.
- [44] Ortiz, L. T., Rodriguez, M. L., Alzueta, C., Rebole, A., Centeno, C., Trevino, J., 2004, Effect of carob seed (*Ceratonia siliqua* L.) in broiler chick diets on nutrient digestibility and intestinal viscosity. In: EAAP Publication 110, Spain, pp. 239-242.
- [45] Ørskov, E.R., McDonald, I., 1979, The estimation of protein degradability in the rumen from incubation measurements weighed according to rate of passage. *J. Agric. Sci. Camb.*, 92(2): 499-503.
- [46] Preston, T.R., 1995, Biological and chemical analytical methods. In. Preston, T.R. (Ed.) Tropical animal feeding: a manual for research workers. Rome: FAO, P.191-264.
- [47] Priolo, A., Lanza, M., Biondi, L., Pappalardo, P., Young, O. A., 1998, Effect of partially replacing dietary barley with 20% carob pulp on post-weaning growth, and carcass and meat characteristics of Comisana lamb. *Meat Sci.* 50(3):355-363.
- [48] Reitman, S., Frankel, S., 1957, A calorimetric method for the determination of serum glutamic oxaloacetic and glutamic pyruvic transaminases. *Amer. J. Clin. Path.*, 28(1): 56-63.
- [49] SAS. 2009. SAS/STAT® 9.2 User's Guide. (2<sup>nd</sup> ed.), SAS Institute Inc, Cary, NC, USA.
- [50] Serrano, J., Puupponen-Pimiä, Dauer, A., Aura, A., Saura-Calixto, F., 2009, Tannins: Current knowledge of food, sources, intake, bioavailability and biological effects. *Mol. Nutr. Food Res.* 53:S310- S329.
- [51] Satter, L.D., Slyter, L.L., 1974, Effect of ammonia concentration on rumen microbial protein production in vitro. *Br. J. Nutr.*, 32: 199-208.
- [52] Terrill, T. H., Douglas, G. B., Foote, A. G., Purchas, R.W., Wilson, G. F., Barry, T.N. 1992, Effect of condensed tannins upon body growth, wool growth and rumen metabolism in sheep grazing sulla (*Hedysarum coronarium*) and perennial pasture. *Journal Agriculture Science Cambridge* 119: 265-273.
- [53] Tietz, N.W., 1986, Textbook of Clinical Chemistry. WB Saunders, Philadelphia, USA.
- [54] Trinder, P., 1969, Determination of blood glucose using an oxidase-peroxidase system with a non-carcinogenic chromogen. *J. Clin. Pathol.*, 22(2): 158-161.
- [55] Tous, J., Romero, A., Hermoso, J. F., Ninot, A., Plana, J., Batlle, I., 2009, Agronomic and commercial performance of four Spanish carob cultivars. *HortTechnology* 19:465-470.
- [56] Trotta, R. J., Sullivan, S. G., Stern, A., 1982, Lipid peroxidation and haemoglobin degradation in red blood cells exposed to t-butyl hydroperoxide. *Biochem. J.* 204, 405-415.
- [57] Usuh, F.I., Akpan, E.J., Etim, E.O., Farombi, E.O., 2005, Antioxidant actions of dried flower of *Hibiscus sabdariffa* L. on sodium arsenite induced oxidative stress. *Pak. J. Nutr.*, 4:135-141.
- [58] Van Soest, P.J., Robertson, J.B., Lewis, B.A., 1991, Methods for dietary fiber, neutral detergent fiber and non-starch polysaccharides in relation to animal nutrition. *J Dairy Sci.*, 74(10): 3583-3597.

[59]Waghorn, G.C., Shelton, I.D., McNabb, W.C., 1994, Effects of condensed tannins

in *Lotus pedunculatus* on its nutritive value for sheep.

1. Non-nitrogenous aspects. Journal Agriculture Science Cambridge 123, 99-107.

[60] Waghorn, G. C., 2008, Beneficial and detrimental effects of dietary condensed tannins for sustainable sheep and goat production-progress and challenges. Anim. Feed Sci. Technol. 147:116–139.

[61]Warner, A., 1964, Production of volatile fatty acids in the rumen, methods of measurement. Nutr. Abst. Rev., 34: 339-352.

## OPPORTUNITIES FOR THE DEVELOPMENT OF RURAL TOURISM IN SMALL SETTLEMENTS

Ivanka LULCHEVA

Agricultural University - Plovdiv, 4000, 12, Mendeleev Blvd., Plovdiv, Phone: +359 (32) 654 200, Fax: +359 (32) 633 157, Bulgaria, Email: ivanka.lulcheva@yahoo.com

**Corresponding author:** ivanka.lulcheva@yahoo.com

### *Abstract*

*The paper aimed to present the analysis of the situation and opportunities for the development of rural tourism in the lesser known tourist destinations that have attractive natural landmarks, historical heritage and folklore traditions. Separate settlements were selected in mountain and lowland areas, to distinguish and specify their specific problems. Rural tourism establishments – guest house and a house with a courtyard and a farm were surveyed during the period 2009 – 2016. In the study used the following methods: questionnaire survey among the owners of sites for rural tourism; polls among members of the rural tourism product; the method of comparison; the experimental method; SWOT-analysis of the strengths and weaknesses in the operation of the sites for rural tourism in the studied localities. Diversification of economic activities in small settlements (less than 300 inhabitants) for the development of improved conditions of rural tourism, growing role of services in the local economy: retail trade, transport, communications, etc.; more effectively conserve nature and cultural heritage; with employment persist people of working age in the small settlement. So the integration between rural tourism and other activities support economic revitalization of the area, preserve and stabilize the small settlements and improve the lives of the people in them.*

**Key words:** development, rural tourism, analysis, small settlements

### INTRODUCTION

Tourism is a priority branch of the Bulgarian economy, forming a significant part of the gross domestic product of the country. Over the last decade, alternative forms of tourism and, in particular, rural tourism have been successfully developed in many settlements and areas in the country. More and more people prefer the conditions for rest and relaxation that the authentic rural environment offers, the contact with nature, with the rural life and folk traditions, customs and crafts. The needs of tourists are recreational, cognitive, healing, entertaining, etc. Therefore, the basic condition for the development of rural tourism in a given settlement or region is to have not only a material base but also attractive tourist resources - natural landmarks, cultural and historical heritage, unique folklore, folk traditions, crafts, etc.

The purpose of this study is to analyze the state of rural tourism in lesser known tourist destinations, which have attractive natural

landmarks, historical heritage and folklore traditions; to pinpoint the problems and to uncover the untapped opportunities for the development of rural tourism. Rural tourist services have been developed to a certain level though, but in fact agricultural tourism in Bulgaria is not available.[2]

In small settlements, farming is the main occupation and to a lesser extent - livestock breeding. In the last decade, the size of the uncultivated lands has decreased twice (Agrostatistics, 2016). About 98.5% of farms are owned by individuals. The average size of farms of individuals is about 1.8 ha. 98% of private farms cultivate less than 10 ha. Studies of some authors [1], [6] show that for the private farmer who owns a small amount of farmland, in order to increase his income, it is more appropriate to undertake other non-agricultural activities, rather than expanding his agricultural land. An important factor in diversifying the farmer's activity may be the development of rural tourism. In order to ensure the sustainable development of the economy of small settlements and create new



employment opportunities, it is necessary to diversify the economy of the settlement by developing other non-agricultural activities. Tourism is a significant factor to hold optimal amount of population in villages to maintain dynamism in touristically attractive regions and to prevent migration. [7] Studies of some authors [4] strongly suggests that integrated territorial development - partnership, cooperation and interaction between rural tourism, agribusiness, industrial business and services have led to multifunctional use of available resources, stabilization of declining productions, and all this increases the beneficial economic effect for the settlement and the region. Rural development carried out by rural tourism organizations and cooperatives increases the levels of welfare people living in rural areas. [3] Rural tourism researchers [8] have already established the activities that are most often combined with rural tourism: trips: hiking, horseback riding, carriage ride, sledding, bicycling, motorcycling, ski passes, tour of the area; cultural activities: visits to archaeological sites, churches, monasteries, museums, participation in craftsmanship, acquaintance with local folklore and local cuisine, participation in exhibitions, fairs, gatherings, acquaintance with local businesses, studying the flora and fauna of the region; health related activities: mineral baths, spa procedures, fitness, massage, etc .; water activities: swimming and sailing, sailing, fishing, canoeing, surfing; sports activities: participation in mountain orientations, skiing, rock climbing, tennis, golf, hunting, sporting events; air activities: helicopter tour, hang gliding, hot air ballooning; agricultural activities: harvesting of grapes, fruits, vegetables, milking goat, sheep, cows, taking animals to grazing fields, mowing and gathering of hay, cleaning and feeding of animals, watching tillage with plows, etc.

According to the preferences of tourists from different age groups, it is clear that nature walks and exploratory excursions around the region are preferred by almost all age groups of tourists. All the tourists want to get acquainted and taste the specific local cuisine and traditional foods, they state their desire

for recreation among the pastoral countryside. Therefore, these elements of the rural tourism product are an integral part of its structure in all studied rural tourism sites.

It is notable that very often the reason for choosing a particular tourist facility is not a single factor but a number of them. It is noticeable that very often the reason for choosing a certain tourist site is not one but several factors. [5]

As is clear from researchers' studies and views, rural tourism users are looking for a comprehensive tourism product with rich content. Such a complete tourism product can be fully realized through partnership and mutual support between sites of rural tourism, agribusiness, industrial business, services, public authorities and other activities carried out on the territory of the region. The results of the study of the socio-economic situation of residents in the studied settlements give grounds for the current experiment, namely how partnership, mutual support between rural tourism, agribusiness, industrial business, services and public authorities affects the development of rural tourism. By bringing together the organizations in the region, complementary in the technological process of creating the rural tourism product, to create a more complete experience for the user of the rural tourism product.

## MATERIALS AND METHODS

Small settlements were selected for analysis and assessment of the state of rural tourism in lesser known tourist destinations. Settlements in mountain and in lowland areas were selected in order to differentiate and specify their specific problems. In the mountain regions sites for village tourism are selected - village of Kosovo, village of Smilyan, village of Lyaskovo, located in the Eastern Rhodopes, and in the lowland areas - sites in the villages of Klokotnitsa, village of Gorski izvor, village of Bryastovo. All the areas studied have attractive natural landmarks, interesting historical heritage, unique folklore traditions. The sites for rural tourism - a guest house and a house with a yard and a farm were studied during the period from 2009 to

2016, i.e. for eight years. The main methods used in the study are the following: survey among the owners of rural tourism sites; surveys among users of the rural tourism product; the comparison method; the experimental method; SWOT - analysis to reveal the strengths and weaknesses in the activities of rural tourism sites in the studied settlements.

## RESULTS AND DISCUSSIONS

In the studied settlements, only about 9% of the economically active population are employed employment. Two-thirds of the economically active population are employed in micro and small-sized private enterprises. Half of these enterprises operate on the brink of bankruptcy. The structure of farmers' income in the surveyed areas and settlements shows that the main source of income for people living in these settlements is pensions - about 35% of the total income. Only 30% of the income is provided by salary (in the case of people who have a job). 17 to 22% of the income is provided by the farmers' family farm. In the small settlements studied, the economy is weak and unsustainable, almost entirely based on agricultural production, and it is characterized by employment of seasonal workers and lack of rhythm of activities. During the study period - the last decade, the development of agricultural production in the conditions of private ownership is accompanied by a gradual renewal of the applied equipment and technologies, greatly reduces the use of manual labour. Agricultural production cooperatives and land tenants have specialized in a particular agricultural production, almost always fully mechanized and they do not seek manpower and do not offer jobs. The incomes of people of working age in these settlements are not high and this limits the development of the Services sector. Due to the difficult transport communications, the spatial, social and professional mobility of all people living in small settlements is limited. Because of all these conditions, people in working age in these small settlements are heavily affected by unemployment. The migration process is also

determined by these conditions. Economic migration includes more and more young people. The living conditions in these settlements are not above the socially acceptable minimum for all inhabitants (compared to the average for EU). Only in terms of environmental protection requirements are fulfilled.

Table 1. SWOT – analysis of rural tourism in the lowland areas

Strengths	Weaknesses
Beautiful scenery, landscapes and climate	Not everywhere the road infrastructure is good
Proximity to cultural, historical and natural attractions	Hygiene in the settlements is not at the required level
Preserved old local traditions, crafts, customs, rituals, preserved local folklore	The age structure of the population in the villages is worsened, which affects the characteristics of the civil society
The villages are electrified and water-supplied	There is no coherence between the municipality, the business and the civil society
A quality and complex tourism product is offered	Insufficient qualification of the owners of guest houses
Prices are affordable for the mass visitor	Insufficient information provision
Preserved agricultural production - vegetable growing, grain, viticulture	There are no traditions in offering tourism products and in servicing tourists
	Insufficient promotional materials, no media and press releases
	Owners of tourist sites do not attend tourist fairs and other similar events
	Not all owners are members of branch organizations and associations
	Not all cultural and historical monuments are maintained in the necessary condition
Opportunities	Threats
Ability to combine different types of alternative tourism	Changes in legal and regulatory provisions concerning rural tourism
Funding from European or government projects and programs	Increase of taxes and fees
Increasing demand for the rural tourism product	Closure of roads in the region
Increasing interest in cultural and historical heritage in the region	Increasing competition of neighbouring municipalities
Increasing the number of tour operators that offer packages for rural tourism	Emigration of people of working age

Source: author's study

Table 2. SWOT – analysis of rural tourism in the mountain areas

Strengths	Weaknesses
Location amid beautiful scenery and fresh air	Villages, remote and inaccessible during the autumn and winter season
Municipal institutions that manage the cultural and historical heritage	Not everywhere the road infrastructure is good
Preserved old local unique traditions, crafts, customs	Domestic waste pollution - not everywhere the hygiene in settlements is at the required level
Well-furnished guest houses in typical Rhodope style	Underdeveloped and low-efficient economy in the villages
Developing mountain agriculture and livestock breeding-lawn maintenance, potato-growing, goat and sheep breeding	Limited number of promotional publications, not filled with meaningful information
	The water supply network does not cover all neighbourhoods
Opportunities	Threats
Enhancing the professional qualifications of the owners of guest houses	Changes in legal and regulatory provisions concerning rural tourism
Enriching the content of the offered rural tourism product	Closure of roads in the region
Creating a regional center for vocational training of owners and managers, guides, animators, mountain guides	Increasing competition of neighbouring municipalities
Funding from European or government projects and programs	Reduction of people of working age
Initiatives of the municipality to support rural tourism	
Creating a regional network for accommodation in guest houses	
Inclusion of new natural, cultural and historical landmarks in the tourism product	

Source: author's study

The results of the SWOT analysis presented in the two tables show that there are enough tourist resources and facilities in the studied settlements and in the mountain and the lowland areas, in order to realize a complex rural tourism product. The identified weaknesses can be eliminated with the common efforts of the owners of tourist sites, municipal authorities and social institutions.

The identified weaknesses can be eliminated with the joint efforts of the owners of tourist sites, the municipal authorities and the social institutions.

During the eight-year study period following the implementation of the strategy for diversification of the economic life and the economy of the studied settlements in them, the following structure was established:

In the lowland areas the farm structure includes: agricultural development - grains, vegetables, silage, canning plant, tailoring workshop for ladies' and children's apparel, a large number of farmers produce home-made wine, dairy farm, guest house, possibility for spa services and water treatment with mineral water in the nearby resort centre. In the mountain area the following is developed: green school, guest house; mountain farming - potato growing, meadows, mountain livestock breeding - sheep and goats, woodworking plant, workshop for making Rhodope folk costumes, dairy farm.

In practice, under the guidance of experts, the cluster approach was implemented, cluster unions were formed based on partnership and mutual support between direct and indirect participants in the process of creating a rural tourism approach: small and medium-sized tourism enterprises, public authorities, cultural institutions, balneological centre for spa services, marketing organizations, etc. In the cluster, none of the organizations involved in it is the leading one. The exchange of experience and knowledge has contributed greatly to improving the quality of service in guest houses.

Table 3. Change in number of overnight stays for one month per room

season	Village of Bryastovo		Village of Klokochnitsa		Village of Gorski izvor	
	before	after	before	after	before	after
spring	10/20	18/36	9/18	16/32	10/20	18/36
summer	14/28	30/60	18/36	28/56	19/38	29/58
autumn	18/36	28/56	17/34	24/48	21/42	26/52
winter	9/18	14/28	8/16	14/28	9/18	13/26

Source: author's study

As it is clear from the data in Table 3, the number of overnight stays spent in the

observed guest houses increased during all seasons of the year. This is due not only to the diligence of the owners and all those working in the guest houses, but also to the cooperation with travel agencies and joint marketing activities. There is a strong increase in the quantity of specific local food products sold after putting into operation of guest houses and the implementation of partnerships with commercial establishments. The quantity of the following products sold: home-made red wine and home-made rakia has been increased by more than five times, wine vinegar and apple vinegar - more than three times, the sales of pork babek (cured meat), sheep sizdirma (sausage) and bacon have increased four times, sales of sheep and goat yoghurt, sheep qatiq have grown more than five times. The demand for a Rhodope female costume and knitted scarves, socks and gloves has increased.

## CONCLUSIONS

By diversifying the economic activity in the small settlements the conditions for development of rural tourism are improved. Through the development of rural tourism, the role of services in the local economy is growing: retail, transport, communications, etc.; the nature, the cultural and historical heritage are more effectively protected; with employment, people in working age are kept in the small settlement. Thus, the integration between rural tourism and other activities supports the economic revival of the settlement and preserves and stabilizes the small settlements and improves the lives of their population.

## REFERENCES

- [1]Blajeva, V., 2011, Rural Development, Svishtov, Academic Publishing House „Tsenov”, pp. 36-81.  
[2]Kilimperov Ivan, 2017, Current state, development opportunities and promotion of rural and agricultural tourism in Bulgaria, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 17(4):173-178  
[3]Kiper, T., Özdemir, G., 2012, Tourism Planning in Rural Areas and Organization Possibilities,

Environmental Sciences "Landscape Planning", pp. 123-150

[4]Lulcheva Ivanka, 2017, Rural tourism and family hotels, Plovdiv, ed. Academic Publishing at do Agrarian University, pp. 54-130.

[5]Lulcheva Ivanka, Aleksandrov Krasimir, 2017, Research on the supply and consumer demand for rural tourism in Eastern Rhodopes, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 17, Issue 4, pp. 179-186.

[6]Madjarova, St., 2000, Rural Development, Sofia, University Publishing House „Stopanstvo“, pp. 37-123.

[7]Özdemir, G., Unakitan, G., Yilmaz, E., Ülker, F.E., Keskin, G., 2017, Women's Perspective on Organization and the Alternative Means of Income in Agriculture in Thrace Region Turkey, British Journal of Economics, Management & Trade, Vol. 16, Issue 3, pp. 1-9.

[8]Stamov, S., Alexieva Jordanka, 2008, Specialized Tourism Types, Part One, Stara Zagora, ed. "Kota“, pp. 73-186.



## REFORMS AND AGRICULTURAL POLICIES IN ROMANIA (1918-2018)

Aurel LUP, Liliana MIRON, Indira Denis ALIM

Academy of Romanian Scientists, 54 Splaiul Independenței, District 5, Bucharest, Romania, Email: luparel@yahoo.com

The „Ovidius” University of Constanta, Romania, 124 Mamaia Boulevard, Constanta City, Romania, Phone: 0040-41614576; Emails: miron\_stroe\_liliana@yahoo.com, alimindira@yahoo.com

**Corresponding author:** luparel@yahoo.com

### *Abstract*

*This paper chronologically presents the main reforms and agrarian policies in Romania, over the last hundred years, starting with the 1918 agrarian reform and up to today's Community policies. The 1921 agrarian reform was based on King Ferdinand's solemn promise in 1917 to give land to the peasants who were the main participants in the First World War. This reform, which lasted for 10 years, expropriated 6,127 thousand ha; 1,479 persons became the owners of 3,404 thousand ha in total. Commons and village hearts were built. In its turn, the 1945 agrarian reform had a much smaller scale, i.e. 1,444 thousand ha were expropriated and 1,058 thousand ha were distributed. In fact, the reform was only a bait, in order to attract the peasants to the side of the new communist power, for the 1946 elections. In 1949, it was decided to collectivize the agriculture, process that would end in 1962. The next reform was represented by Law 18/1991, enforced after the fall of communism. Initially, a maximum of 10 ha in arable equivalent land was returned. In parallel, the former state-owned enterprises turned into commercial companies and were privatized. After 1989, with the transition to the market economy, and after 1997, with the accession to the European Union, Romania's land policy has been subject to Community policies.*

**Key words:** agrarian reforms, chronology, collectivization, Community policies

### INTRODUCTION

In 2018, we celebrate 100 years since the unification of all the provinces inhabited by Romanians (1918), forming the "Great Romania". Thus, the authors of this paper consider to be the right moment and useful to review the main historical stages of the Romanian agriculture from the last century. The topic of this paper is pertinent and up-to-date for Romania. 100 years ago, our country was preeminently agrarian in terms of population (over 80%), and nowadays it is predominantly rural. Moreover, its agriculture still seeks structures and technological systems able to raise it to the performance worthy of its environmental potential and align it with the EU agriculture standards, 11 years after accession (i.e. 2007). Victorious in the coalition that defeated the Central Powers

in the First World War, Romania succeeded in uniting all the provinces inhabited by the Romanian people in a single national unitary state. At that time, its agriculture, and especially its rural population – the one that bore the war burden – was weakened; moreover, it had inherited ownership and operation structures incompatible with the European standards. In the period leading up to the Second World War, Romania's agriculture achieved some success in terms of land yield, but remained far from the level of Western European countries. In the Second World War, the agriculture made again the greatest economic and human sacrifices. After the war, Romania entered into the Soviet influence sphere and underwent radical changes. The private land ownership and the agricultural capital were confiscated; from owner and free entrepreneur, the peasant

became an employee, the entire agricultural system being adapted to the non-performing Soviet model. In these circumstances, under the obedient leaders of the so-called Marxist system, but especially of the Soviet system, Romania tried again to modernize and technologize; however, the results were far below expectations. In 1989, with the break-up of the communist bloc, Romania freed itself from the communist-totalitarian regime and chose the transition to a market economy, following a long transition. Lacking experience and standing in the hands of some extremely corrupt leaders, Romania's agriculture has continued its transition and integration processes into European structures. From our perspective, in this context, the description of the willful and forced experiences of the Romanian agriculture can be useful and pertinent.

## MATERIALS AND METHODS

The materials are of two types, i.e. historical and derived from the authors' own researches. The former are focused on information dating until the Second World War. For the last 40 years of socialist agriculture, the first author – an agrarian economist – has virtually monitored the entire course of the agriculture, being the author of numerous studies and researches in the managerial and economic sphere: operation structures, investments, workforce, economic efficiency. As far as the transition period to the market economy is concerned, the research belongs to all three authors, in different fields of agriculture: organization, investment, work, performance. The method used is also partly historical, but subject to the rules of economic research: collection and selection of data, data processing, synthesis and conclusions, proposals.

## RESULTS AND DISCUSSIONS

**The agrarian reform of 1921.** Compared to the agrarian reforms in other European countries, the Romanian reform was the widest, both in scale and in its effects on the territory.

The expropriated land, with an area of 6,008,100 ha across the country, reduced the area of Romanian latifundia, from 8,109,000 ha in 1918 to 2,100,000 ha in 1930 [3].

**Table 1.** Areas expropriated by the Agrarian Reform

Provinces	Latifundia area ha	Expropriated area ha	Expropriation rate %
The Old Kingdom	3,397,851	2,776,401	81.7
Basarabia	1,844,549	1,491,920	76.9
Transylvania	2,751,457	1,663,809	61.2
Bucovina	115,000	75,967	66.1
Romania	8,108,857	6,008,097	74.1

Source: [3]

The data from the table above show that the expropriated area represented about 3/4 of the Romanian latifundia existing in 1918. This massive reduction of the latifundia led to the decrease of their share in the total area from 40.3% in 1918 to 10.4% in 1930.

From the entire expropriated area of over 6 million ha of agricultural land (of which 4 million ha represented arable land), 5,067,922 ha were allotted to 1,393,383 peasants (the average family area was 2.9 ha). The remaining area was allotted to state farms, schools and faculties, localities and churches, and to the state reserve.

As it results from the censuses of the time, the right to property under the four laws of the agrarian reform was granted to 2,005,477 persons, but only 69.5% benefitted from it [3]. The 1921 agrarian reform took place in the period 1918-1928, but the 1921 legislation – unlike the previous ones (and the one from the 1945s) – was the most extensive, a total area of 3,304 thousand ha being allotted to 1,479 thousand persons (out of more than 2,300 thousand applications), compared to 1,995 thousand ha allotted to 516 thousand persons in 1864.

Besides its profoundly social nature, the allotment of land to most of the peasantry – by the 1921 agrarian reform – was unique in the field also due to other features, such as:

- Most latifundia were affected – i.e. the vast property (the state had only a few hundred thousand hectares) in lots of over 100 ha – reducing it to 15-17% of the arable land and to 27-28 % of the agricultural land of the country [2].

-Ownership was made by the mass sale of land (between 5,811 thousand ha and 6,127 thousand ha, according to some data), for the amount of 12,016 million lei, payable by peasants in 15 years.

-Under this reform, there were established commons, in whose absence the peasantry would have been dependent on great owners and leaseholders.

-At the economic and organizational level, the share of large undertakings – with their advantages, as assessed by most commentators – diminished, and the peasants’ small-scale farms became predominant.

The achievement stage of the 1921 reform was presented after more than 12 years (in 1933) (see the table below) [8].

**Table 2.** The agrarian reform of 1921. Expropriations and allotments, December 31, 1933 (thousand ha)  
Expropriations

Definitive		Under trial	
No. of latifundia	area	no. of latifundia	Area
22,523	6,126.8	312	50.6

Allotments

Peasants enrolled thousand	Final allotment		Commons	Village hearts	Special allotments	Total area
	With lots	Area				
2,308.9	1,479	3,404	1,117	65	35	4,620

State reserves

Forests	Building plots	Road Institution	Leased to locals	Designed for colonization	Sold land	Non-productive	Total
856	75	318	81	128	17	44	1,518

Source: [8]

A positive and novel element for the 1921 reform is represented by the formation of commons, in whose absence the peasantry had deepened its dependence on the great landowners and leaseholders for half a century. At the same time, the state increased its reserve by over 1.5 million ha (mostly forests). The transformation of the large landed property into small peasant properties triggered some social effects (most peasants became land owners) but also some economic ones, i.e. it reduced the large undertakings and

their advantages, to small ones, which had a rudimentary inventory and low yields [2].

**The agrarian reform of 1945.** This reform was unique in its own way, as it was performed under particular domestic and external conditions. The reform had a very populist nature (or electoral, in today’s terms), aiming mainly at attracting the peasantry’s sympathy – a class still prevalent in Romania – to the new social-political order.

The hypocritical nature of the reform lies in the fact that its transience (the reform would be annulled only four years later by the resolution of the CC Plenary Meeting of the Romanian Communist Party of March 3-5, 1949 on the collectivization of agriculture) had been known since that time. Under the pretext of abolishing any form of exploitation of the peasantry by landlords and other categories of exploiters, all landed property up to the limit of 50 hectares was expropriated, without any compensation, which actually meant the confiscation of the land.

Moreover, tractors and other agricultural machinery and equipment were seized. Unlike the land, which was distributed partially to the peasants, they became public property, i.e. state property, and formed the tractor and agricultural machinery fleet of the future stations for the mechanization of agriculture.

The 1945 agrarian reform was also the smallest. There were expropriated 1,444 thousand ha, out of which 1,058 thousand ha were distributed to 800 thousand peasants (the rest became state property). In fact, the expropriation of the properties greater than 50 ha continued after 1945. Thus, in 1948, the state increased its land property to 2,871 thousand ha of agricultural land and 710 thousand ha of arable land. In 1950 (after the collectivization campaign had begun), the state’s agricultural land heritage amounted to 3,086 thousand ha (21.5% of the total) agricultural land and 863 thousand ha of arable land (9.2% of the total national arable land), which would form the future state-owned sector of agriculture.

As far as the operation structure was concerned, it remained equally fractured and unfit for rational operation, despite the changes in the property structure, for the



peasantry's benefit.

In almost a century, the average area of the peasant farm had changed from 4.55 ha to 4.34 ha. Thus, the structure of expropriations and allotments (on January 8, 1947) was as follows:

*Expropriation*

Number of expropriated owners . . . . .143,219

Expropriated area (ha) ..... 1,443,911

*Allotment*

Eligible persons ..... 1,114,888

Number of owners ..... 796,129

Distributed area (ha) ..... 1,057,672

State reserve (ha) ..... 387,565

Landing titles

- written ..... 665,646

- granted..... 608,317

The expropriation also extended to the private ownership of capital, as all agricultural machinery and the corresponding share of the livestock were transferred to state ownership. Furthermore, no compensation was granted; thus, this was an act of confiscation of the agricultural and industrial goods from the private property. As a result, from an economic perspective, a large part of the modern agricultural undertakings – equipped with mechanized techniques, situated at the top of the Romanian agriculture, with a superior organization level in terms of yield and efficiency – were disaggregated. Thereafter, the conditions and practice of the tithes and corvées – as remnants of the relationships between peasants and landlords – were forbidden by law; except for the undertakings of 50 ha, the agrarian structure of the country became entirely peasant, with the stratification specific to the interwar period [2].

***The socialist transformation of agriculture.***

This name was given to the most radical and profound agrarian reform in the Romanian history. The land ownership system, the type and size of agricultural undertakings, the technological system, the organization, the financing and everything related to the agricultural and rural system were changed. However, it is strange that no one wondered why the so-called popular democracy regime (installed on March 6, 1945) decided to carry

out the collectivization of agriculture only after 3 years of leadership.

Was it an indigenous initiative or the whole system was imposed by the Soviet Union on all the countries of Central and Eastern Europe that entered its influence sphere after the Second World War? Some historians [6] chose the first option:

*"A leading principle of the democratic-popular regime was represented by the confiscation of the private property that brought any kind of income (land, buildings, factories, workshops, installations/equipment, transport enterprises, banks, trading forms etc.). The regime aimed at transforming the citizen into an employee, and the salary became the only form of income; the peasant's dependence on the regime was complete" [6]. Thus, the principle was indigenous, not imported (s.n.). The solution was provided by the USSR and resulted in the kolkhoz. The "formula" would also apply to Romanian People's Republic, by all coercion means, violence, mass arrests, even assassination [Giurăscu et al.].*

Therefore, the model, the recipe was only imported and not imposed by the USSR and the Red Army (which remained in Romania until 1958). Moreover, the Soviet councilors would be present in all ministries for another five years. We believe that the offensive on private agriculture, i.e. the collectivization, was imposed against the peasantry and even against the autochthonous rulers.

It is unlikely that, in 1945, all the Communist-Marxist leaders of all the countries under the Soviet influence had suddenly (and at the same time) the idea of agricultural collectivization, leaving aside that some of them were not even convinced of its advantages. In our opinion, they acted in obedience to the mighty Eastern ruler, who named them heads of their peoples. As far as Romania is concerned, things seem to have happened in the same way, especially since the rich and poor Romanian peasants strongly wanted to get their own land, which they would work for their own benefit. A proof in this regard is represented by the report of a discussion between Petru Groza (president of

the Plowmen Front) and the Communist rulers, probably in the autumn of 1944:

*"Also, last year, in autumn, when we went to Bucharest, among others with our friend Zaroni, the first question that the leaders of the Communist Party asked was: "You, the plowmen, what program do you have? What do you want us to do with the land?" Naturally, the plowmen replied, "We want to own the lands we are working on. Moreover, we want to get the land of those who have more than they need; we want to give land to those who do not have or have too little, i.e. under two or three yokes, so that they would have land too". The Communist Party approved this because its program aimed at abolishing the landlords and dividing the land among the peasants, and we have fought together the entire fall. You have read the gazettes and you know: we've been fighting hard, the proletariat from factories and cities fought together with the plowmen, so that the latter receive justice and be granted individual properties. Indeed, today the plowmen are free, they are no longer subject to the landlord, they own the land they are working on; now, every man owns his land yoke, and this is largely due to the Communist Party" [11].*

It is true that the Romanian peasants wanted the lands of those who had more than they needed. Moreover, the working conditions of the peasants lacking land or having insufficient land (being thus forced to work on the estates of great property owners or leaseholders in order to feed their families) were increasingly enslaving. The periodic uprisings – that at the beginning of the twentieth century culminated in the great 1907 uprising suppressed with cruelty by the authorities – attest to this state of affairs. This situation, called Neo-bondage by C. Dobrogeanu-Gherea (an adept of Marxism), needed radical reforms, including the overthrow of the current state form:

*"the abolition of Neo-bondage" – he wrote – "will remedy the misfortunes caused by the Neo-bondage regime, not by the capitalist one; as far as the latter is concerned, another regime will come and heal all the wounds it produced; this is the socialist regime, which*

*will come, it will surely come".* However, until then, he proposed the replacement of Neo-bondage by capitalism; thus, the agrarian problem would be connected to the agricultural one and the latter - to the industrialization of the country [1].

As far as the Romanian peasants were concerned, they wanted their own land, not organized in collective farms. The struggle and sacrifices they had made for 13 years opposing collectivization, sometimes at the expense of their lives, proved this to a great extent. They opposed collectivization not because they did not know what a collective farm was and because they were scared by *the boiler food*, as some authors suggest [7], but because of their thirst for land and for economic and social freedom. The same authors [7] admit that the army of councilors present in the country throughout the collectivization period did not play only the role of spectators to the implementation of the Soviet model. They were also coordinators and supervisors that translated the Soviet model into reality.

*"The counselors' task was to ensure that the Soviet Union was not a mere model, but that it actually exerted power in Romania.* The political analyst Stelian Tanase states:

*"Here, the real power, the only power that held the leading team, was the Soviet power. More like anywhere else and in a less camouflaged way, the Soviets were present in the army, in the police, in the administration, in the economic life, where they directly controlled an important part. In the communist environments of other popular democracies, Romania was considered the 17<sup>th</sup> Soviet republic, as early as 1947" [7].*

In Romania, the collectivization of agriculture was decided and triggered by the famous Plenary Meeting of the Central Committee of the Romanian Workers' Party (RWP), on March 3-5, 1949, under the slogan borrowed from the Leninist-Stalinist precious teaching: *"We support the poor peasantry, strengthen the alliance with the middle-class peasantry, and lead an uninterrupted struggle against kulaks".*

Collectivization began in force in the spring of 1949 and ended 13 years later, i.e. in the

spring of 1962. The first collectivized province was Dobrogea, then known as Constanta region, located in the southeastern extremity of Romania, due to the efforts of the party activists headed by Vasile Vâlcu. The collectivization of the agriculture in Constanța region ended in the autumn of 1957, almost five years before the end of the action at the country level [9].

*The Prime Secretary of the RWP, Gh. Dej, highlighted the merits of Constanța region – the first fully collectivized area. The full collectivization opens up to the hard-working peasant from Constanta region new opportunities for economic and cultural development as they have never been and could never be otherwise. Subsequent to the agrarian reform of 1945, in this region, each peasant farm has on average 5.4 ha of agricultural land – the highest average in the country. Moreover, here, the peasantry felt more strongly than anywhere the lack of production means. In Constanta region, the fruits of mechanized socialist agriculture and its immense growth prospects were strongly emphasized. Dej's conviction, shared to the 2,000 participants, was that "the advanced experience of the region regarding the socialist construction in villages should be studied by all regional and district party and state organs, in order to be used according to local conditions and features.*

The collectivization process had various rhythms, degrees and methods for the clarification and observance of the most hypocritical slogan, i.e. *free consent*, also imported from the Soviet Union. In a 1930 lecture entitled "*The Dizziness of Success*", Stalin stated:

*"The success of our kolkhoznik policy is explained by the fact that this policy is based on the principle of the voluntary adherence to the colossal kolkhoznik movement and that it takes into account the diversity of conditions, in various regions of the USSR. Kolkhozniks should not be established by force. This would be a stupid and reactionary process"* [6].

Even in our country, at high level, all the speeches delivered by party leaders would recall the need to respect free consent; however, the field activists knew how to

translate this recommendation.

If this recommendation had been observed, collectivization would not have been achieved, not even in half a century. The collectivization campaign was carried out forcefully, abandoning the principle of free consent, although since 1950 the party had noticed the abuses and commissioned statistics and classifications in terms of case seriousness, because no action had been taken anyway. It was found on this occasion that up to that date, 789 abuses had been committed, out of which only 34 were *justified* [6]. However, in 1951, no collective farm was established; moreover, the persons enrolled were able to withdraw and the action was interrupted temporarily. At that time, the associations were predominant; in these associative forms, members retained their right to property on the land. Consequently, in 1956 only 29.3% of the agricultural area was organized in associative forms. The events that took place in the autumn of 1956 in Hungary and Poland also slowed down the collectivization campaign, and the authorities became more cautious. However, taking into account the share of less than 20% of the collectivized land, the party resumed in force the collectivization campaign in 1957 [6].

In order to boost the collectivization campaign, the mandatory quotas of the agricultural yields that had to be handed over to the state (introduced in 1946) were increased and extended to all individual farms. Thus, they increased from 110 kg/ha for the farms with 1-2 ha per family up to 520 kg/ha for those with 10 ha per family. In the spring of 1952, another enlargement and extension to collective farms took place. The middle-class peasants had to deliver between 300-350 kg/ha and the kulaks - 500-825 kg/ha, taking into consideration that the average yield was 821 kg/ha for wheat (the 1931-1935 average) and 1040 kg/ha for maize. Kulaks were forced to sell to the state almost their entire yield, and sometimes they had to buy products in order to deliver their quotas. Moreover, in 1952, another decree increased the sanctions for failure to deliver the quotas, while the latter continued to increase. [6]

The increase in the peasants' burdens triggered more and more protest movements; in response, the authorities turned to repression, arrests, sentences for the failure to perform certain fieldworks, but also for the failure to deliver quotas. The party leadership was aware of the situation and requested information. The data received showed that between 1950 and 1953, over 89,000 peasants were sentenced for various offences in the agricultural sector; 46.3% were kulaks, 41.5% - middle-class peasants, and 8.2% - poor peasants. In fact, the repression accelerated, from 15,467 sentences in 1950, to 40,989 sentences in 1952. However, in 1953, only 8,750 sentences were pronounced, the explanation being Stalin's death and the indications received from Moscow [6].

The problem of the land owned by the 1,029 collective farms, i.e. 280 ha/unit – which was far too little – remained to be solved; thus, they received land mainly from the state. The period 1956-190 was characterized by the abolition of compulsory quotas and their substitution with contracts (also obligatory at prices fixed by the state in the latter's favor). However, in July 1956, only 29.3% of the lands were collectivized and the party reinvigorated the sanctions, which triggered a natural response, i.e. the intensification of protest actions. In 1957, real riots took place and the authorities turned again to repression. Vadu Roșca case, from Galati region (1957), was famous in this regard:

*The peasants opposed and, after an attempt to seize the mayor and the representatives of the district, an agreement was reached: the team was allowed to leave, and the second day the villagers would meet with the representatives of the authorities, for negotiations. While the peasants were assured that force would not be used in the collectivization process at Vadu Rosca, the village was surrounded by the Securitate, isolated from the rest of the commune, and the state of siege was declared. On December 4, 1957, around 9 am, after a short verbal altercation between the locals and the officials, fire was opened against the villagers gathered at the place called the "Casemata". The victim's record amounted to 9 dead and about 60 injured; numerous*

*arrests were made. Nicolae Ceausescu (young at that time) was sent to coordinate the "pacification" of the village. The RWP organization in the commune – which had 11 members – was abolished by Ceausescu: "You, as party members, were hiding under your bed! 11 individuals with 11 stakes would have knocked this village into shape! I abolish the party organization!" These were Ceausescu's words, according to an eyewitness. Finally, 18 sentences were issued for participating in Vadu Rosca riot, and the collectivization of the village was suspended from 1958 until 1960 [10].*

In fact, N. Ceausescu was known for the gentleness of his methods. In 1958, when 80% of the peasantry had already been incorporated in commons, the campaign was resumed in its toughest form in the regions where the peasants had shown the most resolute resistance: Galati, Craiova and Arges regions. For instance, a group of party activists, including Nicolae Ceausescu, who came personally in order to give an impulse to the resumption of collectivization in sensitive areas, was assaulted and chased away from a village; this led Ceausescu to personally direct the intervention in force, firing himself on the peasants. Furthermore, the big boss, i.e. Dej, was no longer gentle when faced with the peasants' counter-revolutionary actions: "Is it not worthwhile to break the throat and spine of such men for such counter-revolutionary actions? These people must be beaten up hard; you should not feel sorry for them, because they are not fond of our regime".

In Iasi, in September 1961, angry that only 8% of the peasants refused to sign up, Dej said: "They must be told that they won't get away from the collective farm as they won't escape death". There were also more original methods of enrollment in the collective farm: in Pechea (the first collectivized commune in Galati region), a person hid in the stove oven from the team that had come to his home. However, his foot went out: "Do you enroll in the communal ownership?" The team asked him. He answered: "No!" They put ink on his toe and thus he signed "willingly" to enroll in

*the communal ownership. He did not even have to get out of the stove.*

The riots continued in 1958, 1959 and even after 1962, when at the end of April 23-25, the collectivization of agriculture was achieved. It was celebrated with great pomp, also in the presence of a large number of delegates from all categories of those who contributed in some way to this long process that had lasted 13 years or 156 months. As already mentioned, it was declared “achieved” because, according to the data from the table below, only 3.20% of the peasant families with an area of 433.1 thousand ha (4.9%) were still included in agricultural associations at that time (i.e. when the collectivization was declared achieved) [10].

Table 3. Dynamics of the socialist sector development in agriculture

Year	Agricultural associations			Collective agricultural units		
	Units	Families (thousands)	Agricultural area (thousand ha)	Units	Families (thousands)	Agricultural area (thousand ha)
1949	-	-	-	56	4.0	14.3
1952	1,834	84.0	187.6	1,795	165.5	713.4
1955	4,471	206.3	395.4	2,152	183.2	905.8
1958	12,748	1399.8	2,550.8	3,028	468.5	1,892.5
1961	6,677	1,080.6	2,058.3	6,424	2,051.0	5,973.3
1962	1,317	241.8	433.1	6,546	3,194	8,862.0

Source: [10]

In fact, the collectivization pace was so fast that between December 1961 and March 1962 (i.e. the last 4 months of the campaign), 37.1% of all families and 33.17% of the land were collectivized [6].

Regarding this sad period in the history of the Romanian agriculture, the authors Gail Kligman and Katherine Verdery made a surprising assessment. They see this troubled and painful period of the Romanian peasantry as an enlightenment project that aimed at modernizing a backward country. Moreover, they consider the sufferings inflicted by the repressive Communist bodies only as departures caused by the Romanian peasantry itself, which forced the state to create the repressive apparatus that committed these departures (beatings, many detention years, crimes):

*First, like others, we see collectivization as a story about an Enlightenment project for modernizing a “backward” country on a model from the Soviet Union, but we emphasize the departures from the model as well as its imposition. Second, more unusually, we emphasize the coming-into-being of the political organization that is often unproblematically seen as collectivization’s author – the Communist Party – underscoring instead the ways in which collectivization created it, as much as the other way around. Third, we explore in detail the “technology transfer” involved in this process, whereby the peasantry was tied in place differently from before, by transforming their relations to land and one another and by bureaucratizing their daily life [7].*

**The period of socialist agriculture.** Let us agree with the above quoted paper that the socialist transformation of the Romanian socialist agriculture was an *Enlightenment project for modernizing a backward country* and make abstraction of the *departures* of the totalitarian communist regime (punches in the face, boots in the stomach, unjust trials and sentences followed by years of imprisonment, crimes), used in order to achieve its purpose. Moreover, the peasants who were guilty of having opposed this project suffered these atrocities, aberrantly called *departures*. Thus, the state had to create the tools necessary for the application of deviant measures.

This was a real holocaust, not a siege, which lasted 13 years, followed by nearly three decades of slavery. Nearly three decades when more than two-thirds of the country’s population was not tied to the land but enslaved on the same land that had been taken away from them. Indeed, the agriculture was modernized – the beater was replaced by the thresher and then by the cropper; the oxen and horses were replaced by the tractor. Let us make an inventory of the success achieved by the socialist agriculture: the quasi-totalitarian mechanization of all field work, and in some areas (aviculture) even its automation due to the socialist industry; the increase in the amount of fertilizers per ha, from less than 1 kg/ha to over 120 kg/ha; building irrigation

systems on more than 3 million ha; the increase in the number of tractors from 44.2 thousand before collectivization to over 151 thousand in 1989, the arable land per tractor decreasing from 222 ha to 62 ha (see Table 4), while in non-collectivized Western European countries there were 12-15 ha per tractor. This was due to the fact that, although the Romanian industry had the necessary production capacity in order to provide agriculture with a good supply, more than two thirds of the produced tractors were exported (in 1989, the entire tractor production was exported).

Table 4. The evolution of the tractor fleet and of the main agricultural machinery in Romania (units)

Equipment name	1960	1980	1989
Agricultural tractors	44,194	146,592	151,745
Tractor plows	46,130	103,137	83,286
Mechanical cultivator	20,667	40,198	35,386
Mechanical seeders	33,948	48,970	43,608
Machines for spreading chemical fertilizers	3,182	15,100	15,596
Power-propelled spray and dust machines	2,864	23,034	20,803
Self-propelled straw reaper	1,582	35,201	44,749
Self-propelled corn harvesters	-	3,793	17,195
Trailed combine for maize harvesting	846	921	4,115
Trailed combine for fodder harvesting	920	16,876	11,696
Straw balers	...	22,115	23,252
Arable surface per tractor (ha/tractor)	222	67	62

Note: In Romania, in 1938, there were 4,039 tractors of different types.

Source: Statistical Yearbook of Romania, 1990 [15].

The same happened with chemical fertilizers. Although the production capacity of the industry was over 4 million tons, in Romania's agriculture, in 1989, there were used 127 kg/ha, while in Western European countries - 300-600 kg/ha. At the same time, almost half of the Romanian fertilizer production was exported. Under these conditions, it is not surprising that the average yield per ha was half, as compared to that in the non-collectivized countries of Western Europe (Table 5).

Table 5. Yields in Romania and in some European countries in the main crops, in correlation with the fertilization level

Country	Wheat q/ha	Maize q/ha	Potatoes q/ha	Sugat beetq/ha	Chemical fertilizers NPK kg/ha
Romania	25.9	34.6	157	235	106.6
France	50.0	52.1	279	467	300.8
Germany	49.5	57.8	291	473	471.4
Netherlands	62.1	-	375	478	788.8

Source: FAO Yearbook, 1980, Vol. 34, Rome, 1981 [14].

In the Romanian high-speed irrigation systems, which were unfinished and lacked of many essential elements, but which had cost many billions of US dollars, greatly contributing to the country's historical indebtedness, the yields per ha were far below the projected level, causing losses instead of profits. The construction deficiencies were accompanied by the increasing stinginess in the allotment of the main production factors (tractors and fertilizers exported in order to import oil, coal and ore, the energy needed in order to pump the remaining water from the industry) and by the more and more precarious quality of the technology. All these triggered small yields per ha, as far as the economy was concerned. Regarding the over 2 million collective farmers, this situation affected their minimum guaranteed income and then the global agreement (i.e. the payment of work according to the achievement level of the production plan that was never reached because the scales were growing every year).

The data presented in Table 6 show that the peasants' incomes were significantly lower than the average of the national economy. In addition, the figures in the table also include an assessment of the remuneration that collective members performed in personal households. Professor Parpala assessed the share of the latter at 44%; applied to the figures in the table, this reduces further the labor income of collective farmers.

Table 6. The evolution of the remuneration per total economy, in industry, agriculture and agricultural cooperatives (1960-1989)

Specification	Years			
	1960	1970	1980	1989
<i>Remuneration at national level - lei / month workers<sup>*)</sup></i>				
Average per economy	759	1209	2169	2980
Average per industry	803	1226	2244	2971
Average per agriculture	668	1124	2066	2903
<i>Remuneration of the cooperative members in Dobrogea lei/month<sup>**)</sup></i>				
Constanta county	243	562	930	1007
Tulcea county	194	366	500	465
The peasantry's net nominal income from work in agriculture per active person, in Romania	402	571	1973	1920

Source: \*) Romanian Statistical Yearbook 1990 [15].

\*\*\*) Calculations according to the average number of conventional norms and the value of the conventional norm in Dobrogea's agricultural cooperatives.

Professor Parpala also points out the regional differences in the collective farmers' income: "For instance, in 1978, almost ¾ of the cooperatives reported for a co-operator only 6,000 lei annually (i.e. 500 lei per month); over 1/3 of co-operators - under 3,000 lei annually, 150 cooperatives - less than 1,000 lei annually (83.3 lei/month) and only 6.5% of cooperatives - over 1,000 lei annually.

On the territorial level, the disparity is equally evident in counties such as Gorj, Maramures, Sălaj, Vâlcea, where the consumption fund for a co-operator able to work and a participant to work was under 3,000 lei. In counties such as Bacău, Botoșani, Iași, Neamț, Argeș, Bistrița-Năsăud, Suceava, Mehedinți and Dâmbovița, it was between 3,000 and 5,000 lei; at the same time, in Brașov, Constanța, Covasna and Timiș counties, each co-operator had a consumption fund of over 15,000 lei; thus, the most obvious disparity (1:8,7) is also between Gorj and Brasov counties (2,270:19,705 lei) [12].

As for the performances of the socialist agriculture, the academician Davidescu characterizes them as follows:

*Although Romania has good ecological conditions comparable to those from France, the yields in most field crops and animal products were below 60%, compared to those*

*from EU countries. The causes of this state of affairs were numerous; some of them were:*

*- Managerial causes: choosing managers by file and not by professional and managerial skills;*

*- Establishing (by the central bodies) the plan and structure of crops as well as of the targeted yield level, without taking into account the ecological conditions and the technical endowment;*

*- Contracting the entire planned agricultural yield with the state at fixed, non-negotiable prices;*

*- Applying fixed prices for agricultural products, on a long-term (1965-1980), for the social protection of persons, without correlating them with upstream pricing. This explains the hundreds of billions of debts accumulated by the APCs (agricultural production co-operatives), debts that could not be paid; de-capitalizing agricultural enterprises. As a result, the lack of working capital contributed to the accumulation of debt due to high interest rates; the State monopoly on agricultural works, by the MTSs (machine and tractor stations), at fixed or non-negotiable prices; the use of small quantities of fertilizers and pesticides in agricultural technology; poor technical endowment. The arable land area per tractor was 80-100 ha, while in Western European countries it was 10-15 ha; the lack of credits on time and with convenient interests; the low degree of professional qualification of many workers in agricultural units; a variable and non-stimulating retribution system.*

*During this time, the agriculture had to support the costs of intense industrialization and social protection".*

As far as the population's households were concerned, the academician Davidescu stated: *Although they held 12.1% of the arable land and 16.3% of the workforce, the individual sector achieved only 25% of the maize harvest, 15% of the pulse crop, 44% of the potatoes, 32% of the vegetables, 49% of the fruit and 25% of the grapes. At all animal products, individual peasant farms produced more per livestock units than the APCs and STEs (state agricultural enterprises) [4].*

Thus, we returned to the backward agriculture, which had existed before collectivization, and whose performance had been superior to that of the modern socialist agriculture.

**The post-communist period.** At the end of 1989, Romania was the last country to have liberated itself from the communist regime and made it in a spectacular way, in the sight of the whole world, with bloodshed. In terms of land reforms and policies, the events of 1989 should have triggered exactly the reverse of the decisions regarding the collectivization (which lasted no less than 13 years), taken by the Central Committee of the Plenary Revolution of the RWP. The return of agricultural land to its former owners or to their heirs could have been made in a few years, under appropriate laws. This did not happen for several reasons, which will be highlighted by several events and by the regulations elaborated under the new-old political class that was still preserving some totalitarian and associative principles.

Just before the abolition of the former agricultural cooperatives by Law 18/1991 of the Land Fund, in 1990, by Laws 15/1990 and 31/1990, the former state-owned enterprises, as well as other specialized enterprises (vegetables, silkworms, fish) became commercial companies and autonomous administrations. Thus, the former owners of the lands included in these new types of agricultural units were not privatized. Concretely, the effective privatization took place only in 2000, under Law no.1/2000 following another law of 1997, namely Law no. 169/1997 (established by deputy Lupu, member of the Christian Democratic National Peasants' Party). Moreover, on this occasion, the retrocession within the limit of 50 ha of arable land and of 30 ha of wooded land was agreed upon. Meanwhile, former landowners were advised to organize themselves into various associative forms (Law no. 36/1991, for example) [5].

In the meantime, the associative forms have practically disappeared, and the private state sector comprises three categories of agricultural undertakings, classified in terms

of size: family farms ranging from 1 to 100 ha with an average area of 48 ha and a share of 31,8% of the agricultural land; private commercial farms – including those owned by the state – ranging from 100 to over 10,000 ha with an average size of 424.5 ha, representing 34.82% of the agricultural area of the country; non-subsidized subsistence farms - 2,736.7 thousand units, with an average area of 1.79 ha and a share of 33.9% in the total agricultural area. The still very large number of this last category denotes the degree of land fragmentation in Romania.

The process of land restitution under Law 18/1991 and Law 1/2000 continues even nowadays, after almost two decades, accompanied by all sorts of illegalities and scams (false heirs, land restitutions on weaker quality sites, favoritism and other irregularities of which law enforcement officials are often responsible). Television shows and other media are full of cases that trigger different reactions from anger to indifference or hilarity.

The problem of the land sold to foreign natural or legal persons also abounds. In particular, there is targeted the fertile land in the Danube Delta with irrigation possibilities, in connection to the land reclamation policy that gives absolute priority to the rehabilitation of the irrigation systems in the south and east of the country, while neglecting other phenomena with a devastating impact on soil quality, such as erosion.

A historic moment in the field of land and agrarian policies was Romania's accession to the European Union in 2007. Since then, the agrarian policies (and not only) have been designed in Brussels, not in Bucharest. The peasants disinherited for the second time and the workers left without a job by Ceausescu's successors went *to sunny realms* in order to earn their living, under even more disadvantageous agreements than those described by Gherea's Neo-bondage.

During the preparation for the accession, the Romanian peasants were lured by advantageous offers, such as the *SAPARD* programmes [13]. Naturally, no one denies the generous ideas behind the establishment



of the European Union; however, Romania was too poor to benefit from the proposed benefits. The SAPARD offers and other European funds have benefited those natural and legal persons that in some way had accumulated some resources and afforded themselves to contribute with the required percentages. The Community policy originated in the Treaty of Rome (1957). This policy has been periodically updated and adapted to the new political and economic conditions, for instance between 1962 and 1992; the 1992 Reformation (Mac Sharry); Agenda 2000; the Common Agricultural Policy (CAP) 2004-2013, etc. Throughout this period, Romania has tried to adapt and align to the requirements of the European Union's agricultural policy, more or less successfully.

## CONCLUSIONS

There are few historical periods similar (if they can be compared) to the agitated twentieth-century. In the victorious camp at the end of the First World War, Romania was complete, as all the Romanians united on December 1, 1918, forming Great Romania. Over the two following decades, Romania recorded progress in the political, economic, and cultural fields. The Romanian agriculture was modernized and its performances were similar to those recorded in Europe, despite the reminiscences of the archaic relationships between the great and the small property holders. The Second World War had devastating effects on Romania from all points of view. Even before its beginning, the country's territory was amputated; during the war, the agriculture suffered the greatest material and human losses. Moreover, since a misfortune never comes alone, although, in the end, Romania was in the victorious camp, it had the misfortune to get into the influence sphere of its allied Eastern friend, i.e. the Soviet Union. Not only had the latter robbed our country for years by the well-known SovRoms, but it also imposed its own economic system, i.e. the socialism; thus, the state became the owner of all the resources of the entire economy, in the society. There followed another four decades in which the

citizens were stripped of all goods, including freedom, becoming state employees. Due to the megalomaniac ambitions of poorly targeted and damaging investments, Romania's agriculture was deprived of the resources needed by a modern and intensive system. Thus, instead of increasing, its performances decreased, compared to the European ones. The transition to the market economy, the accession to the European political and economic structures followed. However, the positive results are still expected. It is not for the authors of this paper to assess what is happening nowadays. Historians will do it someday.

## REFERENCES

- [1]Alexandri Cecilia, Davidovici I., Gavrilescu D., 2003: *Tratat de economia agriculturii*. Editura Expert, București, pp.55.
- [2]Axenciuc, V.,1996: *Evoluția economică a României vol.II, Agricultura*. Editura Academiei Romane București, pp.99 & 103.
- [3]Bulgaru, V., 2003: *Reforma agrara din 1921*. Editura de vest. Timișoara, pp. 19.
- [4]Davidescu, D., Davidescu Velicica, 2002: *Secolul XX. Performante in agricultura*. Editura Ceres, București, pp. 15-16.
- [5]Gavrilescu, D., Giurca Daniela, 2000: *Economia agroalimentara*. Editura Expert București, pp.173-175
- [6]Giurescu, D., 2013, *Istoria romanilor, vol.X*. Editura enciclopedica, București, pp. 72.
- [7]Kligman Gail, Verdery Katherine, 2015, *Taranii sub asediu*. Editura Polirom, București, pp.54 & 65.
- [8]Lup, A., 2007, *Introducere in economia si politica rural-agrara*. Editura Ex Ponto Constanta, pp. 275.
- [9]Lup, A., 2012, *40 de ani de agricultura socialista in Dobrogea (1949-1989)* Editura Ex Ponto Constanta, pp. 52
- [10]Lup, A., 2014, *Agricultura socialista a României* Editura Ex Ponto Constanta, pp. 64.
- [11]Oțiman, P.I., 1994, *Agricultura României la cumpăna dintre mileniile II si III*. Editura Helicon, Timișoara.pp.55.
- [12]Parpala, O., 1980, *Economia si politica agrara in Republica Socialista Romania*. Editura Didactica si Pedagogica, București.pp. 417.
- [13]Vincze Maria, 2000, *Dezvoltarea regionala si rurala*. Presa universitara Clujeana. pp. 113.
- [14]Anuarul FAO (FAO Yearbook)
- [15]Anuarele Statistic al României, 1990, (Statistical Yearbook of Romania). pp.268-269.

## COMPARATIVE ANALYSIS OF THE FIRST THREE ROMANIAN AGROTURISTIC MACROREGIONS

Ancuța MARIN

Research Institute for the Economy of Agriculture and Rural Development, 61 Marasti Blvd,  
District 1, Bucharest, Romania, Email: marin.ancuta@iceadr.ro

**Corresponding author:** marin.ancuta@iceadr.ro

### Abstract

*This paper aims to achieve a comparative analysis of agro-tourism in the first three macro-regions of Romania regarding the number of agro-touristic pensions as well as the number of Romanian and foreign tourists. This analysis highlights the consistency between the physico-geographic framework, the tourism objectives and the development of agrotourism in the mentioned regions (North-West Region, North-East Region and Center Region). The data were taken from the National Institute of Statistics and processed according to the objectives of the paper. From the work, there are a number of reasons for setting up an agro-touristic pension in an area with a rare natural beauty that offers tourists warm, welcoming accommodation conditions for foreign tourists.*

**Key words:** agrotourism, tourist boarding houses, macroregions, Romania

### INTRODUCTION

With an area of 238,397 km<sup>2</sup>, Romania ranks 12th in size relative to the European continent surface, with a temperate continental climate and with a varied and relatively balanced relief, each major relief form (mountains, hills, plains) occupying about 1/3 of the total area of the territory, our country offers favorable conditions for the development of tourism and agritourism.

Law no.315 / 2004 regulated 8 macroregions of development by bringing together several counties (the territorial-administrative base form). The purpose of creating these development regions was to be able to apply the European regional development policies, aimed at reducing regional imbalances, linking sectoral policies, stimulating interregional cooperation (Photo 1).



Photo 1. Romania's macro-regions of development  
Sursa: <https://goo.gl/SG2zgR>

Agrotourism capitalizes on the natural potential of the area, highlighting both the tourist attractions and the hospitality of the inhabitants, introducing into the economic circuit novelties such as landscape, hospitality, solicitude, information of the nature: geographic, cultural-historical, gastronomic, artistic etc. [1].

Rural tourism includes a wide range of accommodation, activities, events, celebrations, sports and entertainment, all taking place in a typical rural environment. It is a concept that includes the touristic activity organized and managed by the rural local population and which is based on a close connection with the natural and human environment [4].

Agrotourism in Romania is especially a chance for locals who, given the crisis in the agricultural sector, are willing to try a new activity using, in order to increase profitability, the infrastructure they already have. But equally true is that agrotourism can be a good opportunity to make a business and for those who, tired of the stressful life of the city and willing to make a change, may be interested in the idea of moving to the country, together with their own family, to work the land and provide hospitality to tourists [5].

From the point of view of entertainment, agritourism is a form of tourism with a wide variety and uniqueness in delivering services to people who love nature, culture and peasant art [2].

Agrotourism can be a complementary solution to agricultural activities by directly supporting the social and economic development of a macro-region.

**MATERIALS AND METHODS**

For the characterization of rural tourism in the North West Region, North East Region and Central Region of Romania, the following indicators were used: number and share of agro-touristic pensions, number and share of Romanian and foreign tourists in the three development regions. The analyzed period is 2012-2016. The data were taken from the National Institute of Statistics and processed according to the objectives of the paper.

**RESULTS AND DISCUSSIONS**

Agrotourism in general, and in Romania in particular, pursues regional development in several aspects:

- increasing the size of the household;
- development of household facilities;
- increasing the efficiency of the existing natural resources;
- increasing professionalism in hospitality services;
- increasing the living standards of the inhabitants

The official statistical records and the official documents for the operation of the agro-touristic hostels have terms such as: agrotourist pension features, spending, income, inputs, etc.

Table 1. Agrotourism evaluation indicators

Indicators used in this study			
Indicators of result	number of agrotourist hostels	number of tourists / year	the number of new jobs
Indicators of impact	increase in value obtained by additional facilities	the volume of household's complementary income	

Source: UNWTO, [6]

The research carried out by the UNWTO [6] to establish and identify the impact of agrotourism development on regional and national economies allowed them to be grouped into two categories of indicators (Table 1).

From the data from the National Institute of Statistics we have taken up and processed the information regarding the number of agrotourist pensions in the North West Region, North East Region and Central Region of Romania (Fig.1).

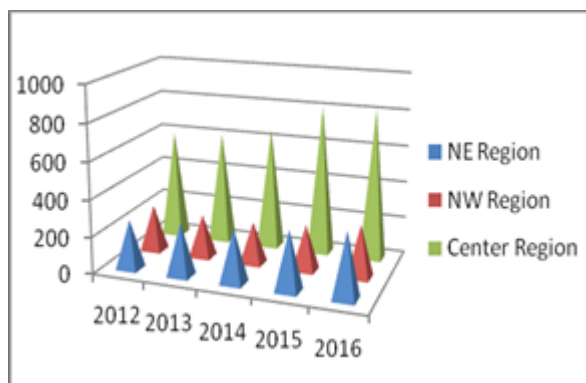


Fig. 1. Number of agro-touristic pensions in the first three macro-regions of Romania

Source: NIS data processing

From the analysis of the number of agrotourist hostels, the following results:

- at the country level most of the boarding houses were registered in the Center Region, their number varies between 594 in 2012 and 823 in 2016, the increase being 229 agrotourist hostels, which represents approximately 39%;
- second place was the NE Region with a number of agrotourist hostels ranging from 226 in 2014 to 284 in 2016, the increase being of 58 agro-touristic hostels, which represents about 26%;
- in the ranking of macro-regions for the number of agrotourist pensions, the North West Region ranks third, the number of them ranging from 265 in 2012 to 352 in 2016, the growth being of 87 agro-touristic pensions, which represents about 33%.

At Romania level, it is observed that the three aggregated macro-regions have overwhelming weights ranging from 70.40% to 71.95% (see Fig. 2).

As regards the population in the analyzed regions, it is noticed that more than 42% of

the Romanian population is concentrated in these areas (Table 2).

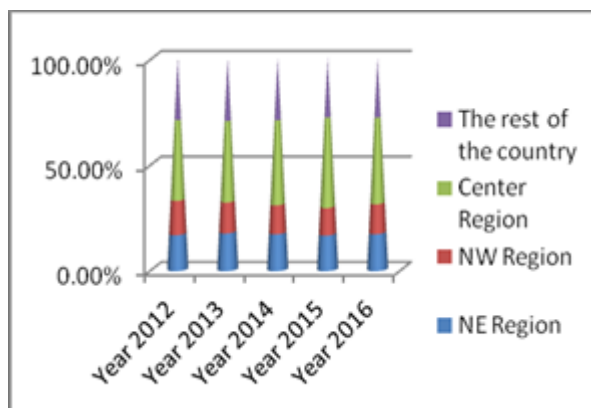


Fig. 2. Share of agro-touristic pensions from the macro-regions studied in total

Source: NIS data processing

Of the total of 10,843,549 Romanian men, 42.66% live in the three studied regions, while out of 11,371,446 Romanian women 41.90% live in the North East, North West and Center Region.

Table 2. Population structure in studied macroregions

Region	TOTAL inhabitants of which:	Men		women	
		No.	%	No.	%
NE	3,924,954	1,951,730	18.00	1,973,224	17.35
NW	2,832,637	1,384,709	12.77	1,447,928	12.73
Center	2,632,384	1,289,448	11.89	1,342,936	11.81
Whole country	22,214,995	10,843,549	100.00	11,371,446	100.00

Source: NIS data processing

Throughout the analyzed period 2012-2016, the number of Romanian tourists who visited the three analyzed regions was increasing.

Thus, in the North West Region the number of Romanian tourists increased by 793,003 from 1,814,020 in 2013 to 2,607,023 in 2016, representing 43.72%.

In the Central Region, the number of Romanian tourists increased by 1,309,084 persons (42.72%), from 3,064,185 in 2012 to 4,373,269 in 2016.

In the North East Region, the number of Romanian tourists increased by 519,740 persons (36.72%), from 1,415,328 in 2013 to 1,935,068 persons in 2016 (Table 3).

Table 3. Number of Romanian tourists (thousands of people)

Region	2012	2013	2014	2015	2016
NW	1.819,6	1.814,0	1.960,7	2.270,2	2.607,0
CENTER	3.064,2	3.356,9	3.490,7	4.122,5	4.373,3
NE	1.446,9	1.415,3	1.499,1	1.699,6	1.935,1
Whole country	15.868,7	15.884,8	16.511,9	19.047,7	20.609,1

Source: NIS data processing

As a percentage of the total Romanian tourists who visited the three analyzed regions, we see an increase from 39.89% in 2012 to 43.26% in 2016. By far the Center Region leads the ranking, the share of tourists visiting it tending to 25% of the total number of tourists in the country. Second place was the North West Region with about 12% of the total Romanian tourists visiting Romania. Within a short distance, the North-East Region is located, with about 9% of all Romanian tourists visiting their country (Fig. 3).

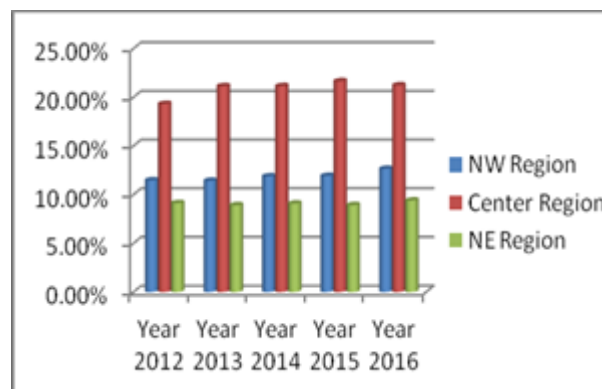


Fig. 3. Share of Romanian tourists in total

Source: NIS data processing

Regarding the number of foreign tourists who visited the three reference macro-regions in the present paper, the trend was growing throughout the period (from 31.11% to 37.35%), the ranking being the same (Center, North West and North East).

Table 4. Number of foreign tourists (thousands of people)

Region	2012	2013	2014	2015	2016
NW	292.1	299.7	326.8	443.6	481.5
CENTER	612.9	680.7	754.1	919.6	1,012.9
NE	186.9	199.0	211.3	234.7	270.7
Whole country	3,297.4	3,477.9	3,768.1	4,471.6	4,725.6

Source: NIS data processing

The number of foreign tourists who visited the three areas is much lower than that of Romanian tourists, but steadily increasing. Thus, the sum of tourists visiting the three macro-regions increased by 673,285 persons from 1,091,916 persons in 2012 to 1,765,201 in 2016, an increase of 61.66% (Table 4).

## CONCLUSIONS

In conclusion, the Center Region is detached in our analysis in terms of the number of agritouristic hostels built and in terms of the number of Romanian and foreign tourists who visited it. On the second place is the North West Region, followed by the Northeast Region.

The number of agrotourist pensions increased during the analyzed period 2012-2016, so by the end of 2016, in the three macro-regions analyzed, there were 1.459 (cumulated) of such accommodation units, representing approximately 72% of those on total country.

Also, the number of Romanian and foreign tourists has been increasing.

Agritourism in the Central Region, North West Region and North East Region harness the natural potential of the areas, highlighting both the tourist attractions and the hospitality of the inhabitants.

## REFERENCES

- [1]Gheorghilaş Aurel, 2014, Geography of tourism, Bucharest University, CREDIS publishing house, pp.10.
- [2]Pota Madona Maria, 2010, Research on the agrotourist potential of the Arad lowland area, PhD thesis abstract, USAMV Timisoara, page 9
- [3]Petrescu, M., Sîrbu, N., Petrescu, A. G., Petrescu, M., 2012, A Risk Management Approach to Cyberspace, Transylvanian Review of Administrative Sciences, Cluj-Napoca.
- [4]Stanciulescu Gabriela, Lupu, N., Ţigu Gabriela, Ţitan Emilia, Stancioiu Felicia, 2002, Lexicon of tourist terms, OscarPrint publishing house, Bucharest
- [5]The Gazette of Agriculture, September 2008, Agritourism, a chance in the current crisis in the agricultural sector
- [6]UNWTO, 2017.

## AN ANALYTICAL REVIEW OF CROPPING SYSTEM RESEARCH IN INDIA- A CASE STUDY

**Suresh Kumar MUDDA, Rajendra Prasad VANA**

Acharya N.G. Ranga Agricultural University, Agricultural College, NAIRA 532185 India. Phone +919848065893, Emails: sureshkumarmudda@gmail.com, skmudda1971@rediffmail.com, pasad\_v@yahoo.com

**Corresponding author:** skmudda1971@rediffmail.com

### **Abstract**

*The future agriculture will be guided by the compulsions of food and nutritional security, by the concerns of environmental protection, and profitability of farm enterprises. Cropping system research could be highly effective in providing balanced food and regular employment, sustaining soil health, and increasing farm productivity and farm income which would ultimately increase the purchasing power of farmers. Andhra Pradesh was one among the typical cases representing South East Asian conditions registering prominent and favourable shifts in the form of relatively diversified cropping patterns. Study of the dynamics, determinants of cropping systems and their implications is of paramount importance for planning the future agricultural policies. Results of the study indicated that paddy continues to be the most beneficial crop due to its agronomic suitability; economic viability as it is the staple food crop of the region. Similarly implications out of Analyses of rain fed cropping systems, Horticulture and vegetables based cropping system, and Energy utilization of major cropping systems etc. were also discussed and conclusions were drawn to develop the suitable strategies for the sustainable agriculture development in this region.*

**Key words:** Cropping systems, Environmental protection, Nutritional security

### **INTRODUCTION**

Cropping system research is an inter disciplinary approach which should be highly effective in providing balanced food and regular employment, in sustaining soil health, in integrating aberrant weather situation and in increasing farm productivity and farm income which would ultimately increase the purchasing power of farmers [37]. The objectives of the cropping systems development are the effective utilization of all the natural resources which includes the land, water and solar radiation in order to achieve the higher production and high net returns in a sustainable manner [11]. The yield factor i.e., quantity of produce obtained per unit resources in a unit time is the standard parameter in achieving the above objective. Cropping systems research is also advantageous for maintaining soil health so as to achieve the land productivity and improved physical properties of soil and reduced risk of soil degradation [14]. Spatial and temporal analysis of cropping pattern changes both at an all India and states level for 50 years

revealed that the economic and non-price factors influence the cropping pattern changes at macro and micro level [25]. Downward trends observed in the employment opportunities in the field of Agriculture sector and disequilibrium in crop and varietal selections have weakened the existing traditional, conventional and inter sectorial linkages between Agricultural, horticultural crops and livestock sector [4]. The cropping pattern changes so resulted would have complications in future agricultural research, skill orientation of personnel engaged in agriculture, conservation of nature, institutional arrangement, agro processing and expansion of non-farm sectors.

Agriculture is an important sector in the economy of the state of Andhra Pradesh in India. It is the biggest source of employment provider. Out of 34.89 million employees in the state (according to 2011 census) agriculture and allied sector provide employment to 21.69 million workers (62.14%) besides its contribution to the net domestic product [3]. Considerable change has occurred in the structure of agriculture in

Andhra Pradesh. The cropping pattern has shifted towards paddy and sugar cane among irrigated crops and cotton and groundnut among dry crops. The net sown area under millets is also reduced drastically [6]. Hence prominent and favourable shifts have taken place in the state of Andhra Pradesh in the form of diversified cropping systems. Study of the dynamics, factors affecting cropping systems and their implications is of paramount importance for planning the future agricultural policies. However, spatial and temporal analysis of the dynamics, determinants and its implication is difficult through conventional investigative research planned for fixed period of time [8]. Hence, an analytical review of the cropping system research was attempted with the following objectives:

- (i) To analyse the economic aspects of various existing cropping systems in the state of Andhra Pradesh.
- (ii) To study the determinants and factors affecting the existing cropping systems in the state of Andhra Pradesh.
- (iii) To analyse the existing cropping systems in the state of Andhra Pradesh both in temporal and spatial dimensions.

## MATERIALS AND METHODS

Methodologies those were adopted while reviewing the cropping system research were as follows.

1. Costs and returns analysis
2. Benefit cost ratio
3. Energy utilization
4. Sustainability index
5. Resource use efficiency and inefficiency
6. Linear programming
7. Returns to scale

The methodologies that were not found in cropping system research of Andhra Pradesh but were still found in the research literature of cropping systems elsewhere are detailed hereunder:

- Budgeting techniques
- Participatory research for a period to know the sustainability of the cropping system.
- Decision supporting systems for cropping system analysis.

- Total factor productivity.
- Extensions of linear programming.
- Seven factor additive model.
- Ranking techniques, shadow pricing and opportunity costing.
- Production and productivity to observe the economic superiority the cropping systems.

### *Cropping system research in Andhra Pradesh*

A review was attempted to study the major cropping systems prevailing in the state of Andhra Pradesh for their economic viability resource use efficiency and environmental sustainability, factor productivity and finally for optimal crop planning as it was done in the state of Gujarat [15]. Spatial analysis of various cropping systems was studied to know the suitability of cropping systems in various agro, climatic zones of Andhra Pradesh. Temporal analysis was done to know the dynamics of various factors affecting the cropping systems and in turn the agriculture of Andhra Pradesh.

## RESULTS AND DISCUSSIONS

### **Paddy based cropping systems**

Paddy is the important food crop in Andhra Pradesh. Paddy-Paddy is the most beneficial cropping system among cropping systems studied in Guntur district such as Paddy-Paddy, Dry paddy – Ground nut, Paddy – Blackgram– Cucumber, Dry Paddy – Red gram, Groundnut-Red gram, Bajra-Red gram, Ground + Red gram and Bajra + Red gram [36]. Studies conducted for the period 1965-2000 in Assam revealed the changes in cropping pattern in favour of food crops and the greater contribution of the food crops was due to expansion effect [23]. Among the cropping systems Rice-Rice – HYV Rice, Rice-rice-wheat and Rice-HYV rice, rice-fallow-HYV ice, rice-chilli-fallow and rice-jute-potato studied in Bangladesh during 2000-01, rice-rice-HYV rice was found to be the beneficial cropping system [31]. The superiority of the rice when compared to wheat, jute and the importance of HYV in cropping systems was established by this study [1]. These findings are important in command areas of the Indian sub continent



where paddy based intensive agriculture is practiced.

Studies conducted during 1984-85 in Krishna district for comparison of rice-rice and rice-pulse cropping systems [29] resulted in both the systems being statistically on par in yields whereas economic analysis of Paddy based cropping systems in Nellore district [43] revealed the superiority of paddy-pulse rotation over monoculture. The ill effects of monoculture of paddy in the traditional belts might be more evident by 1995 when compared to 1985 in Andhra Pradesh.

Paddy and redgram were the beneficial crops among paddy, chillies, cotton and Redgram in Prakasam district [16].

#### **Sugarcane based cropping systems**

Sugarcane, paddy two-year rotation was found to be the most common cropping pattern observed in Andhra Pradesh [5]. Economic analysis of sugarcane based cropping systems was not found in Andhra Pradesh. Hence works done in U.P during 1999-2001 [40] regarding various intercrops such as potato, mustard, Green gram, Blackgram chickpeas and wheat raised along with sugarcane and their profitability revealed that the yield of sugarcane was even higher with potato and chickpea as intercrops compared to sugarcane alone.

#### **Cotton based cropping systems**

While analysing the comparative economics of cotton against soybean based cropping systems viz. Soybean - bengal gram, soybean + redgram and soybean-jowar, and found that all the soybean based cropping systems were economically beneficial and sustainable when compared to cotton crop [30].

Similar results were obtained in Maharashtra during 1996-97 [20] where soybean was found to be beneficial than the cotton, sorghum and soybean that were analysed for the economics.

#### **Analysis of rain fed farming systems**

Agriculture in Andhra Pradesh like other states of India is predominantly rain fed in nature. Economic analysis of cropping systems in rain fed conditions and consequent identification of beneficial crops and cropping systems under this condition would be beneficial for majority of farmers who

cultivate crops under rain fed conditions. Rain fed conditions involves resource scarce, constrained conditions and risk. Hence, identification of beneficial cropping systems under rain fed conditions involves application of complicated economic tools, which could estimate risk and optimal use of scarce resources under constrained conditions [39]. It was also concluded as the same [19] and reported that crop and varietal diversification of rain fed rice based cropping systems for higher productivity and profitability in Eastern India.

Groundnut and millets are the crops that predominately occupy the rain fed areas in Andhra Pradesh. Efforts were made to review the economic analysis that was attempted in these crops in Andhra Pradesh and also comparable literature elsewhere in India and other entries. It was also revealed [42] that groundnut intercropped with pigeon pea recorded significant increase in pod yield. It also registered higher net returns in both good and bad years in red sandy loams of Tirupathi, when compared to groundnut monocrop grown with one row skipping. Virtual academy of semiarid tropics of ICRISAT, Hyderabad revealed that sorghum – groundnut two years rotation, chickpea (residual moisture double cropping) were beneficial. Analysis of millet based cropping systems analysed in middle Gujarat during 2011-12 concluded that the hybrid napier + cowpea + lucerne higher than maize-potato – bajra, Bajra-cowpea-lucerne, sorghum-potato-bajra, bajra-lucerne, bajra-potato-bajra+cowpea and hybrid napier + cowpea + lucerne, whereas bajra-potato-bajra+cowpea had got highest gross and net returns. Pearl millet + potato+tomato system highest under irrigated conditions in a semi-arid environment among the pearl millet monocrop, potato-potato, pearl millet-potato-green gram, cotton-wheat and soybean-wheat-fodder cowpea.

Analysis of rain fed farming system through linear programming technique in Chattisgarh during 1998-99 revealed that in farms with on-farm irrigation nearly 15 percent of crop area was allocated to vegetables in all the three crop seasons which contributed to 50.69 percent to the gross income under on-farm



irrigation [21]. Similar studies also [8] indicated that mono-cropping is the most common farming practice followed in the North Eastern Hilly Region (NEHR) of India and farmers leave the land fallow after harvesting the main crop.

The identification of suitable sequential crops is essential to increase the cropping intensity, land-use efficiency and overall productivity of the land. A study was carried out during 2008–09, 2009–10 and 2010–11 on maize (rainy season) followed by table pea, mustard, French bean and groundnut (post rainy season) [7]. Sequence crops were imposed with paddy straw mulch at 5.0 t ha<sup>-1</sup> and without mulch. The availability of water and moisture retention was higher ( $p < 0.05$ ) on mulched plots, yield was also higher. However, recorded soil temperature was higher on mulched plots at 08.00 hours and lower at 12.00 and 16.00 hours compared with the no-mulch plots. Recorded maize equivalent yield, production efficiency, economics and total energy use and output (MJ ha<sup>-1</sup>) were higher for maize–French bean.

#### **Horticulture and vegetables in cropping system**

Research on coconut based high density cropping system in the form of intercropping banana cv grand-nain-wilhams, pineapple cv, Grandkew and black pepper cv karimunda with coconut cv Bernaulim resulted in higher total number of nuts than the mono cropped coconuts in Goa during 2000-01 [41]. Intercropping of banana, pineapple vanilla suitable to the east west areas in Konaseema (East Godavari dist.) uddanam (Srikakulam) and other traditional coconut growing areas in Andhra Pradesh might brought additional returns to the farmers and other benefits. Location specific research on other crops suitable for intercropping with coconut might bring still encouraging results.

Pulses and vegetables were found to be beneficial crops among the crops that were economically analysed in Jharkhand [18] through linear programming techniques. Cauliflower, cabbage, tomato, radish, bean and bottle ground were the beneficial crops among the winter vegetables that were studied

during 1997-98 in Bangladesh [2]. Tomato intercropped with cotton yielded higher returns in Pakistan when compared to the tomato, cotton mono crops grown separately. A case study conducted in Himachal Pradesh between 1940-90 revealed that the agriculture had shifted from the cultivation of staple crops, grain legumes, tuber crops and oil seed crops to vegetables and fruits. Potato intercropped with garlic 2:1 ratio in Uttaranchal found when compared to potato, garlic pure crops and potato intercropped with 1:1 ratio [40].

#### **Cropping system in command areas**

The economic evaluation of cropping system in the command areas involves collection of input-output data in three reaches of the canal. Certain studies [33] also concluded the following facts about the cropping system research conducted left bank canal command of Tungabhadra project. The results would have implications for the command areas of Andhra Pradesh also. Kharif crops, in general and rice, in particular dominate the cropping system in the command area. Diversified cropping systems were noticed in the tail reach. In the head reach, rice-rice system was not only widespread but also profitable. In the middle reach, cotton was the most profitable and widespread system. Rice-rice, cotton, groundnut-groundnut, fallow-jowar and sunflower-jowar cropping systems were popular in the tail reach [32]. However, the rice-rice system was more profitable, in Toto. It was also reported that [15] the Rice (*Oryza sativa* L.) and maize (*Zey mays*) are grown in 3.5 million hectares (Mha) in Asia that includes 1.5 Mha in South Asia. Sequentially these crops are grown on the same land in the same year either in double–or triple-crop systems for the increasing demand of rice for the escalating human population and maize for the livestock and poultry. A critical analysis of the available literature on agro-ecosystems and adaptations, its territorial spread of the technologies, yield potential and yield gaps, and fertilizer management schedules adopted for rice-maize (R-M) systems in in India and South Asia outlines principles of Integrated nutrient management for R-M systems, and identifies development,

refinement, and dissemination of the integrated plant nutrition system technologies based on location-specific, microclimate oriented fertilizer management principles as priorities for future research to increase the productivity, profitability, and sustainability of Rice–Maize cropping systems.

### **Energy utilization of major cropping systems**

Study of inputs as energy sources for crops and cropping systems would be useful to know the economic and environmental sustainability of cropping system. A cropping system, which uses chemical fertilizers and pesticides more, is less sustainable economically and environmentally when compared to cropping systems using more percent of seed, human labour etc., in their cost of production. An attempt has been made [34] on economic analysis of energy utilization on major cropping systems in Guntur district and summarized the results as detailed below.

Chilli based cropping system require more inputs. Legumes had less cost of cultivation than paddy, chilli and other commercial crops. Human labour followed by chemicals and fertilizers contribute to more than fifty per cent of the cost of cultivation in cereals and commercial crops. Paddy based cropping systems are better in large holdings. Paddy based cropping system are suitable to extensive and low input management. Commercial crops are having better profits for small farmers. Commercial crops are suitable to intensive high input management. Cropping systems which involves pulses in rabi or summer will enhance farmers economy as well as reduce dependence on commercial source of energy.

It was also concluded that [12] concluded that mono cropping based farming systems in North Eastern Region of India is low and it is a high economic risk activity. Over degradation of the soil, excessive depletion of the natural resources like soil, water, vegetation, traditional and conventional agricultural practices will affect the sustainable yields and food security of this region in due course of time. In order to have the sustainable production system in different

farming situations zero tillage based resource conservation practices will be an effective alternative to reconcile agriculture with its environment and overcome the imposed constraints of climate change and escalating inputs cost. This study also revealed that in terrace upland, growing mustard on residual moisture followed by upland rice/maize is practised under conservation tillage conditions. Similarly, in valley upland, growing second crop of pea in rice fallow is possible with zero tillage conditions by utilising the residual soil moisture. A long-term study (2006–2009) indicated that zero tillage practice in rice-based system is cost-effective, restored soil organic carbon (70.75%), favoured biological activity (46.7%), conserved water and produced yield (49%) higher than conventional tillage. Hence, conservation tillage practices like zero tillage in different situations viz., terrace upland, valley upland and low-land conditions ensured double-cropping, improved farm income and increased livelihood in rain fed NE India. This was also [13] confirmed the same while reporting about their recent research on resource conservation technologies involving tillage and crop establishment options that are enabling farmers to sustain productivity of intensive rice–wheat systems. Field results show that the resource conserving technologies, an exponent of conservation agriculture, improve yields, reduce water consumption, and reduce negative impacts on the environmental quality [26].

### **Analysis of cultivation costs in different cropping systems**

The analysis of costs in various studies that were reviewed so far was summarized and the conclusions were presented below. The items like fixed costs, operations costs, cost of cultivation in various crops and cropping systems of Andhra Pradesh were taken into consideration while summarizing their trends in the studies that were reviewed so far. This would throw light on the comparative economics, profitability of the cropping system that was present in Andhra Pradesh and helps in crop planning in future.

Operational costs were found higher in chillies among cotton, redgram, paddy and chilles. Total fixed costs were higher in jute, Jowar and castor. That means credit is required for Jute, Javer and castor during the start of the season and in lump sum, whereas it is required in phases and also during the peak season for the chillies followed by cotton, redgram and paddy. Total cost of cultivation consequently the credit requirement would be more for cotton, paddy and redgram and cropping systems based on these crops. Human labour is the highest component in cost of cultivation of paddy based cropping systems. A constant return to scale was observed in all the cropping sequences. This implied that agriculture in Andhra Pradesh continued to be subsistent in nature as one rupee investment gives a return of one rupee only in the cropping systems followed in the Andhra Pradesh agriculture. Major contribution in costs had shifted from bullock labour to manual labour in tribal farming [9]. Machine labour and manures and fertilizers are the other important components of cost of cultivation. From this, it could be concluded that agriculture in Andhra Pradesh is gradually transforming from subsistence to commercial phase as there was increased use of machine labour and agricultural chemicals in crop production. Use of fossil fuels and chemical in production of crops would have implications on environment and food safety.

#### **Temporal analysis of economics of cropping systems**

Economic analysis of various cropping systems at different points of time helps in identifying the trends of various factors that affect the yields, economics, gross and net returns, profitability and sustainability of the cropping systems. This will be of great use in taking decisions both at farmer and policy level.[15]

Rice-Rice cropping systems [28] was initially beneficial but gradually as the time progressed pulses inclusion [43] became inevitable for the profitability of the paddy cropping systems. But during 2014, [17] after analysis of ten years (2000-10) data for rice and wheat was observed current scenario of IGP.

The Contribution of IGP percentage area in India is 48.4% for rice and 74.7% for wheat. The rice wheat system is pre dominant cropping system of IGP. HYV of pulses was recommended and still remained a research gap during the study period to increase the gross returns of the paddy based cropping system. Human labour continued to be critical input in paddy based cropping systems during the study period.

Recommendations were also given [6] based on economic considerations alone, jute-potato-rice, rice-potato-rice and rice-potato-sesame can be recommended as cropping systems for resource-rich growers in the eastern part of the IGP. Systems such as jute-wheat, rice-wheat and jute-rapeseed-rice appear to be most suitable for small and marginal farmers that cannot afford the large production costs associated with crops such as potato.

Critical input in tribal farming was shifted from bullocks labour [10] to human labour [24]. System approach and manure use pattern (composition of fertilizers and manures) might have changed in tribal areas during the study period where implications are to be analysed in due course.

Sunflower was identified as an alternative beneficial crop to cotton [34]. That means sunflower should be considered as an alternative in case of failure of Bt technology in future course in traditional cotton growing areas in the state.

A case of economic analysis of cropping systems in Guntur district at two different points of time revealed that shift from food grain dominated cropping system [36] to cotton and chilies based cropping systems [35]. Thus, Agriculture in Andhra Pradesh shifted from subsistence to commercial cultivation. Human labour, which was the critical input in agriculture in case of food grain, changed to machine labour and agriculture chemicals during the study period i.e., from sustainable human labour to exhaustive and unsustainable machine labour and agriculture chemicals. The implications thus arise in Andhra Pradesh agriculture needs to be tackled carefully out of the experiences gained from the above reviewed research.

Research on risk preferences and optimal enterprises combinations [27] revealed that changes in risk preference do effect the optimal crops combinations. The typical cropping pattern (Farmers practice) is rational as the farmers meet both food and cash under modest variability of income and insisting on producing more food by the farmers reduce the efficiency and limits the feasible plans. Here the policy comes into action to keep the farmer cultivating cropping systems that are sub optimal at micro level but whose production is essential at macro level. Policy research for recommending optimum crop plans essential at micro level and the required policy to keep the farmers to cultivate sub optimal cropping systems at micro level is to be focused on a continuous basis.

## CONCLUSIONS

From the above studies it can be concluded that paddy continues to be the most beneficial crop in Andhra Pradesh. This might be due to agronomic suitability; economic viability as it is also the staple food crop of the state provided it is properly managed in the systems approach. Its rotations with other crops, adoption of HYV suitable to the locations were some of the measures as evident from the above findings. In West Bengal rotation of Potato with rice was formed to be beneficial.

Studies on intercropping in Andhra Pradesh are relevant, since factors like increased cost of cultivation, declaring the crop holiday in some of the traditional crop areas were resulting in making the crops non remunerative.

The findings before the introduction of Bt cotton, which had totally catapulted the cotton crop from a high input economically unsustainable system to a profitable enterprise for the time being. Research on alternative cropping systems that could be economically comparable with cotton can now be regarded as the next best alternative to the cotton based cropping system. But once the sucking pest complex dominate the cotton ecosystem or the Bt technology fails for the American boll worm and tobacco caterpillar then the established findings on the economic analysis

of alternative cropping systems for cotton would come into handy.

It could be concluded that vegetables incorporated even at low per cent of total area in a cropping system would contribute to higher per cent of income. By this, they not only contribute to the income security but also the nutritional security of not only of the farm family but also the society as a whole. So it is desirable to include vegetables in every cropping system depending on the feasibility even in small areas. It was [15] also felt that the mono cropping of rice has led to a continuous degradation in soil quality, resulting in a serious threat to the sustenance of the agricultural production system in the high rainfall zone of south Gujarat, India. Their experimental results showed that system productivity for rice–fenugreek (*Trigonella foenum-graecum*)–okra (*Abelmoschus esculentus*) was highest (25.73 t ha<sup>-1</sup>), followed by rice–onion (*Allium cepa*)–cowpea (*Vigna sinensis* L.) (24.15 t ha<sup>-1</sup>); and the lowest system productivity was observed with the rice–wheat (*Triticum aestivum*)–fallow system (7.85 t ha<sup>-1</sup>). The sustainable yield index (0.97), production efficiency (102.94 kg ha<sup>-1</sup> day<sup>-1</sup>) and field water use efficiency (15.98 kg ha<sup>-1</sup> mm<sup>-1</sup>) were highest with the rice–fenugreek–okra system. Similarly, net returns (96,286 Rs ha<sup>-1</sup>), net return per rupee invested (2.83 Rs), monetary production efficiency (385.14 Rs ha<sup>-1</sup> day<sup>-1</sup>) and water use efficiency (59.80 Rs ha<sup>-1</sup> mm<sup>-1</sup>) were maximum with the rice–fenugreek–okra cropping sequence. There were significant effects of various cropping sequences on available nitrogen, phosphorus, potassium and organic carbon content in the soil. Overall, the rice–fenugreek–okra system was found to be the most productive, sustainable, resource-use efficient and remunerative cropping system, followed by the rice–onion–cowpea system in this region.

Further research should be directed towards identifying economically viable cropping systems, which use less fossil fuels and chemicals i.e, environmentally sustainable. Safe, vulnerable and sustainable energy utilization should be the top priority along

with economic feasibility while identifying beneficial cropping systems and was [22] also confirmed the same.

While presenting the results it was concluded that the primary mechanism of the higher yield of the MNR (Organic manure based and LEG (Legume based) cropping systems is due to high moisture-holding capacity of the soils. Soils in the organic plots captured more water and retained more of it in the crop root zone than in the CNV (Conventional chemical based) treatment. Water capture in the organic plots was approximately 100% higher than in CNV plots during September's torrential rains. Research findings on the effect of price variations on cropping patterns of main crops indicated that the crops with low price variations (i.e. Rice) were excluded from cropping pattern, where the expected income was declining. In that place some products that have high price variations but high yields remain in cropping patterns. It was suggested that in order to raise the acreage and production of food crops, in addition to price policies attention must be paid to non-price policies, which can increase the yield. Since the emerging cropping patterns involved crops that have high price variations risk analysis and economic analysis with decision making under risk in agriculture in gaining importance.

The overall analysis of the above conclusions revealed that the cereal based farming system was predominant in terms of area occupied in the sub-continent. It was also confirmed and reported [38] that increased productivity brought economic benefits to farmers and led to the establishment of Wheat-Rice Cropping Pattern (WRCP) as the main agricultural system of Punjab which more recently has become reliant on underground water resources, agricultural machinery, chemical fertilisers and pesticides. Degree of diversification was inversely proportional with the size of the farm in Sothern agro climatic zones. Paddy + Paddy system was found most important in terms of contribution to farm income in the area. Its share is more than 59 per cent. However its importance decreases with increase in size of holding due to decreased contribution of livestock.

Paddy+Paddy+Livestock system ranked second with more than 32 per cent share. The maximum sub farming systems were either paddy or oil seed involved the farming system in scarce rainfall zones of India. Cotton based along with horticulture gardens and cash crops are the predominant farming system in the Deccan plateau of the sub-continent. Pulses, oil seeds followed by sugar cane and horticulture based farming systems were next to cereal based and cotton based farming system. The numbers of farm house holds are mostly dominated by following paddy or sugarcane based system in the river basins. Other farming systems are in negligible proportion in basin agro climates. This showed the high amount of specialization in agriculture in the river basins and command areas. Sources other than farming were also contributing towards the household income in hilly and tribal areas. This showed the lack of strong agricultural base to provide sustained livelihood in hilly and tribal areas.

Finally, research revealed that India having relatively diversified cropping patterns. The experience gained from cropping system analysis in one situation could be carefully modified and adopted in another situation along with risk analysis and policy analysis from cropping system point of view. The thorough review of this type would benefit the farming community and results in sustained agricultural production in the study area.

## REFERENCES

- [1] Akteruzzaman, M., Halim, M.A., Moniruzzaman, 2001, Relative profitability of alternative cropping patterns under irrigated condition in some selected area of Barguna District. Bangladesh-Journal-of-Training-and-Development. 14: 1-2, 31-38.
- [2] Alam, M. J., Mawla, M. G., Murshed, S. M. M., 2001, Economic analysis of winter vegetables in a selected area of Bangladesh. Economic-Affairs-Calcutta. 46(4): 215-221.
- [3] Ashok, S. Alur, Maheswar, D.L., 2017, From plough to plate -an overview of Indian food processing sector, comprehensive commodity intelligence, Sept 2017, Vol.17, Issue 9, www.commodityindia.com, Accessed January 21, 2018.
- [4] Bhavani, R., 1989, Optimum resource allocation on sample farm of Guntur district – Andhra Pradesh. Un published thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.

- [5] Biswas, B., 2015, Cropping System: Research Approach, Publisher: OmniScriptum GmbH & Co. KG
- [6] Chowdry, K. R., Rao, G. V. K., Karuna sree, 1996, Agricultural diversification of small farms of Nizamabad District in Andhra Pradesh. *Indian Journal of Agricultural Economics* 51:68 .
- [7] Choudhary, V.K., Suresh Kumar, P., 2011, Crop and water productivity, profitability and energy consumption pattern of a maize-based crop sequence in the North Eastern Himalayan Region, *India Journal Archives of Agronomy and Soil Science* 59 (5) : 653-669
- [8] Conway, R.G., 1985, Agro ecosystem analysis. *Agricultural administration*. 20:31-35.
- [9] Dasu, T., 1988, Economics of tribal farming and marketing of minor forest produce in Vizianagaram district of Andhra Pradesh. Un published thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [10] Directorate of Economics and statistics Government of Andhra Pradesh, 2013, <http://apdes.cgg.gov.in/>, Accessed January 21, 2018.
- [11] FAO, 1989, Sustainable development and natural resource management. *The State of Food and Agriculture*. 171p.
- [12] Ghosh, P. K., Das, A., Saha, R., Kharkrang, E., Tripathi, A. K., Munda, G. C., Ngachan, S. V., 2010, Conservation agriculture towards achieving food security in North East India. *Current Science* Vol. 99, No. 7, pp. 915-921
- [13] Gupta, R., Seth, A., 2007, A review of resource conserving technologies for sustainable management of the rice-wheat cropping systems of the Indo-Gangetic plains (IGP), *Crop Protection*, 26(3), 436-447.
- [14] Hamblin, A., 1991, Sustainable agricultural systems - What are the appropriate measures for soil structure. *Australian Journal of Soil Research*. 29(6) 709 – 715.
- [15] Jagadish Timsina, Mangi L. Jat, Kaushik Majumdar, 2010, Rice-maize systems of South Asia: current status, future prospects and research priorities for nutrient management, *Plant and soil*, Vol. 335, Issue 1–2, pp. 65–82.
- [16] Kajeswaramma, G., 1990, Resource productivity and optimum resource allocation on sample farms in Prakasam District in Andhra Pradesh. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [17] Koshal, A. K., 2014, Changing current scenario of Rice-Wheat System in Indo-Gangetic Plain Region of India, *International Journal of Scientific and Research Publications*, Volume 4, Issue 3, 1-13, March 2014
- [18] Koshta, A. K., Chandrakar, M. R., 2004, Linkages estimation with on-farm irrigation under rainfed farming system at Raipur district of Chhattisgarh state. *Agricultural-Marketing*. 46(4): 35-39.
- [19] Lal, B., Gautam, P., Panda, B. B., Raja, R., Singh, T., Tripathi, R., Shahid, M., Nayak, A.K., 2017, Crop and varietal diversification of rainfed rice based cropping systems for higher productivity and profitability in Eastern India, <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0175709>, Accessed January 21, 2018.
- [20] Lanjewar, D. M., Gadge, S. S. and Lanjewar, A. D., Pajankar, V. D., 2000, Socio-economics consequences of change in cropping pattern. *Journal-of-Soils-and-Crops*. 10: 2, 272-274.
- [21] Lonaric, R., Lonaric, Z., 2004, The decision support system with economic analysis of field vegetable production. *Acta-Horticulturae*, (655): 497-502.
- [22] Lotter, D.W., Seidel, R., Liebhardt, W., 2003, The performance of organic and conventional cropping systems in an extreme climate year. *American Journal of Alternative Agriculture*, Vol.18, Issue 2, 2003, pp.1-9.
- [23] Maibangsa, M., Maibangsa, S., 2001, Analysis of changes in the cropping pattern of Assam during 1965/66-1994/95: an econometric study. *Asia-Pacific-Journal-of-Rural-Development*. 11(1): 26-39.
- [24] Muzeebuddin, S., 1994, Economics of Tribal farming in East Godavari district of Andhra Pradesh. Un published thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [25] Neena, D., 1998 Inter-state variation in cropping pattern in India. *Indian Journal of Regional Science*. 30: 2, 57-69.
- [26] Piepho, H. P., 1998, Methods for comparing the yield stability of cropping systems - a review. *Journal-of-Agronomy and Crop Science*. 180: 4, 193-213.
- [27] Pirooz Rad, M., Bakhshoode, M., Abd-Shahi, A., Nejati, A., 2004, Determination the best time for sale and optimum cropping pattern using a minimum regret model: case study of Ramjerd District in Fars province. *Iranian-Journal-of-Agricultural Sciences* 35(1): 31-37.
- [28] Prasanna, T., 1982, Economic analysis of farming systems in Guntur district of Andhra Pradesh. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [29] Radha, Y., 1985, Economic analysis of rice based farming systems in Diviseema of Krishna District. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [30] Rajendra Prasad, V., 1999, Sustainable cultivation of Cotton – An economic analysis. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [31] Ram A. Jat, Dungrani, R. A., Arvadia, M. K., Sahrawat, K.L., 2012, Diversification of rice (*Oryza sativa L.*)-based cropping systems for higher productivity, resource-use efficiency and economic returns in south Gujarat, *Archives of Agronomy and Soil Science*, 561-572
- [32] Rani, P.S., 1988, Role of women in agricultural production-A study in rice and cotton based cropping systems in Prakasam district of A.P. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [33] Rao, G., Basavaraja, H., 2008, Economics of cropping systems in the Left Bank Canal Command of Tungabhadra Project. *Karnataka-Journal-of-Agricultural-Sciences*. 14(2): 385-389.

- [34]Rao, K. L., 1987, An economic analysis of energy utilization on major cropping systems in Guntur district of Andhra Pradesh. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [35]Ravikanth, M., 2005, Crop diversification in upland areas of Guntur district of Andhra Pradesh. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [36]Reddy, T. S., 1978, Economics of multiple cropping pattern in command area development programme of Guntur district. Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.
- [37]Saleth, R.M., 1999, Shift in cropping pattern from cereals to non-cereals. Indian Journal of Regional Science. 78 pp.
- [38]Shukla, A. K., Shukla, N. D., Singh, V. K., 2002, Farming systems approach for food security and sustained rural economy. The Second International Agronomy Congress on Balancing Food and Environmental Security - A Continuing Challenge, New Delhi, India, 26-30 November 2002. Fertiliser News 47: 11, 55-62, 65-66.
- [39]Singh, S., Park, J., Litten-Brown, J., 2011, Change and Uncertainty Challenges for Agriculture, Food and Natural Resources. EAAE 2011 Congress, August 30 to September 2, 2011 ETH Zurich, Zurich, Switzerland.
- [40]Singh, R. V., Johri, S., Tripathi, Y. N., Mishra, A. C., 2003, Potato intercropping with garlic in rainfed mid hills of Uttaranchal. Journal-of-the-Indian-Potato-Association. 30(3/4): 319-320.
- [41]Singh, S. P., Manjunath, B. L., Khan, H. H., Shalini, B., Shalin. I. B., 2002, Coconut based high density cropping system in Goa. Indian-Coconut-Journal. 33: 7, 9-12.
- [42]Subramanyam, Reddy, K. S., Mitra, G. K., 1998, Energy use and its efficiency in A.P. Agriculture. Indian Journal of Agricultural Economics. 53: 268-269.
- [43]Thulasamma, L., 1995, Economics of nutrient management in paddy based cropping system in Nellore district of Andhra Pradesh Unpublished thesis of M.Sc. (Agriculture) at ANGRAU, Hyderabad, India.

## MANAGEMENT OF AGRICULTURAL CULTURE ESTABLISHMENT WORKS

Olimpia PANDIA<sup>1</sup>, Ion SĂRĂCIN<sup>2</sup>, Alexandru Ioan SĂRĂCIN<sup>3</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40745 762 957, Emails:olimpia\_pandia@yahoo.com, elizaelyzuc@yahoo.com

<sup>2</sup>University of Craiova, Romania, Faculty of Agriculture, 13 A.I.Cuza, Craiova, Romania, Phone: +40251 414 398, Fax: +44251 414 399, Mobile: +40744 162 539, E-mail: ion\_saracin@yahoo.com

<sup>3</sup>University Polytechnics of Bucharest, Splay Independence, 313, Bucharest, 060042, Romania, Phone: +4 021-402 94 65, Fax: +4 021-402 94 65, Mobile: +40753.064.854, E-mail: alex\_saracin@yahoo.com

**Corresponding author:** olimpia\_pandia@yahoo.com

### **Abstract**

*In this article there are presented few of the objectives which are required in the management of the works for agricultural cultures foundation like: the execution of agricultural works with superior qualitative indices; the execution of agricultural works respecting the protection and conservation of soil, respectively the seizure of the carbon in soil; the assurance of vegetative place of plants; the realization of agricultural works in optimal time with minimum costs. Are presented the agricultural used aggregate and the mandatory adjustments imposed by those. It is make a comparative analysis of qualitative indices of agricultural works conducted in conventional system and conservative system and an economic analysis of the costs with the works for of agricultural cultures in these two systems. Are elaborated a series of conclusions and recommendations.*

**Key words:** minimum costs, protection and conservation, qualitative indices

### **INTRODUCTION**

The agro-production process consists of a series of components of the technique with which the cultivator acts on the soil and the plant to form the crop.

These elements are grouped into methods, works, and processes, depending on the soil, the species and the vegetation. They can be of a general character, with mandatory application to all agricultural crops, or a particular character with application for certain crops or applied only to plants.

The modernization in agricultural production aims at expanding and diversifying the mechanization of agricultural works, as it ensures the increase of the labor productivity, the achievement of the good quality works at the optimum terms, which leads to the increase of the harvest and the decrease of the costs over time.

Machines must be as universal as possible, easy to handle, with allow weight, with removable active organs, which allows a reduction in specific investment, metal and fuel consumption.

At the same time, their exploitation will be more economical and efficient, and lower fuel consumption, by categories of works. [8]

#### **1. What you need to know when you start a technology:**

**1.1. What you want to do, culture, set-up period, vegetation period, phytotechnical conditions, etc.**

**1.2. What farming system do you want to practice:**

Conventional agriculture, intensively mechanized, with competitive products, but based especially on the concentration and specialization of production.

Extensive agriculture with low input: subsistence, with poorly competitive production. Organic or organic farming -



intensive and less aggressive in relation to environmental factors, with less competitive agricultural products in the short term, but which are considered superior in terms of quality. Organic agriculture - the exclusive use of organic fertilizers in relatively high doses. Conservative agriculture consists of applying modern agricultural technologies to increase production.

Precision agriculture: the most advanced form of agriculture, which is practiced on narrower surfaces, based on the most modern methods of controlling the quality of different environmental resources, the optimal application of all technological components.

Sustainable (integrated) agriculture - intensive production of competitive products with harmonious, environmentally friendly relations.

### **1.3. You choose the technology but keep in mind: the climate, the soil and the money**

"Technology is imposed by the climate, the type of soil and the money you have," says Viorel Matei, one of the farmers with experience in agriculture, which exploits over 3,000 hectares in Banat. [7]

"For now, I opt to work interleaved, that is, where scarification is going to happen, in the next year to make a cut. But not in exceptional situations, when the terrain is very difficult; of course, then it is necessary to enter again with the scarifier. [6]

The farmer knows that technologies have changed lately and many farmers prefer not to show up. "I work on two fronts, where the land is beaten come with a scarification work at a depth of 40-60 cm, after which I compulsively cut. Not only does it give the crop plant the opportunity to grow normally but incorporates into the soil and vegetal remains, which are major nitrogen deposit.

Prof. Vasile Popescu, in a specialized publication, points out that after the summer plow the land is very well prepared, the water is stored in the soil until the autumn and there is provided about 100 kg of nitrogen in the soil by incorporating the vegetal remains „in a non-precipitated area, a minimum system of soil works is required.

At the seed incorporation level, a starter dose of nitrogen and phosphorus is added, which

represents 20% of the fertilizer standard administered for each culture set up. [4]

Experience has led to significant savings in terms of costs per hectare, meaning that less fuel is used as well as moderate fertilizer doses, about 200 kg of NPK active substance.

It is advisable that the minimum system of work should be applied only in the spring.

## **MATERIALS AND METHODS**

It is based on studies and researches made by specialists in the field of sustainable agriculture. Sustainable agriculture is a long-term and long-term action aimed at overcoming the problems and constraints of conventional agriculture currently practiced by most farmers.

### **(i)Tillage systems**

**The system with no loosening, synonymous with:** direct sowing, sowing in the slit, chemical system, mulch system, stubble system, ecological system, no till. [1]

This system is based on the introduction of seed directly into the stalk of the pre-culture without performing any previous soil loosening work, except for the simultaneous sowing of a very narrow strip of sowing only a few centimetres to allow seed to be introduced into the soil. Control of weeds, including weeding plants, is carried out only by chemical methods with the help of biological herbicides if possible. [5]

**The system of soil work in strips,** synonymous with the work in strips or zonal. This plant cultivation technology allows the loosening and the working or mobilization of the soil in strips or strips with a width of 5 to 20 cm, intended only for sowing, between these bands the soil remaining completely undisturbed, uncorked and covered with vegetal remains so that the surface of the soil after sowing to remain covered over 30%. Compared to the previous work, which referred to direct sowing, by stripping, the soil is disturbed to a greater extent, the degree of coverage of the vegetal remains is lower, but the risk of soil degradation in the long run is higher. [3]



Fig.1. Execution of the soil loosening work in strips  
Source: authors.

**Vertical lying work** consists in loosening and mobilizing the soil on a depth of 20-30 cm, or even deeper, without turning the furrow.

The soil surface remains covered after sowing vegetal remains in a convenient proportion (over 30%). At the same time, soil compaction is shorter in the short term.



Fig.2. Execution of scarifying and rolling work  
Source: authors.

**The bobbling** is a technological plant cultivation that allows for the development of balls or "elevated areas" used as germinating beds where the seed is to be introduced, alternatively with lower areas that can be used as watering pads or areas for the movement of agricultural machinery for other works.

**Scarification or deep loosening of the soil**

Deep churning, without turning the furrow, is one of the works that influences the condition of crops when climate conditions are not entirely favourable. This is done to break the waterproof layer of the soil and to allow

infiltration of water and air from the upper layers.



Fig.3. Execution of the deep licking work  
Source: authors.

The work is done in the summer months, July - August, or autumn after harvesting crops. The minimum depth cannot be less than 40 cm and the maximum depth can be up to 80 - 90 cm, in this case it is a soil drainage that is not recommended to be done annually.

Table 1. The tariffs applied to the farm works for the provision of services with equipment for the year 2014/2015 la SC Agrodez Dandro SRL, Ciocanesti Locality.

No.	Agricultural work	Price with VAT
1.	Plowing	400.00 lei/ha
2.	Scarificator	400.00 lei/ha
3.	Milling	250.00 lei/ha
4.	Disk	190.00 lei/ha
5.	Sowing	140.00 lei/ha
6.	Hoeing	140.00 lei/ha
7.	Fertilize	50.00 lei/ha
8.	Sprayers	50.00 lei/ha
9.	Harvesting	260.00 lei/ha
10.	Grain transport	30.00 lei/km
11.	Cleaning	190.00 lei/ha
12.	Baleing	3.00 lei/buc

Source: SC Agrodez Dandro SRL, Ciocanesti Locality.

**(ii)Cut costs by optimizing engine speed**

The method is based on analysis of the traction diagram of the aggregate used for the execution of agricultural works, for both soil cultivation systems.

Plowing is the agricultural work that consumes about 30% of the amount of diesel allocated to all mechanized agricultural work as a result of high specific consumption, which has negative economic repercussions. Running the right way can reduce fuel consumption.

Table 2. Expenses with the application of conventional soil technology

Work	The aggregate used	Expenditures (lei/ha)	Fuel consumption (l/ha)
Plowing	Tractor+ plug	400.0	18-28
Disk	Tractor+ Gr. discuri	190.0	9-14
Cultivation	Tractor+ cultivator+tăvălug	140.0	9-14
Sowed with fertilized	Tractor + seed drills +fertilizer equipment	140.0	9-14
Fertilizer Management	Tractor + chemical fertilizer spreader	50.0	5-7
Weed control	Tractor + sprayed machine or equipment	50.0	5-7
Combating diseases and pests	Tractor + the machine or equipment sprayed and dusty	50.0	5-7
Harvesting	Combine	260.0	12-16
Transport	Tractor + trailers	30 (lei/km)	5.7 (l/h)
Seeding Material	Certified seeds		
Fertilizers	N,P,K		
Chemical preparations	Chemical substances to combat diseases and pests		

Source: SC Agrodez Dandro SRL, Ciocanesti Locality.

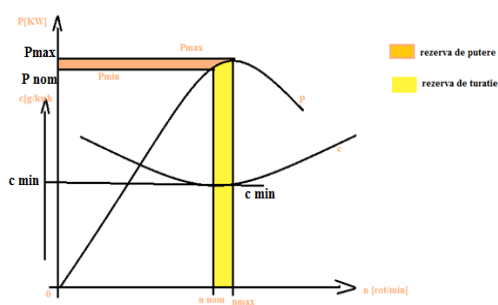


Fig. 4. External feature of the thermal engine

Source: authors.

## RESULTS AND DISCUSSIONS

Air and water are the factors that, along with the nutrients obtained from biochemical processes in the soil, conditioned by these factors, provide the favorable environment for plant growth and development.

Table 4. Porosity and apparent density of soil according to the work performed

Agricultural work	Porosity (%)		Apparent density (g/cm <sup>3</sup> )
	Aeration	Total	
Plowing at 28cm	24.3	35.7	0.91
Loosening	26.0	34	0.87
Deep hatch	28.7	31.3	0.81
Vertical milling	31.1	28.9	0.78

Source: <http://www.fao.org/nr/land/sustainable-land-management/en/>

Generally, a middle soil consists of 50% solids and 50% open spaces, occupying 25% with air and 25% with water.

Depending on the type of soil and how it is worked, the volume of the soil can vary very much. So, when talking about soil porosity, we have in mind these spaces that keep the volume of water and air in the soil steady.

## CONCLUSIONS

Total soil porosity can be 48-60%, of which capillary porosity 30-36% and non-capillary porosity (aeration) 18-24%.

Aeration porosity is considered deficient when it is 6-10%, moderate 11-22% and good when it represents 23-30% of the soil compartments.

It is practically considered a favorable situation for crop plants when the soil pores are occupied 2/3 with water and 1/3 with air.

The root system develops well at 1.07-1.45 g / cm<sup>3</sup> Da and the soil nitrification process at Da of 1.11-1.15 g / cm<sup>3</sup>.

Radical changes in soil porosity occur after plowing. Thus, prior to cutting, the capillary porosity was 26.1%, and the pore size was 12.3%, while the non-capillary porosity was 11.2, and after 42.5% the pore.

Of course, both through the natural settlement of the soil and the subsequent works, the porosity values return to normal.

## REFERENCES

- [1]Borza Mioara, 2008, Difficulties in Achieving Sustainable Agriculture in Romania, Scientific Papers Agriculture in Romania, Scientific Papers Magazine, vol. (51) 218-221, ISSN 1454-7414
- [2]Frățilă Rodica, 2008, Comparative agricultural technologies (course support), pp. 51-52
- [3]Hera, C., 1999, Sustainable Agriculture - Performance, Agris Publishing House, pp. 51-61.
- [4]Oancea John, 2005, Advanced Agricultural Technologies, Ceres Publishing House, Bucharest, pp. 93-101.
- [5]Radulescu V., Carmen, 2003, Sustainable Development and Economic and Financial Implications of Organic Farming Organization, ASE, Bucharest, pp. 8-9; 26-27
- [6]Sin Ghe., 2004, Technological Management of Field Cultures, Ceres Publishing House, Bucharest, pp. 406-436.
- [7]Sustainable Land Management, <http://www.fao.org/nr/land/sustainable-land-management/en/>, Accessed February 20, 2018.
- [8]<http://www.biblioteca.digitala.ase.ro/biblioteca/carte/2.asp?id=265&idb>, Accessed February 20, 2018.

## ASPECTS REGARDING THE LIVING STANDARD OF THE RURAL POPULATION IN THE SOUTH MUNTENIA REGION OF DEVELOPMENT, ROMANIA

**Ionut Daniel PETRE**

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest Romania, Phone: +40213182564, Fax: +40213182888, Email: ptr\_ionutdaniel@yahoo.co.uk

**Corresponding author:** ptr\_ionutdaniel@yahoo.co.uk

### **Abstract**

*The study had the purpose to analyze the evolution of the rural population and its living standard in the South Muntenia region in the period 2007-2016. The data were collected from the National Institute of Statistics and the fixed basis index and comparison method were used to establish the evolution of the following indicators: rural population, rural population dealing with agriculture, human resource, civil occupied population, GDP and GDP/inhabitant, average monthly income and expense per household, and poverty rate. The results showed that rural population represents 58 % of the region population, and is in a continuous decline due to the low birth rate, high mortality rate and migration. Most of the people work in agriculture. The living standard is low as GDP/capita, average income and expense per household are much lower than the average in the country. In this context, the authorities both at the national and local level should establish a corresponding strategy for the sustainable development of the South Muntenia region for improving the living standard of the local population.*

**Key words:** living standard, rural population, South Muntenia region, Romania

### **INTRODUCTION**

The South Muntenia region is one of the 8 micro regions of development existing in Romania. It is situated in the South part of the country, and has 34,453 km<sup>2</sup> surface, representing 14.5 % of Romania's area [29].

From an administrative point of view, its surface includes 7 counties: Arges (19.8%), Calarasi (14.8%), Dambovita (11.8%), Giurgiu (10.2 %), Ialomita (12.9%), Prahova (13.7%) and Teleorman (16.8%). Within the counties there are 2,019 villages and 519 communes, but also 32 cities and 16 municipalities [28].

The economic development of the South Muntenia region is based on its natural resources of the subsoil (natural gases, petroleum, coal, salt, sulphur, gypsum, and buildings materials which contributed to the development of industry. About 71 % of the region surface is represented by agricultural land, of which about 81 % is arable land suitable for cropping [18].

The variability of relief including branches of mountains belonging to the Southern

Carpathians, the Subcarpathic hills, and the plains in the South, as well as the climate favor the development of agriculture, a large variety of crops being cultivated and large range of farm animals being grown.

From an economic point of view, the South Muntenia region is among the less developed regions having a GDP/inhabitant smaller than 75 % of the EU average.

The urbanization rate is 41.4 % at the region level reflecting that rurality is dominant, as confirmed by the share of 58 % of the rural population in the total population of the South Muntenia region, which accounted for 3,394,547 inhabitants on July 1st, 2017 [5, 24, 27].

Even if it is dominant, the rural population is in a continuous decline due to the decreasing birth rate, the need for jobs of the young population who migrates to cities and the weak institutional infrastructure, public utilities and services [2].

In the South Muntenia region most of the population living in the rural area is dealing with agriculture, and this is a specific feature in the rural Romania where the diversification

of the activities is weak, and the dependence of agriculture always led to low incomes per household and a low living standard [6].

The rural workforce is mainly engaged in agricultural activities, self-employed people and contributing family worker having the highest share. Also, in the rural area, population has a lower education level, farmers and skilled workers being dominant among other professions and also low productivity is another characteristics [8, 12, 14, 21].

In the South Muntenia region farm structure is not homogenous having a mixed profile in most of cases. Farm size is small and very small, and performance in agriculture is very low, characterizing subsistence and semi-subsistence farming which does not compile with the market oriented production [15].

The low technical endowment and investment, and weak business management, besides the low infrastructure are also other specific features in the rural areas of the South Muntenia region as well as at the country level, being the main restraining factors of the sustainable development of the economy at the national and regional level [11, 16].

Taking into account the situation of the economy and of rural population, the national and local authorities established a smart specialization strategy based on innovation and investments destined to assure a sustainable development of the South Muntenia Region [25, 30].

The aspects mentioned above are the reasons which stayed at the basis of this paper. The goal of the paper was to analyze the evolution of the rural population in the South Muntenia region, in the last decade, 2007-2016, in close connection with its living standard expressed by the economic development characterized by GDP and GDP/capita, income and expense per household, and poverty rate.

## MATERIALS AND METHODS

The indicators used in this study have been: rural population, rural population dealing with agriculture, forestry and fishing, GDP at the region level and GDP per capita, income per household and income of the agriculturists,

expense per household and agriculturist, poverty rate.

In the study it was analyzed the evolution of these indicators in the period 2007-2016 according to the data collected from the data base Tempo online of the National Institute of Statistics.

The dynamics was interpreted based on the results of the fixed basis indices, the reference term being the 2007 level in most of cases. Comparison method served to establish the position of the South Muntenia region versus the average at the country level for each analyzed indicator.

All the data and results were presented in tables and analyzed.

## RESULTS AND DISCUSSIONS

**The population of the South Muntenia Region** of development was 3,394,547 inhabitants in 2007, and during the analyzed period it decreased by 4.89 %, reaching 3,228,630 inhabitants in the year 2017.

The decrease of the population is justified by the negative evolution of the demographic indicators such as: the birth rate in decline and the growing mortality rate, and also the migration rate continuously higher [2].

This decreasing trend of the population in the South Muntenia region is similar with the descending trend of Romania's population from 22,562,913 inhabitants in 2007 to 22,201,702 inhabitants in 2017 (-1,61%).

If we compare the decrease rate, it is easy to notice that the decline rate of the population is 3 times higher than at the country level.

Under these conditions, the share of the population of the South Muntenia region in Romania's population declined from 15.04 % in 2007 to 14.54 % in 2017 (Table 1).

**The rural population in the South Muntenia region** represents an important part of the population. Its evolution was also a decreasing one from 1,929,086 inhabitants in 2007 to 1,845,886 inhabitants in 2017, meaning by -4.32 % less.

The trend of the rural population of the South Muntenia region was similar to the descending trend of the rural population at the country level. If in 2007, Romania had

9,743,693 people living in the rural areas, in 2017, there were only 9,690,464 inhabitants, by 0.55 % less than in 2007.

Therefore, in the South Muntenia region, the decline of the rural population is more severe than at the country level.

As a result, the share of the rural population of the South Muntenia region in Romania's rural population decreased from 19.8 % in 2007 to 19.05 % in 2017 (Table 1).

Table 1. The evolution of the population and rural population in the South Muntenia region in the period 2007-2017 (No. of persons)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Romania's population	22,562,913	22,542,169	22,520,477	22,492,083	22,441,740	22,401,865	22,359,849	22,299,730	22,260,158	22,236,059	22,201,702
Romania's rural population	9,743,693	9,758,152	9,749,431	9,737,074	9,732,730	9,739,334	9,723,610	9,714,936	9,697,725	9,708,759	9,690,464
Share of rural pop. in Romania's population (%)	43.18	43.29	43.29	43.29	43.37	43.48	43.49	43.57	43.57	43.66	43.65
Population of the South Muntenia region	3,394,547	3,384,932	3,373,155	3,360,408	3,343,770	3,327,723	3,309,182	3,289,404	3,269,867	3,252,112	3,228,630
Rural population of the South Muntenia region	1,929,086	1,927,190	1,920,166	1,912,871	1,906,025	1,899,724	1,889,251	1,878,293	1,866,548	1,859,209	1,845,886
Share of the rural pop. in the population of the South Muntenia region (%)	56.83	56.93	56.92	56.92	57.00	57.09	57.09	57.10	57.08	57.17	57.17
Share of the population of the South Muntenia region in Romania's population (%)	15.04	15.02	14.98	14.94	14.90	14.85	14.80	14.75	14.69	14.63	14.54
Share of the rural population of the South Muntenia region in Romania's rural population (%)	19.80	19.75	19.70	19.65	19.58	19.51	19.43	19.33	19.25	19.15	19.05

Source: Own computation based on the data collected from NIS, 2018 [31].

The decline of the population is explained by the decreasing fertility rate, the low birth rate, the high infant mortality rate, the negative natural increase, caused by the low living conditions, and health assistance [7, 19].

**The labor resource in the South Muntenia region** has registered a continuous decline from 2,049.3 thousand persons in 2007 to 1,884 thousand persons in 2016, meaning by - 8.07 % less than in the 1st year of the analysis.

The evolution was similar to the evolution of the workforce in Romania, where in 2016,

labor resource was 12,562 thousand persons, by 9.82 % less than in 2007.

In consequence, the share of the labor resource of the South Muntenia region in Romania's labor resource registered a slight growth from 14.88% in 2007 to 15 % in 2016 (Table 2).

Rural population is an important human resource of labor force in the South Muntenia, where its share in the total population accounts for 58 %. In fact, as long as Romania is a "rural state", rural population is of high importance in the country development [20].



Table 2. The evolution of the labor resources in the South Muntenia region in the period 2007-2016 (Thousand persons)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Romania's labor resource	13,772.7	13,747.4	13,875.9	14,047.6	14,047.7	14,033.7	13,997.9	12,597.7	12,481.1	12,562.00
Labor resource in the South Muntenia region	2,049.3	2,043.2	2,063.00	2,087.8	2,085.6	2,078.8	2,068.8	1,899.4	1,875.4	1,884.00
Share of South Muntenia region in Romania's labor resource (%)	14.88	14.86	14.87	14.86	14.85	14.81	14.78	15.08	15.03	15.00

Source: Own computation based on the data collected from NIS, 2018 [31].

**The civil occupied population** in the South Muntenia region declined by 9.79 % from 1,214.8 thousand persons in 2007 to 1,095.9 thousand persons in 2016.

Table 3. The evolution of the civil occupied population in the South Muntenia region in the period 2007-2016 (Thousand persons)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Romania's civil occupied population	8,725.90	8,747.00	8,410.70	8,371.30	8,365.50	8,569.60	8,530.60	8,431.70	8,340.60	8,317.60
Romania's civil occupied population in agriculture, forestry and fishing	2,462.40	2,407.40	2,410.70	2,439.90	2,442.00	2,510.00	2,380.10	2,304.10	2,003.10	1,726.80
Share of the civil occupied population in agriculture in total civil occupied population in Romania (%)	28.22	27.52	28.66	29.15	29.19	29.29	27.90	27.33	24.02	20.76
Civil occupied population in the South Muntenia region	1,214.80	1,201	1,159.90	1,154.80	1,154.50	1,182.60	1,168.80	1,146.50	1,117.70	1,095.90
Civil occupied population in agriculture, forestry and fishing in the South Muntenia region	434.7	424.3	424.9	428.3	429.6	442.8	419.1	404.4	351.9	303.7
Share of the civil occupied population in agriculture, forestry and fishing in total civil population occupied in the South Muntenia region (%)	35.78	35.33	36.63	37.09	37.21	37.44	35.86	35.27	31.48	27.71
Share of the civil occupied population in the South Muntenia region in Romania's occupied population (%)	13.92	13.73	13.79	13.79	13.80	13.80	13.70	13.60	13.40	13.18
Share of the civil occupied population in agriculture, forestry and fishing in Romania's civil population occupied in agriculture (%)	17.65	17.62	17.63	17.55	17.59	17.64	17.61	17.55	17.57	17.59

Source: Own computation based on the data collected from NIS, 2018 [31].

The trend was similar with the descending evolution of the civil occupied population in Romania, -4.68 %, but it is easy to notice, if the two figures are compared, that in the South Muntenia region, the decline rate was doubled than at the country level. This shows that in the South Muntenia region, it is a much higher lack of jobs than at the country level.

The share of the civil occupied population in the South Muntenia region in the civil occupied population in Romania also declined from 13.92 % in 2007 to 13.18 % in 2016 (Table 3).

**The civil occupied population** in agriculture, forestry and fishing in the South Muntenia region accounted for 434.7 thousand persons in 2016, that is by 30.14 % less than in the 1st year of this analysis. This deep decline was caused by the lack of jobs in agriculture, forestry and fishing and also by the migration to cities or abroad looking for jobs or for better paid jobs.

The decrease of the civil occupied population in agriculture in the South Muntenia region is similar to the decline of about 30 % at the country level in 2016, when only 1,726.8 thousand persons were occupied in agriculture, forestry and fishing in Romania.

The civil occupied population in agriculture in the South Muntenia region represents 17.59 % of Romania's civil occupied population in these fields of activity in the year 2016 compared to 17.65 % in 2007 (Table 3).

Besides the civil occupied population, an important part of the population is unemployed, the young people of 15-24 years old being the most affected. Unemployment was very high during the economic crisis and continue to be a problem in the South Muntenia region as well as at the country level, where the unemployment rate is about 24 % for the youngest age category, 3 times higher than the average unemployment rate in the country [13, 22, 26].

Because of the high importance of the rural population in the economy, an action plan was established to assure employment of labor force and social inclusion [23].

**The economic development of the South Muntenia region**

The economic development of the region is in close relationship with the living standard of the population. For this reason, in this part of the paper it is presented the evolution of some specific indicators characterizing the economy in the South Muntenia region.

**(a) The evolution of GDP and GDP/inhabitant**

Table 4. The evolution of GDP in the South Muntenia region in the period 2007-2015 ( Lei million)

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Romania's GDP	428,979.0	538,049.9	526,345.3	529,623.5	562,062.4	595,367.3	637,456.0	668,143.6	712,658.5
GDP of the South Muntenia region	53,486.1	67,581.7	69,362.1	66,193.0	73,612.8	71,087.1	77,804.3	86,814.7	86,647.2
Share of GDP of the South Muntenia region in Romania's GDP (%)	12.47	12.56	13.18	12.50	13.10	11.94	12.21	12.99	12.16

Source: Own computation based on the data collected from NIS, 2018 [31].

The GDP/inhabitant increased by 24.76 % in the South Muntenia region and by 21.15 % in Romania.

Despite of the higher growth rate, the GDP/inhabitant in the South Muntenia region is smaller than the country average. In 2007, in the South Muntenia region, it was

In the period 2007-2015, the economy of the South Muntenia region has continuously developed so that in 2016 the GDP of the region was by 61.99 % higher than in 2007. In 2016, it reached Lei 86,647.2 million in comparison with Lei 53,486.1 million in 2007. This reflects a positive economic aspect with a deep impact on the social situation, more exactly on the living standard. This positive evolution kept pace with Romania's GDP whose level increased by 66.12 % in the analyzed period. (Table 4).

registered Lei 22,792.9/capita while the country average was by 23.2 % higher, accounting for Lei 29,679.1/capita. In 2015, in the South Muntenia region, the GDP/capita reached Lei 28,436.4 being by 21.92 % smaller than the average GDP/capita in Romania (Table 5).

Table 5. The evolution of GDP/capita in the South Muntenia region in the period 2007-2015 ( Lei/inhabitant)

	2012	2013	2014	2015
Romania's GDP/capita	29,679.10	31,890.80	33,547.30	35,957.10
GDP/capita in the South Muntenia region	22,792.90	25,120.00	28,240.80	28,436.40
Share of GDP/capita in the South Muntenia region in Romania's GDP/capita (%)	76.80	78.77	84.18	79.08

Source: Own computation based on the data collected from NIS, 2018 [31].

**The agricultural production value.**

Taking into account that over 57 % of the population of the South Muntenia region is represented by rural population and that over 90 % of the rural population is dealing with agriculture, forestry and fishing, it is important to know how agricultural production value has performed during the analyzed period.

The agricultural production value in the South Muntenia region increased by 72.28 % in the analyzed period from Lei 7,697,601 thousand in the year 2007 to Lei 13,261,487 thousand in 2016. This growth rate is much higher than the increase rate of 45.3 % of Romania's agricultural production value. This aspect is

justified by the fact that the South Muntenia region is one of the most important areas for agriculture in Romania, due to the soil quality and climate conditions which favor cereals and technical plants cropping.

The positive evolution of the agricultural production value was supported by the continuous development of the vegetal sector in the South Muntenia region. The vegetal production value was 2.13 times higher in 2016 than in 2007. As a result, the vegetal sector increased its contribution to the value of agricultural production at the region level from 57.11 % in 2007 to 70.78 % in 2016.

Therefore, the South Muntenia region has an important contribution to Romania's



agricultural production value, and its weight increased from 16.14 % in 2007 to 19.12 % in 2016. Also, the contribution of the vegetal sector of the South Muntenia region to

Romania's vegetal production value raised from 15.30 % in 2007 to 20.79 % in 2016 (Table 6).

Table 6. The evolution of the agricultural production value in the South Muntenia region in the period 2007-2016 (Lei thousand)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Romania's agricultural production value	47,699,916	66,993,906	59,928,386	64,452,571	76,508,656	64,259,474	78,464,416	74,524,454	68,749,578	69,348,614
Romania's vegetal production value	28,723,475	45,742,175	35,735,477	43,488,480	54,179,772	40,169,144	53,843,812	49,058,330	43,574,128	45,155,180
Share of vegetal production value in Romania's agricultural production value (%)	60.22	68.28	59.63	67.47	70.82	62.51	68.62	65.83	63.38	65.11
Value of agricultural production in the South Muntenia region	7,697,601	12,164,295	10,768,676	11,575,621	14,604,812	12,534,763	15,613,379	13,753,306	13,373,646	13,261,487
Value of vegetal production in the South Muntenia region	4,395,721	8,416,882	6,319,534	7,999,378	10,973,585	8,613,675	11,539,817	9,656,827	9,343,874	9,386,852
Share of vegetal production value in the value of agricultural production in the South Muntenia region (%)	57.11	69.19	58.68	69.11	75.14	68.72	73.91	70.21	69.87	70.78
Share of agricultural production value in the South Muntenia region in Romania's agricultural production value (%)	16.14	18.16	17.97	17.96	19.09	19.51	19.90	18.45	19.45	19.12
Share of vegetal production value of the South Muntenia region in Romania's vegetal production value (%)	15.30	18.40	17.68	18.39	20.25	21.44	21.43	19.68	21.44	20.79

Source: Own computation based on the data collected from NIS, 2018 [31].

**The total average monthly income/person** in the South Muntenia region is another important indicator reflecting the living standard of the population. In 2016, the level of this indicator was Lei 1,004.02 per person, by 25.39 % higher than in 2007, which is a positive aspect.

But, if we compare this level with the average monthly income per person in Romania, Lei 1,112.22 in 2016, we may easily draw the

conclusion that in the South Muntenia region the level of this indicator is just 90.27 % of the average at the country level. More than this, it has a tendency to diminish its share from 95.27 % in 2007 to 90.27 % in 2016 (Table 7).

These findings characterize in fact the general situation in Romania, where the income of a household member represents the lowest share of the salary in the GDP/inhabitant [3].

Table 7. The evolution of the total average monthly income per person in the South Muntenia region in the period 2011-2016 (Lei/person)

	2011	2012	2013	2014	2015	2016
Total average monthly income per person in Romania	839.53	861.15	895.85	937.65	1,010.67	1,112.22
Average monthly income per person in agriculture in Romania	603.72	583.73	608.1	629.98	648.48	632.21
Share of the average income in agriculture in the average income per person in Romania (%)	71.91	67.78	67.88	67.19	64.16	56.84
Average monthly income per person in the South Muntenia region	800.67	835.46	839.66	896.02	911.3	1,004.02
Average monthly income per person in agriculture in the South Muntenia region	634.28	690.85	623.88	657.97	553.17	594.29
Share of average monthly income in agriculture in the average monthly income in the South Muntenia region (%)	79.22	82.69	74.30	73.43	60.70	59.19
Share of the average monthly income per person in the South Muntenia region in the average monthly income per person in Romania (%)	95.37	97.02	93.73	95.56	90.17	90.27
Share of the average monthly income per person in agriculture in the South Muntenia region in the average monthly income per person in Romania's agriculture (%)	105.06	118.35	102.59	104.44	85.30	94.00

Source: Own computation based on the data collected from NIS, 2018 [31].

The average monthly income/person earned in agriculture, forestry and fishing is much smaller the South Muntenia region than the average monthly income at the country level. In Romania, this sort of income registered Lei 632.21/person in 2016, being by 4.71 % higher than in 2007, while in the South Muntenia region, it accounted for Lei 594.29/person being by 6.31 % smaller than

in 2007. This reflects that work in agriculture, forestry and fishing in the South Muntenia region is less paid than at the country level, despite that the contribution of agricultural production of the South Muntenia region to Romania's agricultural production value have been continuously increasing.

This aspect is also confirmed by the share of the average monthly income in agriculture,

forestry and fishing in the South Muntenia region in the average income in agriculture at the country level. If in the period 2011-2014, the average income in agriculture of the South Muntenia region exceeded the average income in agriculture in Romania by about 2-18 %, in 2015 and 2016, it decreased by 6-15 %. The income decline reflects, of course, a decline of the living standard of the agriculturists too (Table 7).

More than this, despite this disparity regarding the income per household, in case of the income coming from agriculture, other authors found that there are differences regarding the income obtained by agriculturists depending on the farm size, agricultural production value and subsidies [1].

Also, while in the urban area, the households incomes are coming mainly from the salary of

the employees, in the rural areas incomes are coming mainly from agriculture and in the total revenues self-consumption prevails in the peasant families. The gross or net average earnings are very low, as in general in Romania, a country which is situated on the penultimate position in the EU from this point of view [4].

For farmers, subsidies are very important to help them to balance their income and costs and to get profit [17].

**The total average monthly expenses per household** is another indicator reflecting the living standard. In the South Muntenia region, the average monthly expenses increased by 23.22 % from Lei 1,889.46/household in 2008 to Lei 2,328.35 in 2016. However, the growth rate in the analyzed period is smaller in comparison with the growth rate of 31.78 % in Romania.

Table 8. The evolution of the total average monthly income/household in the South Muntenia region in the period 2008-2016 (Lei/household)

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Average monthly expense per household in Romania	1,915.19	2,047.33	2,062.95	2,183.76	2,244.47	2,317.40	2,269.25	2,351.53	2,523.99
Average monthly expense per household in agriculture in Romania	1,501.31	1,723.39	1,618.49	2,002.30	1,965.74	2,038.26	1,999.90	2,020.63	1,960.41
Share of the average monthly expense per household in agriculture in the average monthly expense per household in Romania (%)	78.39	84.18	78.46	91.69	87.58	87.95	88.13	85.93	77.67
Average monthly expense per household in the South Muntenia region	1,889.46	2,013.58	2,120.07	2,090.72	2,209.00	2,189.64	2,240.33	2,180.10	2,328.35
Average monthly expense per household in agriculture in the South Muntenia region	1,488.57	1,864.28	1,802.82	1,905.71	2,171.93	1,937.00	1,826.47	1,864.81	1,860.05
Share of average monthly expense per household in agriculture in the average monthly expense per household in the South Muntenia region (%)	78.78	92.59	85.04	91.15	98.32	88.46	81.53	85.54	79.89
Share of average monthly expense in the South Muntenia region in the average monthly expense per household in Romania (%)	98.66	98.35	102.77	95.74	98.42	94.49	98.73	92.71	92.25
Share of average monthly expense per household in agriculture in the South Muntenia region in the average monthly expense per household in agriculture in Romania (%)	99.15	108.18	111.39	95.18	110.49	95.03	91.33	92.29	94.88

Source: Own computation based on the data collected from NIS, 2018 [31].

As a result, the share of the average monthly expense/household in the South Muntenia region in the average monthly expense/household in Romania declined from 98.66% to 92.25 %, reflecting that the reduction of the income has led to the diminishing of the expenses, therefore to a reduced living standard in the South Muntenia region.

If we analyze the average monthly expense/household in agriculture of the South

Muntenia region, we may notice an increase by 24.95 % in 2016 compared to 2008. However, this growth rate is smaller than +30.57 % at the country level for this indicator.

Also, the average monthly expense/household in agriculture of the South Muntenia region has recorded a smaller share in the average monthly expense/household in Romania, from 99.15 % in 2007 to 94.88 % in 2016. This indicator confirms again the reduction of the

living standard of the agriculturists in the South Muntenia region (Table 8).

The poverty rate in the South Muntenia region was 24.8 % very close to the poverty rate in Romania, 25.3 %, in 2016. The lowest

rate of poverty in the South Muntenia region was registered in the years 2010 and 2011, about 21 %, but since that time, the poverty rate increased in the coming years (Table 9).

Table 9. The evolution of the poverty rate in the South Muntenia region in the period 2007-2016 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Poverty rate in Romania (%)	24.6	23.6	22.1	21.6	22.3	22.9	23	25.1	25.4	25.3
Poverty rate in the South Muntenia region (%)	26.8	22.9	22.4	21.2	21.1	22.1	22.7	25.5	30.6	24.8

Source: Own computation based on the data collected from NIS, 2018 [31].

Rural poor population represents 1/3 of the total poor population in the country, and taking into account this proportion, it is more exposed to poverty and social exclusion than the urban population. The relative poverty risk is about 42 % in the rural areas than in the urban ones (18%) [9, 10].

## CONCLUSIONS

The results obtained in this study allowed to draw the following important conclusions:

- The South Muntenia region has an important human resource for the economic development.
- Rural population represents the majority of the population and is dealing mainly with agriculture, forestry and fishing.
- In the last decade, the main trends refer to the continuous demographic decline caused by the low fertility rate, low birth rate, high mortality rate and migration to cities.
- The population in the rural areas has a low living standard as reflected by the low GDP/inhabitant, the lower income and the low expense per household in comparison with the average in the country.
- The living standard of the rural population is in a continuous decline.
- The poverty rate is high, determined by the economic status, low infrastructure, low education level, population aging, migration of the young people, the lack of jobs, and low income.
- Agricultural activities are almost the main source of existence, but being practiced in small farms mainly subsistence and semi-

subsistence farms, self-consumption is dominant and the obtained products are not market oriented. This means a low productivity and low income finally.

For these reasons, the South Muntenia region should be in the attention of the authorities at the national and local level and rationale programmes for its sustainable development are required. Investments in a modern infrastructure could create jobs, special educational programmes could be helpful for improving the education level, the measures of the National Programme for Rural Development are also important tools sustaining young farmers, modern technologies, a high a higher productivity and competitiveness of farms. All these could definitely contribute to a better living standard of the rural population of the South Muntenia region.

## REFERENCES

- [1] Brinaru Aurelia Ioana, Dona Ion, 2016, Analysis of the support mechanism of the pillar I and the results in the Romanian agricultural exploitations South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 16, Issue 2, 2016, 43-48
- [2] Busega Ionuț, 2014, Demo-economic restructuring in South-Muntenia development region. Causes and effects on the regional economy, Theoretical and Applied Economics Volume XXI (2014), No. 9(598), pp. 83-92
- [3] Chivu Luminita, Ciutacua Constantin, Georgescu Laurentiu, 2015, Household income in Romania. A challenge to economic and social cohesion, 2nd International Conference 'Economic Scientific Research - Theoretical, Empirical and Practical Approaches', ESPERA 2014, 13-14 November 2014,

Bucharest, Romania, Procedia Economics and Finance 22 ( 2015 ) 398 – 401.

[4]Cismas Laura, Miculescu Andra, Oțil Maria, 2010, Income and expenditure of households in Romania, Annals of Craiova University, pp.1-8, [http://feaa.ucv.ro/annals/v1\\_2010/038.02.pdf](http://feaa.ucv.ro/annals/v1_2010/038.02.pdf), Accessed March 28, 2018.

[5] Condei Reta, Alecu Ioan Niculae, Popescu Agatha, Ciocan Horia Niculae, 2016, The analysis of the human resources involved in the rural tourism in Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 16, Issue 2, 2016, 85-93

[6]Condei Reta, Popescu Agatha, Balan Aurelia, Tudor Valentina, 2015, Aspects of employment in agriculture in the main development regions of Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 2, 2015, 67-73

[7]Costaichie Georgiana Melania, Niculae Ioana, 2014, Sustainable development in public health in the South Muntenia Region and South West Oltenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14, Issue 1, 2014, 67-70

[8]Dinculescu Corina-Georgeta, 2016, The influence of education on rural population employment: Regional disparities, Agrarian Economy and Rural Development - Realities and Perspectives for Romania, 279-286, [https://www.econstor.eu/bitstream/10419/163386/1/IC-EADR-2016\\_p279.pdf](https://www.econstor.eu/bitstream/10419/163386/1/IC-EADR-2016_p279.pdf), Accessed April 3, 2018.

[9]Eurostat Statistics Explained, 2017, Statistics on rural areas in the EU, [http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics\\_on\\_rural\\_areas\\_in\\_the\\_EU](http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_rural_areas_in_the_EU), Accessed March 28, 2018.

[10]Gherghinescu Oana, Poverty and social exclusion in rural areas Romania, Final Report, Annex I, European Commisison, [ec.europa.eu/social/BlobServlet?docId=4436&langId=en](http://ec.europa.eu/social/BlobServlet?docId=4436&langId=en), Accessed March 28, 2018.

[11]Grigoras Mircea Adrian, Popescu Agatha, Holeab Cosmin, Chedea Veronica, Merce Emilian, 2007, Bridging the innovation gap and the management of interdisciplinary project for sustainable development, XXXVII Annual Meeting of European Society for New Methods in Agricultural Research, ESNA, 10-19.

[12] Herman Emilia, 2012, Rural employment in the context of Romanian Regional Development, Annals of the „Constantin Brâncuși” University of Târgu Jiu, Economy Series, Issue 3/2012, 131-140.

[13] Iorga Adina Magdalena, 2017, Characteristics of the Romanian agriculture workforce, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 2, 2017, 183-186.

[14]Lascar Elena, 2013a, Specific conditions and forms for the development of the rural area in South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 13, Issue 2, 2013, 209-212

[15] Lascar Elena, 2013b, The structure of the farms in South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 13, Issue 1, 2013, 205-208

[16]Lascar Elena, 2014a, The analysis of the rural infrastructure development in South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14, Issue 3, 2014, 135-138

[17] Lascar Elena, 2014b, The role of subsidies in the rural development of South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14, Issue 1, 2014, 179-182

[18] Lascar Elena, 2015, The analysis of the economic development of South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 1, 2015, 255-258

[19] Lascar Elena, 2017, Aspects regarding the house, education and health infrastructure in South Muntenia Region, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 1, 2017, 273-276

[20] Popescu Agatha, 2013, Consideration on the rural populartion as a resource of labor force in Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 13, Issue 3, 2013, 229-236

[21]Popescu Agatha, 2015, Research on labor productivity in Romania's agriculture, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 2, 2015, 271-280

[22] Popescu Agatha, Condei Reta, 2015, Research on Romania's employment in agriculture and its position in the European Union, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 2, 2015

[23] Regional Action Plan for Employing Labor Force and Social Inclusion and the Implementation Plan of the Regional Action Plan 2006 – 2008 South Muntenia Region, Labor Ministry, <http://www.mmuncii.ro/pub/imagemanager/images/file/Domenii/Management%20fonduri%20europene/SM.pdf>, Accessed March 20, 2018

[24]Romania's population by residence localities (Populatia Romaniei pe localitati dupa domiciliu), INSSE, 1 iulie 2016, [http://www.insse.ro/cms/sites/default/files/field/publicatii/populatia\\_romaniei\\_dupa\\_domiciliu\\_la\\_1\\_iul\\_2016\\_0.pdf](http://www.insse.ro/cms/sites/default/files/field/publicatii/populatia_romaniei_dupa_domiciliu_la_1_iul_2016_0.pdf), Accessed March 28, 2018.

[25]Smart specialization Starategy of South Muntenia Region, Innovative instrument devoted to regional economic development South Muntenia Region, Ministry of Regional Development and Public Administration, <http://s3platform.jrc.ec.europa.eu/documents/20182/164072/regioengfinal.pdf/eb02665f-256f-460f-9ab1-2260a918d588>, Accessed April 3, 2018.

[26] Social trends, 2016, INSSE, [http://www.insse.ro/cms/sites/default/files/field/publicatii/social\\_trends.pdf](http://www.insse.ro/cms/sites/default/files/field/publicatii/social_trends.pdf), Accessed March 28, 2018.

[27] Socio-economic analysis of the South Muntenia Region of Development, (Analiza socio-economica a regiunii de dezvoltare Sud Muntenia, ADR Sud Muntenia), [https://www.adrmuntenia.ro/.../analizasocecpdr20142020draft3revizuit110213\\_am\\_encr...](https://www.adrmuntenia.ro/.../analizasocecpdr20142020draft3revizuit110213_am_encr...), Accessed March 28, 2018.

[28] South Development Region (Regiunea de Dezvoltare Sud), [http://www.mdrl.ro/\\_documente/regiuni/3.S\\_ro.pdf](http://www.mdrl.ro/_documente/regiuni/3.S_ro.pdf), Accessed March 20, 2018

[29] South Muntenia Region, General Presentation, PPT, <http://www.provincia.fe.it/download/traian.pdf?server=sd2.provincia.fe.it&db=/intranet/internet.nsf&uid=F960872228EDA0C0C1257507002A59CD>, Accessed March 20, 2018

[30] Study regarding the actual development statement of the South Muntenia Region of development (Studiu privind stadiul actual de dezvoltare al ... - ADR Sud Muntenia) <https://www.adrmuntenia.ro/...file/.../studiu-infrastructura-adr-sud-muntenia-final-abc.pd...>, Accessed March 28, 2018.

[31] The National Institute of Statistics Tempo Online Data base, 2018., [www.insse.ro](http://www.insse.ro), Accessed April 3, 2018.

## E-BUSINESS APPLICATION TO IMPROVE TRACEABILITY AND SUPPLY CHAIN FOR FRESH FOOD

Ruxandra – Eugenia POP, Alexandra BRĂTULESCU

Research Institute for the Economy of Agriculture and Development, 61 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Phone: +40213136087, Fax:+40213136096, Mobile:+4087700676, Emails: pop.ruxandra@iceadr.ro, bratulescu.alexandra@iceadr.ro

*Corresponding author:* pop.ruxandra@iceadr.ro

### Abstract

*The agri-food sector in Romania is of particular importance for the market economy, referring to agriculture, food industry, commerce, and not ultimately the final consumer. Due to changes in consumer behavior of agri-food products, it is increasingly desirable to know the food traceability, the concept from farm to fork being constantly developing. In the context of ensuring food security, it is important to have an efficient monitoring of the food route in order to keep it fresh. An important factor in this process is the new communication and information technologies, which are in continuous development especially from the applicative point of view. This paper aims to support the producers and suppliers of fresh agri-food products in order to improve management at the short supply chain by exemplifying some types of computer tools that can be used in their work. The conclusion was that GIS maps and GPS location enable the use to know where production is located and the storage conditions.*

**Key words:** fresh food, supply chain, traceability, e-business tools

### INTRODUCTION

Traceability is a concept that refers to all products and to all types of supply chains. At present, in a system where companies compete in a highly consumer-centric environment, traceability is an indispensable tool in conducting an efficient activity. Its direct benefits are supply chain optimization, product safety and improved marketing.[8] There are several definitions in the literature for the traceability concept. The Webster's Dictionary defines traceability as "the ability to track or study in detail, or step by step, the history of a particular activity or process" [11].

There is also a definition that says "traceability is the ability to track a batch of products and its history throughout the entire production chain or part of it, from harvest to transport, storage, processing, distribution and sale" [6].

Moreover, traceability is, according to the European Commission, a major factor in ensuring food security, which is a risk management tool. [2]

Against this background, due to the importance of the traceability concept in a

competitive agri-food economy, it is important for the distribution chain to have an effective monitoring and control system.

Thus, managerial decisions can be made based on different parameters, such as the status of fresh food or the location of agri-food products.

### MATERIALS AND METHODS

In this paper we will use as methods the analysis of specialized literature, indigenous or international, to define the technologies used in the traceability system. The novelty of the paper is represented by a series of applicative recommendations from which users could start to develop a traceability system in their economic activity for fresh food such as vegetables or fruits. It will also analyze the positive effects that a traceability system can bring to the enterprise level, socially and environmentally.

### RESULTS AND DISCUSSIONS

It is known that the implementation of an efficient traceability system can bring a number of beneficial effects to the users.

Moreover, it can be a pillar in ensuring food safety, and benefits can also be observed at the social or environmental level. In Table 1, we briefly outline some of the benefits that traceability can bring at an economic, societal and environmental level.

Table 1. Efficient Traceability System Benefits

Category	Positive effects
Economic level	Cost saving; Increasing profit; Sales reduction protection
Social level	Consumer and public protection; Animal protection; Local business protection; Competition protection Labor protection.
Environmental level	Preventing air/soil/water pollution Protecting environmental resources

Source: Kraivuth K., Ting Z. (2011) [4]

In our opinion, the only weak point of the traceability system's development is that this procedure implies a increased implementation cost. But this cost will bring a lot of benefits for the user of the traceability system. In literature, different technologies are delineated to bring traceability from the concept stage to the practical stage. The more information the traceability system can generate, in terms of production times, lots, storage conditions, the more cost-effective the economic activity becomes and, why not, the reputation of the user. Currently, localization and identification technologies used on a large scale are:

*-Alphanumeric codes:* the presence of sequence numbers or letters on product labels generated by a company's organization; [1]

*-Bare Codes:* optical representation of the data, giving an automatic reading of data on production, distribution, storage or retail sale; [3]

*-RFID: Radio Frequency Identification:* allows automatic identification of products, being considered a more advanced version of bar code reading; [10]

*-GIS: Geographic Information System:* technology based on a computerized information management system in terms of space coordinates; [7]

*-GPS: Global Positioning System:* satellite positioning system, based on 24 satellites, which continuously orbits the earth. [9].

In Table 2 we synthesize the positive effects that these technologies can produce.

Table 2. Positive effects of different technology types

Technology Type	Positive Effects
Alphanumeric codes	economical; easy to use, but it implies high costs with the human resources that manipulates them;
Bar code	fast and cheap approach, but there is a physical dependence on the product that needs to be tracked
RFID	high level of the data identification and does not require a manual scanning of the product
GIS	the use of this tool in the supply chain can lead to a sustainable development of the food chain
GPS	GPS localisation can provide real time information and this type of instrument is

Source: Kraivuth K., Ting Z. (2011) [4]

By briefly presenting the technologies used to ensure the traceability system and analyzing the positive effects they bring, we can state that GIS and GPS technologies are superior to others. Of course, account must be taken of the particularities of the user's activity.

In case of this paper, we refer to the traceability system for fresh food, such as vegetables or fruit. Thus, it is important for the user to have accurate information about the humidity, pressure and temperature at which foods are subjected during transport or storage. All the more, the different storage conditions vary according to each product. Taking the example of certain types of vegetables, we can see in Table 2 that the optimum humidity and temperature differ for each of them.

With a good traceability system, the user will be able to see on the GIS maps if their products are maintained in optimal parameters to ensure the quality of the high end product. Also, using the GPS tracking system, it is possible to check the route of the products at any time whether we refer to their route from the farm to the processing and processing plants (in the case of commercial companies)

or from the place of production to the consumer (in the case of individual households). [5]

Table 3. Humidity and temperature parameters for different types of vegetables

Type of vegetables	Humidity parameters	Temperature parameters
Tomatoes	85% - 95%	0°C - 1°C (4-5 weeks) or 1,6°C - 10°C (until maturity)
Cucumbers	80% - 90%	6°C - 10°C
Cabbage	85% - 95%	0°C - minus 1°C

Source: Marin A., et. all, 2016 [5]

In our opinion, at the level of supply chain management, for fresh products, there should be a traceability system to ensure:

- Effective management of the supply chain for fresh food or agricultural products;
- Monitoring the status of agrifood products through a web tool, chosen according to the particularities of the activity and the financial resources available to the company;
- Providing real-time information on the route that agrifood products are going through, using, for example, GPS technology to make it effective;
- Providing important information to properly manage the supply chain, such as: stock of products, raw materials, auxiliary materials, this can be done through mobile applications.

## CONCLUSIONS

In the first part of this paper we analyzed the traceability concept and the benefits that an efficient traceability system can bring to the user level. Due to the development of information technology, there are multiple variants of transformation of traceability from the concept stage into practice. Analyzing the widely used technologies, we conclude that it would be advisable to turn our attention to GIS maps and GPS location. Thus, the user will not only know where production is located, but he will be able to see if the production is stored under optimum conditions and fit into specific parameters such as humidity or temperature.

We took the example of these parameters for tomatoes, cucumbers and cabbage. At the end of this paper we outlined some recommendations on what an IT system should provide.

## REFERENCES

- [1] Abad, E, Palacio, F., Nuin, M, Zárata, A.G.D., Juarros, A, Gómez, J.M., Marco, S., 2009, RFID smart tag for traceability and cold chain monitoring of foods: Demonstration in an intercontinental fresh fish logistic chain, *Journal of Food Engineering*, Vol 93, Issue 4, pp. 394-399;
- [2] European Commission 2007, Health and Consumer Protection, Available at [http://ec.europa.eu/food/food/foodlaw/traceability/foods/heet/trace\\_2007\\_en.pdf](http://ec.europa.eu/food/food/foodlaw/traceability/foods/heet/trace_2007_en.pdf), Accessed January 15, 2018.
- [3] Flott, L.W., 2002, Bar codes, *Metal finishing*, Vol 100, pp. 42-47.
- [4] Kraisintu, K., Zhang, T., 2011, The Role of Traceability in Sustainable Supply Chain Management, Master of Science Thesis Report No. E2011:085, Göteborg, Accessed January 15, 2018. <http://publications.lib.chalmers.se/records/fulltext/146242.pdf>, Accessed January 15, 2018, pp. 15-17; 29-36.
- [5] Marin Ancuța, Raluca Andreea Ion, Iuliana Dobre, Chetroiu Rodica, Iurchevici Lidia, Ruxandra Eugenia Pop, Valentina Tudor, Marius-Mihai Micu, Melania Costaiache, 2016, Proiectarea și experimentarea de modele de dezvoltare a lanțurilor scurte de valorificare a producției de legume, Ed. ASE, Bucharest, pp. 50; 54.
- [6] Moe, T., 1998, Perspectives on traceability in food manufacture, *Trends in Food Science & Technology*, Vol 9, pp. 211 – 214.
- [7] Qu, X., Zhuang, D., Qiu, D., 2007, Studies on GIS Based Tracing and Traceability of Safe Crop Product in China, *Agricultural Sciences in China*, Vol 6, No. 6, pp. 724-731.
- [8] Regattieri, A., Gamberi, M., Manzini, R., 2007, Traceability of food products: General framework and experimental evidence, *Journal of Food Engineering*, Vol. 81, pp. 347 – 256;
- [9] Rizos, C., 1999, *Satellite Navigation & Positioning Laboratory*, Available at [http://www.gmat.unsw.edu.au/snap/gps/gps\\_notes1.pd](http://www.gmat.unsw.edu.au/snap/gps/gps_notes1.pd), Accessed January 15, 2018.
- [10] Srivastava, B., 2004, Radio frequency ID technology: The next revolution in SCM, *Business Horizons*, Vol 47, No. 6, pp. 60-68.
- [11] Webster's Dictionary, 2011, Webster's Dictionary, [www.merriam-webster.com](http://www.merriam-webster.com), Accessed January 15, 2018.





## DEMOGRAPHIC AND ECONOMIC CHANGES CHARACTERIZING THE RURAL POPULATION IN ROMANIA

Agatha POPESCU, Toma Adrian DINU, Elena STOIAN

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest Romania, Phone: +40213182564, Fax: +40213182888, Email: agatha\_popescu@yahoo.com, tomadinu@yahoo.fr, stoian\_ie@yahoo.com

*Corresponding author:* agatha\_popescu@yahoo.com

### Abstract

*The analysis of the dynamics of the rural population and its structure in Romania in the period 2007-2016 was based on various demographic and economic criteria, the empirical data provided by the National Institute of Statistics, and corresponding processing methods. In 2016, Romania had 9,120,865 inhabitants in the rural areas, representing 46.2 % of the total population. The decline of 3.26 % of the rural population is explained by the low birth rate, high mortality rate, and migration mainly from rural to urban and urban to rural, and also to other countries (46 % of the rural population). The rural population is aging, proved by the unbalanced ratio between the people of 60 years and older (23.03 %) and the people of 0-14 years, (16.04%). About 4 million persons, i.e. 44.73 % of the country active population is in the rural space. Also, the elder age groups have a higher share in the economically active rural population. The rural employment accounts for 3.74 million people, i.e. 44.55% of the employment in Romania. The extreme age categories have the highest share in total employment, attesting the aging of the rural employment. Also, the low training level is reflected by the low share of rural people with high education: 6.52 % tertiary, 1.51 % post high school, 33.89 % high school, and 21.90 % vocational. About 40.54 % of the rural employment is represented by farmers and skilled workers, of whom 76 % are of 35 years and over and also most of them have a low training level. About 86 % of the rural population is part-time employed, and only 41 % is full time. Also, other disparities compared to the urban area, regard the average monthly income per household which accounted for Lei 2,447.02 in 2016, the higher income belonging to the employees. The agriculturists' income was Lei 2.163.31/household, by 12 % less than the average income in the rural area. Therefore, the rural population is an important human resource in the economy, but its living standard is very low. This situation will be changed by the implementation of the National Programme of Rural Development 2014-2020, whose measures will improve education level, farm technologies and efficiency, resource utilization, infrastructure in the rural space, social inclusion, and living standard of the rural population.*

**Key words:** rural population, demographic approach, economic approach, Romania

### INTRODUCTION

Romania has 238,297 square km surface, representing 5.34 % of the EU-28 area and comes on the 9th place after France, Spain, Sweden, Germany, Finland, Poland, Italy and United Kingdom. Of the total area of Romania, 207,522 square km, that is 87.08 % is represented by the rural area.

From an administrative point of view, in the year 2016, Romania had 2,861 communes and 12,957 villages in the rural space, by 0.17 % and respectively by 0.01 % more than in the year 2007 [2].

In 2016, Romania had 19.87 million inhabitants, representing 3.91 % of the EU-28 population and comes on the 7th position after Germany, France, United Kingdom, Italy,

Spain and Poland. The population of Romania has registered a continuous decreasing trend in the last decades due to the negative natural gain and the emigration rate. For this reason, it is expected as in 2060, Romania will have 16.3 million inhabitants. Of the total population of Romania, 9.12 million people live in the rural areas. [10].

The density of the rural population in Romania is very low, 47.9 persons per square km, representing 1/10 of the urban density and more than 50 % of the average density at the country level [13].

In 2016, Romania had 7,470 thousand households, representing 3.39 % din EU-28. Of the total number of households of Romania, 45 % are in the rural area [3].

In the rural areas, the main activities are related to agriculture, forestry and fishing, and just a few opportunities of diversification such as: the small industry and rural or agrotourism have contributed to the rural communities.

The low training level of the rural population compared to the urban population has led to a low productivity and household earnings. Only a higher level of education could assure and enable the qualified and skilled people to produce more and get more income and have a better living standard. [4].

The rural population in Romania is economically dependent on agriculture, which is the main occupation in the rural space. More than 50 % of agricultural production achieved in the rural households is used for self-consumption [16].

Between the dynamics of the population and the changes of its demographic variables it is close relationship which has a deep impact on the economic growth and social development [5, 15].

This is attested by the living standard in Romania in terms of GDP/inhabitant in PPS (Purchasing Power Standard), which has one of the lowest levels in the EU: 55 PPS/capita, the country being situated at the end of the list of countries, being followed only by Bulgaria [8, 17].

Population aging, the low education level, the difficult economic conditions in terms of technical endowment, infrastructure, the lack of jobs, the low earnings, the low social conditions, the dominant agricultural activities and the scarcity of other opportunities for obtaining additional income sources in the rural areas are the main features of the rural population in Romania [1, 6].

Due to this aspects, migration of rural population has become a critical problem in Romania and not only, and this seriously affects labor resources and GDP growth [18].

The low income and weak development of non-agricultural activities have determined the new generation to leave the communes and villages looking for jobs in the cities or to decide to find jobs abroad mainly in the EU countries where they could get a higher salary than in Romania [7, 12].

In this context, the present paper had the following objectives:(i) to analyze the dynamics of the rural population and of its structure in the period 2007-2016, based on various demographic and economic criteria and (ii) to point out the trends, characteristics, differences between the rural population and urban population and also compared to the average population indicators at the national level.

## MATERIALS AND METHODS

The analysis of the trends and characteristics of the rural population was based on two approaches:

(i)The demographic approach, using the following indicators: the number of inhabitants representing the rural population versus Romania's population, the number of births and the birth rate, the number of deaths and the mortality rate, the life expectancy, the age structure of the rural population, and the internal and external migration of the rural population.

(ii)The economic approach, using the following indicators: the economically active rural population, the age structure of the economically active population, the activity rate, the employed rural population, the age structure of the employed rural population, the structure of the employed rural population by status of employment, the structure of the employed rural population by education level, the structure of the employed rural population by group of occupation, the employed rural population by working programmes (full-time and part-time), the number of farmers and skilled workers and their share in the rural population, the structure of the farmers by age group and education level, the average income per household in the rural area and the average nominal net earnings of the rural population working in agriculture, forestry and fishing.

The analysis is founded on the empirical data supplied by the National Institute of Statistics Tempo Online database for the period 2007-2016.

As methodological aspects, there were used the following:

-The dynamic analysis of each indicator in the time interval 2007-2016, comparing the value at the end of the period ( $X_n$ ) with the value in the first year of the study ( $X_0$ ), using the Fixed Basis Index ( $I_{FB}$ ), whose formula is:  $I_{FB} = (X_n/X_0)100$ .

-The structural analysis of the indicators in order to emphasize the share of various components on the total value of the indicator, using the formula;  $S\% = (X_i/X_n)100$ .

-The comparison method for pointing out the differences between the level of the indicators characterizing rural population and the level at the national level and in the urban area.

The obtained results were included in tables and interpreted, and finally the corresponding conclusions results were drawn.

## RESULTS AND DISCUSSIONS

The rural population in Romania represents an important part of the population and plays a substantial role in the economy.

In this paper the topic on the rural population in Romania was demographically and economically approached.

### (a)The demographic approach of the rural population

**The evolution of the rural population versus Romania's population.** In 2016, Romania had 19,706,529 inhabitants, of which 9,120,865 represented the rural population (46.2 %). The evolution in the analyzed period 2007-2016 has pointed out that the rural population followed the same decreasing trend like Romania's population. While the population at the country level declined by 5.64 %, the rural population decreased by 3.26 %.

The share of the rural population in the country's population increased from 45.1 % in 2007 to 46.2 % in 2016.

The sex ratio at the country level was 1.04 female per male, and in the rural area it was almost 1:1. Therefore, the share of men is higher in the rural area compared to the average in the country.(Table 1).

Table 1. Romania's rural population on July 1st, in the period 2007-2016

	Total population	Rural population	The share of the rural population (%)	The share of males	
				In the total population (%)	In the rural population (%)
2007	20,882,980	9,427,486	45.1	48.6	49.6
2008	20,537,848	9,435,046	45.9	48.6	49.6
2009	20,367,437	9,390,879	46.1	48.6	49.6
2010	20,246,798	9,324,629	46.05	48.6	49.6
2011	20,147,657	9,269,558	46.0	48.7	49.6
2012	20,060,182	9,236,964	46.0	48.7	49.6
2013	19,888,694	9,216,016	46.3	49.0	49.9
2014	19,916,451	9,187,522	46.1	48.8	50.0
2015	19,819,687	9,150,118	46.1	48.8	50.0
2016	19,706,529	9,120,865	46.2	48.8	50.1
2016/2007 %	94.36	96.74			

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The evolution of the number of births and the birth rate.** The decline of the population both at the national level and in the rural areas was determined by the movements in the demographic status caused by births and births rate, deaths and mortality rate, which registered a decreasing trend in the period 2007-2016.

In 2016, Romania recorded 203,231 births, of which 92,194 births were achieved in the rural area, meaning 45.36 %. The share of the births in the rural area declined from 45.8 % in 2007 to 45.36 % in 2016, but the birth rate in case of the rural population was higher, 9.5 births/1,000 inhabitants, than in case of the

urban population, 8.9 births/1,000 inhabitants (Table 2).

**The evolution of the number of deaths and the mortality rate.** In 2016, the number of deaths accounted for 257,547 at the country level, while in the rural areas it was registered 135,329 deaths, representing 52.52 %.

While at the country level, the mortality rate increased by 2.2 %, in the rural areas, the mortality rate declined by 1.51 % in the analyzed period. The mortality rate in the rural areas declined from 14.1 deaths/1,000 inhabitants in 2007 to 13.9 deaths/1,000 inhabitants in 2016, but it is still much higher compared to the mortality rate in the urban

area, which increased from 8.9 in 2007 to 9.8 deaths/1,000 inhabitants in 2016.

Table 2. The dynamics of births at the country level and in rural areas Romania, 2007-2016

	Births at the country level	Births in the rural area	The share of the births in the rural area (%)	The birth rate (Number of births/1,000 inhabitants)	
				Urban	Rural
2007	214,728	98,361	45.80	9.1	10.1
2008	221,900	100,382	45.23	9.5	10.3
2009	222,388	100,524	45.20	9.5	10.3
2010	212,199	94,348	44.46	9.2	9.7
2011	196,242	89,575	45.64	8.4	9.2
2012	201,104	92,679	46.08	8.6	9.5
2013	214,932	96,820	45.04	9.3	10.0
2014	202,501	92,059	45.46	8.8	9.5
2015	201,023	90,586	45.06	8.8	9.3
2016	203,231	92,194	45.36	8.9	9.5
2016/2007 %	94.64				

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

The high mortality rate in the rural areas is determined by the low living conditions and the hard work in the country side (Table 3).

Table 3. The dynamics of deaths at the country level and in rural areas Romania, 2007-2016

	Deaths at the country level	Deaths in the rural area	The share of the deaths in the rural area (%)	The mortality rate (Number of deaths/1,000 inhabitants)	
				Urban	Rural
2007	251,965	137,403	54.53	8.9	14.1
2008	253,202	138,850	54.83	8.9	14.2
2009	257,213	141,045	54.83	9.1	14.5
2010	259,723	142,091	54.70	9.2	14.6
2011	251,439	136,791	54.40	9.0	14.1
2012	255,539	137,878	53.95	9.3	14.2
2013	250,466	134,059	53.52	9.2	13.8
2014	255,604	136,199	53.28	9.5	14.0
2015	261,697	138,745	53.01	9.8	14.3
2016	257,547	135,329	52.54	9.8	13.9
2016/2007 %	102.02	98.49%			

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The evolution of life expectancy.** Life expectancy increased both at the country level, in the urban and rural areas. In 2016, it accounted for 75.36 years at the country level,

76.79 % years in the urban space and 74.03 years in the rural areas. However, the rural population has the lowest life expectancy in Romania. (Table 4).

Table 4. The dynamics of life expectancy in Romania, in the urban and rural areas, 2007-2016 (years)

	At the country level	Urban	Rural
2007	72.61	73.34	71.64
2008	73.47	74.62	72.02
2009	73.76	75.04	72.18
2010	73.90	75.26	72.20
2011	74.20	75.50	72.55
2012	74.69	75.94	73.13
2013	75.15	76.26	73.65
2014	75.41	76.60	73.91
2015	75.39	76.63	73.85
2016	75.36	76.79	74.03

Source: The National Institute of Statistics Tempo Online Data base, 2018 [14]

**The evolution of the rural population versus urban population by age group.** The rural population by age group had a different net dynamics compared to the urban population. The age structure reflects that in case of the rural population, it is a higher share for the age groups between 0-19 years, and also for

the age groups 60 years and over, where the differences between urban and rural are the highest ones.

If in 2007, the rural population between 35-39 years had the highest share (8.52 %), in 2016, the highest shares belonged to the age groups

40-44 years (8.05 %) and 45-49 years (8.32 %). This reflected a higher aging percentage in the rural area versus the urban one.(Table 5).

Table 5. The evolution of the structure of the rural population versus the urban population, Romania, 2007-2016 (%)

	Urban population		Rural population	
	2007	2016	2007	2016
Total	12,819,220	12,521,300	9,743,693	9,708,759
0-4	5.05	4.60	5.52	4.84
5-9	5.12	5.11	6.09	5.43
10-14	5.24	5.06	6.14	5.77
15-19	7.10	5.17	7.26	6.23
20-24	7.46	5.48	6.81	6.26
25-29	8.24	7.69	7.30	7.44
30-34	8.27	7.41	7.88	6.58
35-39	9.19	8.51	8.52	7.74
40-44	5.60	8.12	4.97	8.05
45-49	6.48	8.77	5.24	8.32
50-54	7.13	5.41	5.55	4.90
55-59	6.19	6.41	5.60	5.41
60-64	4.43	6.39	4.81	5.39
65-69	4.50	5.14	5.35	5.01
70-74	4.11	3.52	5.24	3.93
75-79	3.11	3.27	4.07	3.90
80-84	1.85	2.27	2.45	2.84
85 years and over	0.87	1.58	1.10	1.91

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The internal and external migration of the rural population.**

The changes in the age structure and labor force structure is not caused only by the birth rate and mortality rate, but also by the internal migration determined by various reasons: from rural to urban looking for a job or for a better paid job, from rural to rural for a new residence and also looking for a job, from urban to rural, in case of the people who wants to escape of the urbanization and to live in a healthier and quite environment and to reduce the living cost, from urban to urban looking for a new residence and a better paid job.

Also, we must take into account the external migration to various countries where to find a job much better paid than in Romania. But the share of the external migration from the rural areas is lower compared to the internal migration by category [1, 2].

The internal migration increased by 4.06 % from 374,156 persons in 2007 to 389,373 in 2016. The migration rural to urban is much higher than rural to rural And the migration urban to rural is much higher than the migration rural to urban (Table 6).

Table 6. The evolution of the internal migration and its structure in Romania, 2007-2016 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2016/2007 %
Internal migration (persons)	374,156	389,254	330,672	450,995	324,626	372,197	350,556	371,677	361,083	389,373	104.06
Rural to Urban	21.4	20.2	21.2	21.3	20.5	20.0	21.1	21.0	21.5	21.2	-
Rural to Rural	21.4	20.1	20.3	19.8	19.5	19.5	18.6	19.1	19.7	19.7	-
Urban to Rural	31.6	32.0	29.1	29.5	31.8	31.8	29.2	29.7	29.5	31.0	-
Urban to Urban	25.5	27.5	29.2	31.1	28.6	28.6	30.9	30.0	29.1	27.9	-

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

The territorial flow of the population in Romania, especially from rural areas to urban areas, have been determined by the changes in the profile and socio-economic structure [9]. The migration rate per 1,000 inhabitants is the highest one for urban to rural, varying between 12.1 in the year 2007 to 12.5 in the year 2016. The migration rate in case of rural

to rural registered a slight decline from 8.2 in the year 2007 to 7.9 in the year 2016. The migration rate rural to urban had a continuous increase from 6.3 in the year 2007 to 6.6 in the year 2016. The migration rate urban to urban also increased from 7.4 in 2007 to 8.7 in 2016 (Table 7).

The external temporary migration accounted for 207,578 persons at the country level, of which 46.91 % represented emigrants from the rural areas in the year 2016. The number

of emigrants from the rural areas to other countries increased by 21.43 % in the period 2012-2016. (Table 8).

Table 7. The evolution of the migration rate per 1,000 inhabitants, 2007-2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	16.6	17.3	20.4	14.7	14.5	16.6	15.7	16.7	16.2	17.5
Rural to Urban	6.3	6.2	5.5	7.5	5.3	5.9	5.9	6.2	6.2	6.6
Urban to Urban	7.4	8.4	7.6	11.0	7.7	8.4	8.6	8.9	8.4	8.7
Rural to Rural	8.2	8.0	6.9	9.2	6.5	7.5	6.7	7.3	7.3	7.9
Urban to Rural	12.1	12.8	9.9	13.7	10.0	12.2	10.6	11.4	11	12.5

Source: The National Institute of Statistics Tempo Online Data base, 2018 [14]

It we take into consideration the emigrants for establishing their residence in other countries where they found good jobs, the figures are higher. Spain, Italy, United Kingdom, and

Germany are the main countries were Romanians are attracted to find a better paid jobs.

Table 8. The evolution of the external temporary migration, 2012-2016 (persons)

	2012	2013	2014	2015	2016	2016/2012 %
Temporary emigrants	170,186	161,755	172,871	194,718	207,578	121.97
Temporary emigrants from the rural area	80,200	71,860	80,977	91,211	97,394	121.43
The share of the rural emigrants (%)	47.12	44.40	46.84	46.84	46.91	-

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**(b)The economic approach of the rural population**

*The economically active rural population* accounted for 4,017 thousand persons, representing 44.73 % of the population economically active in Romania in the year 2016. In the analyzed period, the active rural population declined by 12 %, recording a similar decreasing trend like the active population at the country level (Table 9).

Table 9. The evolution of the economically active population at the country level and in the rural areas, 2007-2016 (Thousand persons)

	At the country level	In the rural areas	The share of the rural economically active population (%)
2007	9,987	4,564	45.6
2008	9,908	4,588	46.3
2009	9,576	4,474	46.7
2010	9,365	4,371	46.0
2011	9,188	4,131	44.9
2012	9,232	4,195	45.4
2013	9,202	4,180	45.4
2014	9,243	4,165	45.0
2015	9,159	4,146	45.2
2016	8,979	4,017	44.7
2016/2007 %	89.90	88.01	-

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

*The economically active population in the rural area by age group.* The rural active population has a higher share in the total

active population for the 15-24 years age group: 54.49 % in 2007 and 65.24 % in 2016 compared to the urban active population. Also, the rural active population has a higher share for the age groups: 50-64 and 65 years and over in the year 2007: 52.73 % and respectively, 93.33%, while in 2016, it was found 44.79 %, and respectively 91.55 %, much higher than in case of the active urban population.

Regarding the age group 25-34 years and 25-49 years, the rural population registered a lower share in the total active population and compared to the urban population both in 2007 and 2016 ( Table 10).

*The activity rate* by age group reflected the same situation like in case of the share of the rural population in the total economically active population. The highest activity rate belonged to the 15-24 years, 55-64 years and 15-64 years age groups of the rural population both in 2007 and 2016. (Table 11).

*The employed rural population* followed a similar decreasing trend like the urban population and also like the employment in the country. In 2016, the employed rural population accounted for 3,764,537 persons, being by 13.29 % less numerous than in the year 2007, while the employment at the

national level registered 8,448,777 persons, by 9.67 % less than in 2007. The share of the employment in the rural areas in Romania's employment declined from 46.42 % in 2007 to 44.55 % in 2016 (Table 12).

Table 10. The share of the economically active rural population versus the urban population by age group, 2007 and 2016 (%)

Age group	Economically active population					
	2007 = Total 9,986,795 persons			2016 = Total 8,978,646 persons		
	Urban	Rural	The share of rural population (%)	Urban	Rural	The share of rural population (%)
15-65 years and over	5,422,591	4,564,204	45.70	4,962,391	4,016,255	44.73
15-24	8.55	12.17	54.49	4.25	9.86	65.24
25-34	30.73	23.89	39.54	26.93	20.21	37.83
35-49	42.72	30.59	37.50	46.29	42.33	41.94
50-64	17.35	23.01	52.73	22.03	22.09	44.79
65 years and over	0.62	10.32	93.33	0.48	6.44	91.55

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

Table 11. The activity rate of the rural population versus urban population by age group in 2007 and 2016 (%)

Age group	Total	Urban	Rural	Total	Urban	Rural
15-64	88.1	63.7	69.5	65.6	66.4	64.6
15-24	34.2	26.5	45.3	28.0	20.2	35.4
25-34	84.1	86.1	81.3	80.6	84.0	75.5
35-54	82.6	83.1	81.9	82.6	85.4	78.9
55-64	41.7	27.9	57.5	44.2	39.7	50.6

Source: The National Institute of Statistics Tempo Online Data base, 2018 [14]

Table 12. The dynamics of the employed rural population in Romania, 2007-2016

	Employment at the national level	Employment in the rural area	The share of the employment in the rural area (%)
2007	9,352,472	4,341,475	46.42
2008	9,259,002	4,376,446	47.26
2009	8,952,355	4,235,719	47.31
2010	8,712,829	4,108,187	47.15
2011	8,528,149	3,904,970	45.78
2012	8,605,052	3,987,347	46.33
2013	8,549,132	3,962,003	46.34
2014	8,613,739	3,944,999	45.79
2015	8,535,386	3,872,894	45.37
2016	8,448,777	3,764,537	44.55
2016/2007 %	90.33	86.71	-

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The employed rural population by age group.**

The highest number of persons employed in the rural area belongs to the following age groups: 15-24 years: 56.89 % in 2007 and 67.11 % in 2016, 50-64 years: 53.49 % in 2007 and 65 years and over: 93.40 % in 2007 and 91.58 % in 2016.

All these figures reflect that the rural population has a high employment at the youngest and the oldest categories of people, with a negative impact on the productivity because young people is lacked of experience and the old people is also lacked of corresponding training but also of physical energy to work the land, to raise animals or to do other activities (Table 13).

Table 13. The structure of the employed rural population versus urban population by age group, in 2007 and 2016 (%)

Age group	Employment					
	2007 = Total 9,352,472			2016 = Total 8,448,777		
	Urban	Rural	The share of rural population by age group (%)	Urban	Rural	The share of rural population by age group (%)
15-65 years and over	5,010,997	4,341,475	46.42	4,684,240	3,764,537	44.55
15-24	7.08	10.78	56.89	3.38	8.59	67.11
25-34	30.96	23.72	39.90	26.64	19.77	37.36
35-49	43.41	30.90	38.14	47.03	41.96	41.76
50-64	17.87	23.73	53.49	22.42	22.78	44.94
65 years and over	0.66	10.84	93.40	0.50	6.87	91.58

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The number of employed persons in the rural areas by status of employment.** On the

1st position comes the number of employers, accounting for 1,545,315 persons in 2007 and



1,886,525 persons in 2016, representing 35.59 % and respectively 50.11 % in 2007 and 2016.

On the 2nd position comes the self-employed persons: 1,610,567 persons in 2007 and 1,174,716 persons in 2016, representing 37.09 % and, respectively 31.20 % of the employment in the rural area.

On the 3rd position is the contributing family worker whose share in the employed rural population was 26.52 % in 2007 and 17.96 % in 2016.

In the rural area, the number of employers declined from 30,611 persons in 2007 to 26,826 persons in 2016, and has the lowest share 0.7 % in the employed rural population (Table 14).

Table 14. The structure of the employed rural population versus urban population by status of employment, in 2007 and 2016 (%)

Age group	Employment					
	2007 = Total 9,352,472			2016 = Total 8,448,777		
	Urban	Rural	The share of rural population (%)	Urban	Rural	The share of rural population (%)
Total employment	5,010,997	4,341,475	46.42	4,684,240	3,764,537	44.55
Employee	91.79	35.59	25.14	92.09	50.11	30.42
Employer	2.11	0.70	23.37	1.29	0.71	30.68
Self-employed	5.12	37.09	86.25	5.75	31.20	81.34
Contributing family worker	0.96	26.52	95.98	0.85	17.96	94.40
Member of an agricultural holding or of a cooperative	0.007	0.08	0	-		

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The employed rural population by education level.**

In 2007, the majority of the employed rural population had various levels of education up to high school, accounting for 79.05 %. This category included the high school leavers 16.49 %, the people with vocational, complementary or apprenticeship 27.42 %, the people who graduated the gymnasium 32.49 %, the people with the primary school 11.89 % and the people without any education 1.32 %.

The employed rural population with high education level represented only 20.95 % of the total employment of the rural population

in 2007. In 2016, the employed rural population with post high school education represented 1.52 % and the people with higher education 6.52 %.

Therefore, the remaining of 91.95 % represented the employed rural population with a training level of high school and lower. However, in 2016, the percentage of high school leavers was by 33.89 % higher than in 2007. By education level, the rural population has the highest percentage of low education level and the lowest share of the high school education and tertiary education (Table 15).

Table 15. The structure of the employed rural population versus urban population by education level, in 2007 and 2016 (%)

Age group	Employment					
	2007 = Total 9,352,472			2016 = Total 8,448,777		
	Urban	Rural	The share of rural population (%)	Urban	Rural	The share of rural population (%)
Total employment	5,010,997	4,341,475	46.42	4,684,240	3,764,537	44.55
Tertiary education	22.80	3.12	10.62	31.81	6.52	14.14
Post high school specialty or technical foremen	6.71	17.83	18.72	4.38	1.52	21.89
High school	37.28	16.49	27.70	41.88	33.89	39.41
Vocational, complementary, apprenticeship	22.47	27.42	51.39	14.05	21.90	55.60
High school 1st cycle	2.97	5.45	61.42	-	-	-
Gymnasium	6.51	32.49	81.20	6.72	30.87	78.68
Primary	0.98	11.89	91.26	0.99	4.79	79.41
No education	0.25	1.32	81.77	0.13	0.47	73.09

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The employed rural population by group of occupation.** In the rural areas, the highest employment belongs to farmers, 2,280,469 persons in 2007 (52.52 %) and 1,526,462 (40.54 %) in 2016.

The workers represented 5.51 % in 2007 and 9.80 % in 2016, while the unskilled workers 15.08 % in 2007 and 12.71 % in 2016 in the total employment in the rural areas.

The number of artisans increased from 472,827 persons (10.89%) in 2007 to 590,007 persons (15.67%) in 2016.

The share of technicians, administrative clerks, experts and members of legislative, executive, senior officials of public administration etc represented 10.94 % in 2016 compared to 7,71 % in 2007 (Table 16).

Table 16. The structure of the employed rural population by group of occupation in 2007 and 2016 (%)

Group of occupations	2007	2016	2016/2007%
Total rural employment	4,341,475	3,764,537	86.71
Members of legislative, executive, senior officials of public administration, managers and clerks of economic, social and political units	0.87	1.17	117.08
Experts with intellectual and scientific occupations	1.80	5.07	250.47
Technicians, foremen and assimilated	3.55	2.70	66.00
Administrative clerks	1.49	2.00	116.44
Workers in services and trade and assimilated	5.51	9.80	154.22
Farmers and skilled workers in agriculture, forestry and fishing	52.52	40.54	66.93
Artisans and skilled workers in handicraft, machinery and equipment regulation and maintenance	10.89	15.67	124.78
Other categories	23.34	22.87	84.95
Unskilled workers	15.08	12.71	73.08

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The employed rural population by working programmes (full-time and part-time).** About 41.70 % in 2007 and 40.64 % in 2016 of the rural population was employed full-time, the percentage being lower compared to the urban population. Also, the share of the rural population employed part-time was much

higher 89.12 % in 2007 and 86.33 % in 2016 compared to the urban population.

Of the total employed rural population, the highest share belongs to the persons employed full-time 80.90 % in 2007 and 83.41 % in 2016, but the percentages are lower than in case of the urban population (Table 17).

Table 17. The structure of the employed rural population versus urban population by working programme, in 2007 and 2016 (%)

Working programme	Employment					
	2007 = Total 9,352,472			2016 = Total 8,448,777		
	Urban	Rural	The share of rural population by age group (%)	Urban	Rural	The share of rural population by age group (%)
Total employment	5,010,997	4,341,475	46.42	4,684,240	3,764,537	44.55
Employed full-time						
Full-time	97.98	80.90	41.70	97.89	83.41	40.64
Part-time	2.02	9.10	89.12	2.11	16.59	86.33

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**Farmers and skilled workers-the dominant category of the rural population.** Farmers and skilled workers are the main category of people in the rural population. Their number accounted for 2,382,132 persons in the year 2007 and 2,614,330 persons in the year 2016, according to the data provided by the National Institute of Statistics, 2018.

The farmers and skilled workers dealing with agriculture, forestry and fishing develop their activity both in the rural and urban areas.

The number of the farmers working in the rural areas represented 95.74 % in 2007 and 95.17 % in 2016 of the total number of farmers and skilled workers in Romania.

The farmers and skilled workers represented 52.52 % in 2007 and 40.54 % of the employed rural population, 23.85 % in the year 2007 and 26.17 % in the year 2016 of the total economically active population in Romania and 50 % in 2007 and 57.27 % in the year 2016 of the economically active rural population (Table 18).

Table 18. The number of farmers and skilled workers dealing with agriculture, forestry and fishing and their share in the economically active population, in 2007 and 2016

	2007	2016	2016/2007 %
Number of farmers and skilled workers	2,382,132	2,614,330	109.74
Of which in rural areas (%)	95.74	95.17	-
The share of the farmers and skilled workers (%) in:			
- employed rural population	52.52	40.54	
-economically active population at the country level	23.85	26.17	
-economically active rural population	50.00	57.27	

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

The age structure of the farmers and skilled workers reflects that the highest shares belong to the age groups 35 years and over, totalizing 75.98 %, while the young persons represented only 24.02 % in 2016. Compared to the year 2007, the percentage of the 15-24 years, 25-34 years and 65 years and over declined, while the percentage of 35-49 years and 50-64 years increased. Therefore, the age structure of the farmers and skilled workers is still unbalanced, the older farmers dominating in the Romanian agriculture. This confirms that farmers and skilled workers in Romania are aging, a general phenomenon in the economy (Table 19).

Table 19. The age structure of the farmers and skilled workers in 2007 versus 2016 (%)

Age group	2007	2016
15-24	9.53	8.59
25-34	18.33	15.43
35-49	24.37	28.99
50-64	29.76	30.93
65 years and over	19.00	16.06

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

The structure of the Romanian farmers and skilled workers by education level is the following one in 2016: gymnasium 48.19 %, vocational training 19.79 %, primary education 14.65 %, high school 10.56 %, high school 1st cycle 4.23 %, 0.7 % tertiary education, 0.7 % post high school, and without education 1.12 %. This reflects in general a low education level which has a deep impact on their performance in production and farm management, product quality and competitiveness in the market.

A positive aspect is that in the analyzed period it was noticed an improvement of the education level of this category of rural population. The number of farmers and workers with gymnasium, vocational training, high school and tertiary education increased, while the number of farmers and workers with high school 1st cycle, primary education and no education declined (Table 20).

Table 20. The structure of the farmers and skilled workers by education level in 2007 versus 2016 (%)

	2007	2016
Tertiary education	0.3	0.7
Post high school specialty or technical foremen	0.8	0.7
High school	9.36	10.56
Vocational, complementary, apprenticeship	21.14	19.79
High school 1st cycle	4.94	4.23
Gymnasium	43.38	48.19
Primary	17.90	14.65
No education	1.84	1.12

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The average income per household in the rural area.** The average monthly income per household increased in the analyzed period by 74.57 % at the country level from Lei 1,686.74 in the year 2007 to Lei 2,944.6 in the year 2016.

The average monthly income per household in the rural area followed an ascending trend from Lei 1,401.93 in 2007 to Lei 2,447.02 in 2016 (+74.54 %). Therefore, the average income/household represents 83.10% of the average income/household at the country level.

The employees in the rural areas registered the highest average monthly income/household, which exceeded by 45.38 % the average income/household in the rural area in 2016 compared to 47.53 % in 2007. In 2016, they had an average income accounting for Lei 3,557.65 compared to Lei 2,068.40 in the year 2007.

The average monthly income/household belonging to the employers in the rural area represented 83.67 % of the average income in the rural area. Their average income declined from Lei 2,466.08/household in 2007 to Lei 1,790.22 in 2016.

The workers dealing on their own recorded an average monthly income/household of Lei

1,358.51 in 2007 and Lei 1,989.8 in 2016, therefore their income increased by 46.46 %. But their income represented only 81.31 % of the average income/household in the rural area.

The agriculturists had an average monthly income/household of Lei 1,280.92 in 2007 and Lei 2,163.31 in 2016, meaning by 68.88 % more than in the first year of the analysis. Their income represented 88.36 % in the average income/household in the rural area in 2016.

The unemployed persons registered an average monthly income/household accounting for Lei 1,584.39 in 2016, by 56.15 % more than in 2007 (Lei 1,014.77). Their

average income represented 64.74 % of the average income in the rural area in 2016 compared to 72.38 % in 2007.

The pensioners from the rural area recorded Lei 2,015.92 average monthly income/household in 2016 by 65.74 % more than in 2007 (Lei 1,216.25). Their average income was 82.38 % of the average income in the rural area in 2016 compared to 86.73 % in 2007.

All these figures reflect that the average income/household in the rural areas is much smaller than the average income at the country level. This has a negative impact on the living standard of the households in the rural space of Romania (Table 21).

Table 21. The evolution of the average monthly income/household in the rural area by category of household, 2007-2016

	Average income/household at the country level	Average income/household in the rural area	The share of the average income/Household in the rural area (%)	The share of the average income/household in the rural area by category of household					
				Employee	Employer	Worker on its own	Agriculturists	Unemployed	Pensioner
2007	1,686.74	1,401.93	83.11	147.53	175.90	96.90	91.36	72.38	86.73
2008	2,131.67	1,751.76	82.17	136.75	77.55	86.78	90.63	68.38	91.16
2009	2,315.99	1,920.87	82.93	137.70	79.15	93.20	90.12	75.63	91.69
2010	2,304.28	1,940.14	84.19	138.80	92.27	97.70	91.82	86.31	91.82
2011	2,417.26	2,133.92	88.27	133.86	87.01	89.37	90.05	75.63	90.05
2012	2,475.04	2,182.09	88.16	136.78	87.40	85.17	90.02	90.21	90.02
2013	2,559.05	2,164.63	84.58	134.33	85.86	82.69	89.55	74.05	88.33
2014	2,500.72	2,139.51	85.55	143.43	83.67	86.14	86.23	74.32	86.23
2015	2,686.77	2,278.71	84.81	143.14	-	79.10	83.63	64.58	83.63
2016	2,944.6	2,447.02	83.10	145.38	-	81.31	88.36	64.74	82.38
2016/2007 %	174.57	174.54	-	-	-	-	-	-	-

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

**The average nominal net earnings of the rural population working in agriculture, forestry and fishing** is another indicator which reflect the living standard and purchasing power of a special category living in the rural areas and with the highest share in the rural population.

In the analyzed period, the average monthly nominal net earnings increased by 118.16 % from Lei 743 in the year 2007 to Lei 1,621 in 2016.

Despite that, the average monthly nominal net earnings in agriculture is lower, representing 79.22 % of the average monthly nominal net earnings in the economy, Lei 2,046 in 2016.

There are also differences regarding the average nominal net earnings between men

and women, both at the national economy and also in the rural area and in the field of agriculture, forestry and fishing.

Women are discriminated getting by 7 % lower net earnings per month compared to the average net earnings received by men.

In 2016, women received in average Lei 1,968/ month net earnings compared to Lei 2,116 received by men.

Also, women's monthly net earnings are by 1.42 % lower in the field of agriculture, forestry and fishing: Lei 1,603 per month received by women compared to Lei 1,626 per month received by men.

This differences are determined by gender, education level, age, experience and other factors (Table 22).

Table 22. The evolution of the average monthly nominal net earnings in agriculture, forestry and fishing by gender, 2007-2016 (Lei)

	Average monthly nominal net earnings in the economy (Lei/month)	Average monthly nominal net earnings in agriculture, forestry and fishing (Lei/month)	The share of the average monthly nominal net earnings in agriculture, forestry and fishing (%)	Average monthly nominal net earnings for men (Lei/month)		Average monthly nominal net earnings for woman (Lei/month)	
				(Lei/month)	% of Average monthly nominal net earnings in agriculture (%)	(Lei/month)	% of Average monthly nominal net earnings in agriculture
2007	1,042	742	71.3	746	68.1	733	74.7
2008	1,309	914	69.8	919	68.1	897	70.9
2009	1,361	1,007	73.9	1,014	72.1	986	75.2
2010	1,391	1,024	73.6	1,029	70.1	1,010	77.2
2011	1,444	1,044	72.2	1,053	68.8	1,012	75.01
2012	1,507	1,093	72.5	1,105	69.8	1,055	74.08
2013	1,579	1,179	74.6	1,190	72.5	1,141	75.6
2014	1,697	1,270	74.8	1,279	72.6	1,240	76.2
2015	1,859	1,371	73.7	1,377	71.4	1,353	75.8
2016	2,046	1,621	79.2	1,626	76.8	1,603	81.4
2016/2007 %	196.35	218.16					

Source: Own calculations based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [14]

## CONCLUSIONS

The rural population accounted for 9,120,865 inhabitants, representing 46.2 % of the total Romania's population in 2016. In the last decade it declined by 3.26 % due to the movements regarding the demographic indicators: the lower birth rate and the higher mortality rate compared to the urban area, and the internal and mainly the external migration caused by the low living conditions. As a result, life expectancy is 74 %, lower than in the urban area and the average at the country level. Population aging is another important feature of the rural space, reflected by the higher share of the people of 60 years and older, 23.03 %, compared to the youngest category 0-14 years, 16.04%. The internal migration accounted for 389,373 persons in 2016, being by 4.06 % higher than in 2007. In the internal migration, the share of the rural to urban migration was 21.12 % and of the urban to rural 31 %. About 46.91 % of Romania's emigrants are from the rural areas and their number increased by 21.43 % in the period 2012-2016.

The economically active rural population declined by 12 % in the last decade, accounting for about 4 million persons in 2016, representing 44.73 % of the active population in Romania. The aging of the economically active rural population is confirmed by its share in the total active population: 91.5 % for the age group 65 years and over, 44.79 % for the age group 50-64

years compared to 65.24 % for the 15-24 years age group.

About 3.74 million persons are employed in the rural areas, by 13.29 % less than in 2007, and represent 44.55% of the employment in Romania. The highest employment rate belongs to the extreme age categories: 15-24 years, 67.11 %, and 65 years and over, 91, 58 %, reflecting the aging of the employment in the rural area.

Of the rural employment, in the year 2016, 50.11 % were employers, 31.20 % self-employed, 17.96 % contributing family workers.

The rural population has a low education level as in the rural employment, the people with tertiary education accounts for 6.52 %, the ones with post high school education 1.52 %, the high school leavers 33.89 %, and 21.90 % have attended a vocational training. The remaining of 36.17 % has gymnasium and lower forms of education.

Farmers and skilled workers are the dominant category in the rural area, accounting for 2,614,330 persons in 2016, representing 40.54 % of the rural employment, 57.27 % of the economically active rural population, and 26.17 % of the economically active population in Romania. About 76 % of the number of farmers and skilled workers are of 35 years and over reflecting the aging of these categories of people with high importance in the economic development of the rural areas.

The Romanian farmers have a low training level, most of them attended gymnasium

48.19 %, vocational training 19.79 %, primary education 14.65 %, and high school 10.56 %, explaining, besides other factors, the low productivity and lack of competitiveness of the agricultural holdings.

The share of other categories of people are: artisans 15.67%, skilled workers 9.8 % and unskilled workers 12.71 %.

Most of the rural population 86.33 % is part-time employed, much more than in the urban area and only 41 % is full time employed, much less than in the cities.

Despite that the average monthly income per household in the rural area increased by 74.54 %, accounting for Lei 2,447.02 in 2016, it is far away from the level in the urban area or the average level in the country. Also, there are differences of income between males and females, the last category being disadvantaged. The employees have the highest income, Lei 3,557.65/household, compared to other categories of people in the rural areas. The agriculturists earned in average Lei 2.163.31/household, by 40 % less than the employees and by 12 % less than the average income in the rural area. All these reflect the low living standard in the rural areas.

This analysis has led to the conclusion that even thou the rural population has such a high share in Romania's population and importance as labor resource in the economy, its life is hard and it has the lowest living conditions.

For this reason, it was approved the National Programme of Rural Development 2014-2020 [11], which will be managed by the Ministry of Agriculture and Rural development and provides a new strategy for the development of the rural areas based on the equality and the elimination of discrimination. For its implementation, there were established important measures aiming the knowledge transfer and innovation in agriculture and rural areas, the promotion and implementation of the modern technologies destined to increase farm viability and competitiveness, the setting up of producers' organization and co-operation in agriculture and forestry, the reorganization of the food chain and the establishment of new quality systems for the agricultural and food products, the effective

use of resources under the climate change conditions, the promotion of social inclusion, the reduction of poverty and the economic development of the rural areas by investing in fixed assets, creating basic services in the local communities and renewing the communes and villages, and increasing the living standard of the rural population.

## REFERENCES

- [1]Chitea, L., 2017, Households in the Romanian rural area-theoretical model, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 1, 2017, 81-90
- [2]Cristina, A.-F., Manescu, C., Popescu, A.M., Mateoc-Sirb, N., 2015, Analysis of the Romanian rural area, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 4, 2015, pp.39-42
- [3]Eurostat Statistics Explained, 2018, Household composition statistics, [http://ec.europa.eu/eurostat/statistics-explained/index.php/Household\\_composition\\_statistics](http://ec.europa.eu/eurostat/statistics-explained/index.php/Household_composition_statistics), Accessed March 5, 2018.
- [4]Golas, J., 2017, Professional and social activation of rural population in Poland-Structural aspects and legal frameworks, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 3, 2017, 147-154.
- [5]Guran-Nica, L., Rusu, M., 2015, The changing demographic profile of Romanian rural areas, Agricultural Economics and Rural Development, New Series, Year XII, no. 1, p. 61-70.
- [6]Iorga, A., 2017, Characteristics of the Romanian agriculture workforce, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 2, pp.183-186.
- [7]Iorga, A., Toma, E., Dobre, C., Muscanescu, A., 2014, Rural labor force size and structure analysis, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14, Issue 2, 2014, 169-172
- [8]Living in the EU, 2018, [https://europa.eu/european-union/about-eu/figures/living\\_en#tab-0-1](https://europa.eu/european-union/about-eu/figures/living_en#tab-0-1), Accessed March 5, 2018.
- [9]Mateoc-Sirb, N., Mateoc, T., Manescu, C., Grad, I., 2014, Analysis on the phenomenon of population's migration in Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 14, Issue 1, pp.211-214
- [10]Monitorul de Cluj, 2018, Analysis. The most populated cities in Romania in 2017. Cluj exceeded by Iasi and Timisoara. (Analiza. Cele mai populate orașe din România în 2017. Clujul, depășit de Iași și Timișoara), <http://www.monitorulcj.ro/economie/61894-analiza-cele-mai-populate-ora%C5%9Fe-din-romania-in-2017-clujul-dep%C4%83sit-de-iasi-si->

timisoara#sthash.AXMpajqr.dpbs, Accessed March 5, 2018.

[11]National Programme of Rural Development 2014-2020,

<http://www.madr.ro/docs/dezvoltare-rurala/PNDR-2014-2020-versiunea-aprobata-30-iunie-2017.pdf>, Accessed March 5, 2018.

[12]Popescu Agatha, 2013, Considerations on the rural population as a resource of labour force in Romania. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 13(3):229-236

[13]Rusu, M., Florian, V., 2013, Rural space and rural development, in Romania, [https://ageconsearch.umn.edu/bitstream/122655/2/vol%201\\_3.pdf](https://ageconsearch.umn.edu/bitstream/122655/2/vol%201_3.pdf), Accessed February 3, 2018

[14]The National Institute of Statistics Tempo Online Data base, 2018

[15]Trebici, V., 1996, History of the Romanian demography, Review of Sociological Research (Istoria demografiei românești, Revista de cercetări sociologice) 2, pp. 146-153.

[16]Tudor, M.M., 2015, Small scale agriculture as a resilient system in rural Romania, Studies in Agricultural Economics 117, 27-34

[17]Tudor, M.M., 2016, Human Capital - catalyst or limiting factor of rural Romania's competitive capabilities,

[https://www.ierigz.waw.pl/download/18225-Tudor\\_M\\_M.pdf](https://www.ierigz.waw.pl/download/18225-Tudor_M_M.pdf), Accessed February 3, 2018

[18]Zaharco, S., 2015, Migration from rural areas-Its impact and prospects, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15, Issue 2, 2015, pp.435-438

## A STATISTICAL OVERVIEW ON THE AGROTOURIST GUESTHOUSES VERSUS TOURIST GUESTHOUSES OF THE COUNTY OF SIBIU, ROMANIA

Agatha POPESCU

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest Romania, Phone: +40213182564, Fax: +40213182888, Email: agatha\_popescu@yahoo.com

*Corresponding author:* agatha\_popescu@yahoo.com

### *Abstract*

*The paper analyzed the main indicators of the tourism offer and demand in the county of Sibiu in the period 2007-2016 in order to point out the development of tourist and agro-tourist guesthouses and of their role in the local and national tourism. Fixed basis indices, structural indices, regression models, coefficient of correlations have been the main procedures to process the statistical data supplied by the National Institute of Statistics. The tourism in the county of Sibiu and mainly in the rural tourism had a high dynamics in the analyzed interval. In 2017, in the Sibiu county there were 338 accommodation units, of which 91 tourist guesthouses and 138 agro-tourist guesthouses, whose capacity in terms of places was 10,902 beds at the county level, of which 22.79 % in agro-tourist guesthouses and 18.18 % in tourist guesthouses. In 2016, the Sibiu county registered 503,620 arrivals, of which 75,277 in tourist guesthouses and 54,448 in agro-tourist guesthouses. Of the 830,295 overnight stays in the county, 119,778 were in tourist guesthouses and 92,258 in agro-tourist guesthouses. The number of arrivals and overnight stays in guesthouses, mainly in the agro-tourist guesthouses increased 2 times. The highest average length of stay, 1.99 days was registered in agro-tourist guesthouses, followed by 1.73 days in tourist guesthouses. The rural tourism in the county of Sibiu offers 6% of the guesthouses and 6 % places in the guesthouses of the total existing in Romania. Also, 7.6 % of tourists and 7 % of overnight stays of Romania's tourism are recorded in the guesthouses of the Sibiu area. Tourism demand and offer indicators are closely related in the Sibiu county as proved by the regression models, the high value of the coefficients of determination and the coefficients of correlation. The sustainable development of the rural areas of the county of Sibiu depends on the new investments in infrastructure, the improvement of the managerial skills of the guesthouses' owners, on the promotion of the natural and cultural heritage, traditions, hospitality and high quality of services.*

**Key words:** *statistic approach, agro-tourist guesthouses, tourist guesthouses, Sibiu County, Romania*

### INTRODUCTION

Tourism is a benefic form of diversification of the activities of the local communities. The services of accommodation, board, entertainment and other services offered to the visitors could be an additional income and profit source. Also, tourism and travel services may support the activities of other "actors" who help the tourism such as transporters, small producers, retailers, artisans etc. Tourism is also an effective mean for promote the "treasures" of a country including natural resources, the historical and cultural heritage and the hospitality of its people [5].

The existence of a high percentage of people living in the rural areas of Romania (46%) has

encouraged the inhabitants, who usually practice agriculture, to think of rural and agro-tourism. More than this, people living in the urban areas are more and more attracted either to move their residence in the country side or to spend the holidays with their families in the middle of nature, far away from the noisy civilization, to taste fresh and healthy products directly from the source, to enjoy leisure and relaxation, to experience the country side life at a cheaper price [1].

This has stimulated the development of tourist and agro-tourist guesthouses in Romania during the last decade, for enlarging the tourism offer and for meeting much better the tourist demand [16, 17].

The increasing number of tourists who prefer accommodation and board in tourist and agro-



tourist guesthouses is a proof of their preference and orientation to this type of units with touristic function where the correlation between service quality and price is more convenient [9].

Nowadays, rural tourism is an important component of the sustainable development of the rural space assuring to visitors a harmonized combination between a pleasant stay, feeling and living the rural life, enjoying tasting delicious, fresh and healthy food and drinks and all these in a clean, peaceful and quiet environment full of fresh air and beauties of nature. In this way, both the tourists could benefit and also the owners of guesthouses.

The number of tourist and agro-tourist guesthouses has continuously increased reaching over 3,500 units in 2016, representing over 50 % of the total number of accommodation units with tourism function in the country [11].

Besides Brasov, Harghita, Arges, Maramures and Suceava counties, the Sibiu county plays a more and more important role on the touristic map of Romania [6].

The Sibiu County is situated right in the middle of Romania, in the South West part of the Transilvania region, in the proximity of the the Cindrel and Lotru Mountains, which are branches of the North part of the Southern Carpathians [13].

The Sibiu area is a charming depression with a plenty of small communities where traditions are well preserved and people is full of hospitality. Despite that at the county level, there are over 460 guesthouses, the National Tourism Authority sustains that only about 250 tourist units are operating in the rural area (54.34 %). Their offer includes 2,063 rooms and 4,518 places. Among the localities whose fame is well know it deserves to mention the following communes and villages: Sibiel, Rasinari, Poiana and Sadu as *localities with a rich ethnographic-folk heritage*, Gura Râului, Poiana and Saliste as *localities of the artisans*, Raul Sadului and Jina as *localities with beautiful landscapes and wonderful climate*, Poplaca, Cristian, Jina, Rod, and Raul Sadului as *localities of the shepards and pastoral activities* [3, 14].

Because the official statistics does not include all the exiting information about local tourism, many research studies are based on field survey using questionnaires on a panel of representative individuals. However, it is very difficult to assure a high precision to such a type of studies.

Even the impact of "Sibiu-The European Cultural Capital 2007", such an important event for Romania, the city of Sibiu and for Europe, was difficult to be assessed on the local tourism, economy in general and also from a social point of view. But what is sure is that it had a deep impact on the promotion of Romania at international level [4, 12].

The best known area where local traditions mainly connected to shepherds' life and customs is "Marginimea Sibiului" [15]. Here, agro-tourism is at home, farmers may promote their products and traditions and increase the living standard of their families, and visitors are delighted to have contact with the folk traditions (music, dance, costumes, events), rural life and gastronomy. The great atmosphere in the country side, the authenticity and unicity of the preserved traditions, habits, kindness and hospitality of the hosts, the local craft arts, are reasons to determine visitors to prefer to spend their holidays in tourist and agro-tourist guesthouses [2].

Therefore, rural tourism is a strategic option for sustainable development which could perfectly integrate rural economy, and life with the environment [8].

The development of the sustainable tourism in the Sibiu area requires investments in infrastructure and communication technology, entrepreneurial skills for the guesthouses' owners to enable them to diversify the local economy, to support eco-tourism and agro-tourism and to enhance the cultural heritage. [9].

In this context, the paper aimed to comparatively analyze: (i) the dynamics of the main tourist indicators: number of accommodation units for tourist reception, number of places, number of tourist arrivals, number of overnight stays, average length of stay at the county level, in case of tourist guest houses and in case of agro-tourist

guesthouses; (ii) the dynamics of the share of these indicators of the guesthouses in the county level; (iii) the relationship existing between these tourism indicators by means of regression function, coefficient of determination and Pearson coefficient of correlation in the period 2007-2016, based on the empirical data supplied by the National Institute of Statistics.

## MATERIALS AND METHODS

For setting up this paper, the following tourism indicators have been analyzed:

- the total number of accommodation units for tourist reception in the Sibiu county, of which the number of tourist and agro-tourist guesthouses;
- the number of places in the accommodation units at the county level, of which the number of places in the tourist and agro-tourist guesthouses;
- the average number of places/accommodation unit, the average number of places/tourist guesthouse and the average number of places/agro-tourist guesthouse;
- the number of tourist arrivals in the accommodation units at the county level, of which the number of arrivals in the tourist and agro-tourist guesthouses;
- the number of overnight stays in the accommodation units at the county level, of which the number of overnight stays in the tourist and agro-tourist guesthouses;
- the average length of stay in the accommodation units at the county level, of which the length of stay in the tourist and agro-tourist guesthouses.

These tourism indicators were analyzed in their dynamics in the period 2007-2017 using the data supplied by the National Institute of Statistics Tempo Online Data base [10].

In the study there were used different methods for processing the empirical data as follows:

- *The fixed basis index*,  $I_{FB} = (X_n/X_0)100$ , where  $X_n$  is the value of the variable X in the year n, and  $X_0$  is the value of the variable X in the first year taken into consideration.

- *The structural index*,  $S\% = (X_i/X_T) 100$ , where  $X_i$  = the value of the variable n and  $X_T$  = the sum of the values of the variables.

- *The absolute differences*,  $\Delta_x = X_1 - X_2$ , where  $X_1$  = the value of the variable 1 and  $X_2$  = the value of the variable 2.

- *The average length of stay*:  $D = \sum NO_i / \sum NT_i$ , where  $\sum NO_i$  = the number of overnight stays and  $\sum NT_i$  = the number of tourists.

- *The linear regression function*,  $Y_x = bx + a$ , where a is a constant and b is the regression. The graphically illustration was made using the Excel facilities.

- *The determination coefficient*,  $R^2$ , was also determined using the Excel facilities.

- *The Pearson correlation coefficient* was determined using the Excel facilities.

- *The comparison method* was also used to establish and comment the differences between various indicators in different types of accommodation units.

## RESULTS AND DISCUSSIONS

### **The accommodation capacity in terms of units with function for tourist reception.**

*The number of accommodations units for tourist reception* increased in the Sibiu County by 146 % from 137 units in the year 2007 to 338 units in 2017. The lowest level, 109 units, was registered in the years 2011 and 2012, but then, in the coming years, mainly since 2015, their number was higher and higher in order to keep pace with tourist demand, as long as the City of Sibiu and the county are among the most visited areas in Romania.

*The number of tourist guesthouses* had the most dynamics growth rate in the analyzed period, + 279.1 %, from 24 units in 2007 to 91 units in 2017. Their share in the total number of units for tourist accommodation increased from 17.5 % in 2007 to 26.9 % in 2017, that is 1.5 times, reflecting their importance in the structure of the accommodation units.

*The number of agro-tourist guesthouses* has followed a similar ascending trend. In the analyzed period, their number increased by 170.5 %, from 51 units in 2007 to 138 units in 2017. Their number was 1.5 times higher compared to the number of tourist

guesthouses in 2017. The share of the agro-tourist guesthouses in the number of accommodation units with tourist function registered the highest level in the years 2007-2010, then it declined to 18.3 % in 2011, but

after this year, it has continuously increased, reaching 40.8 % in 2017.

Therefore, the agro-tourist guesthouses had a higher share, 40.8 %, in the number of accommodation units compared to the tourist guesthouses, 26.9 %, in 2017 (Table 1).

Table 1. The evolution of the number of units with function for tourist accommodation, of which tourist and agro-tourist guesthouses in the Sibiu County, 2007-2016

	Number of accommodation units	Tourist guesthouses		Agro-tourist guesthouses	
		Number	Share in the number of units %	Number	Share in the number of units %
2007	137	24	17.5	51	37.2
2008	152	28	18.4	63	41.4
2009	172	32	18.6	74	43.0
2010	167	29	17.3	73	43.7
2011	109	27	24.8	20	18.3
2012	109	25	22.9	25	22.9
2013	112	26	23.2	25	22.3
2014	119	23	19.3	18	23.5
2015	315	90	28.6	118	37.5
2016	295	84	28.5	110	37.3
2017	338	91	26.9	138	40.8
2017/2007 %	246.7	379.1	-	270.5	

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

### The accommodation capacity in terms of the number of places (beds).

The total number of places in the accommodation units with tourist function has recorded a continuous development in the analyzed period. The total number of places increased by 112.8 % from 5,123 places in 2007 to 10,902 in 2017.

The number of places in the tourist guesthouses was 4.08 times higher in 2017 compared to 2007. In the last year of the analysis, it accounted for 1,983 compared to 485 beds in 2007. The share of the places existing in the tourist guesthouses increased from 9.4 % in 2007 to 18.2 % in 2017 in the total number of places in the Sibiu county. But the most dynamic period was 2015-2017 when their share was over 19 %.

The number of places in the agro-tourist guesthouses also registered an ascending trend between 2007 and 2010, then it declined in 2011, but after this year, the number exploded, so that in the last three years 2015-2018, it exceeded 2,000 places. As a result, the share of the places in the agro-tourist guesthouses varied between 12.4 % and 18.8 % in the period 2007-2009, with the lowest

level in 2011, 8.9 %, but then, it has continuously increased exceeding 20 % in the period 2015-2017. The share of the number of places in the agro-tourist guesthouses is much higher than the share of places in the tourist guesthouses (Table 2).

Therefore, in 2017, in the Sibiu County, there were 229 guesthouses and 4,468 places, representing 67.75 % of the total number of the accommodation units and 40.98 % of the total number of places. This reflects the increased importance of guesthouses in the local tourism, as a business for the local population in order to get additional incomes and as a form of diversification of the accommodation offer.

### The number of places per accommodation unit, per tourist guesthouse and agro-tourist guesthouse

The average number of places per accommodation unit with function for tourist reception at the county level varied between 37.3 beds in the year 2007 to 32.2 beds in 2017, meaning a decrease by 13.68 %. The top number of places, 56.2 beds/unit was registered in 2012 and the minimum level, 32.2 beds, in 2017.

Table 2. The evolution of the number of places in the units with function for tourist accommodation, of which in the tourist and agro-tourist guesthouses in the Sibiu County, 2007-2017

	Number of places in accommodation units	Places in the tourist guesthouses		Places in the agro-tourist guesthouses	
		Number	Share in the number of places in the total units %	Number	Share in the number of places in the total units %
2007	5,123	485	9.4	634	12.4
2008	5,265	589	11.1	807	15.3
2009	6,013	580	9.6	1,135	18.8
2010	6,538	581	8.9	1,043	15.9
2011	6,065	548	9.0	543	8.9
2012	6,125	518	8.5	670	10.9
2013	6,247	532	8.5	670	10.7
2014	6,547	491	7.5	736	11.2
2015	10,473	1,827	18.5	2,119	20.2
2016	10,036	1,841	18.3	2,048	20.4
2017	10,902	1,983	18.2	2,485	22.8
2017/2007 %	212.8	408.8	-	391.9	-

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

The average number of places per tourist guesthouse increased by 7.9 % in the analyzed period from 20.2 beds in 2007 to 21.8 beds in 2017.

In agro-tourist guesthouses, the average number of places registered the highest development, being by 45.16 % higher in 2017 compared to 2007. In the last year of the

analysis, it accounted for 18 places compared to 12.4 places in 2007 (Table 3).

The figures from Table 3 reflect that the average number of places per tourist and respectively per agro-tourist guesthouse is lower compared to the average at the county level. It is normal to be so as long as hotels have the highest share and capacity in the accommodation structure in the Sibiu county.

Table 3. The evolution of the average number of places per accommodation unit with function for tourist reception in the Sibiu County, 2007-2016

	The average number of places per			Absolute difference of average number of places per unit (±)		
	Accommodation unit at the county level (AUTF)	Tourist guesthouse (TGH)	Agro-tourist guesthouse (ATGH)	TGH-AUTF	ATGH-AUTF	ATGH-TGH
2007	37.3	20.2	12.4	-17.1	-24.9	-7.8
2008	34.6	21.0	12.8	-13.6	-21.8	-8.2
2009	34.9	18.1	15.3	-16.8	-19.6	-2.8
2010	39.1	20.0	14.3	-19.1	-24.8	-5.7
2011	55.6	20.3	27.1	-35.3	-28.5	+6.8
2012	56.2	20.7	26.8	-35.5	-29.4	+6.1
2013	55.8	20.5	26.8	-35.3	-29.0	+6.3
2014	55.0	21.3	26.3	-33.7	-28.7	+5.0
2015	33.2	21.4	18.0	-11.8	-15.2	-3.4
2016	34.0	21.9	18.6	-12.1	-15.4	-3.3
2017	32.2	21.8	18.0	-10.4	-14.2	-3.8
2017/2007 %	86.32	107.90	145.16	-		

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

This is reflected by the negative differences between the average number of places/tourist guesthouse and the average number of places/accommodation unit at the county level, and also between the average number of

places/agro-tourist guesthouse and the average number of places/accommodation unit at the county level.

But, if we comparatively study the average number of places per guesthouse, we may

easily notice that the differences are smaller, in favor of tourist guesthouses, but in the years 2011-2014, the average number of places in the agro-tourist guesthouses was higher than the average number of places per tourist guesthouse, and in the period 2015-2018, the differences were very small, just 3.3 - 3.8 places (Fig.1).

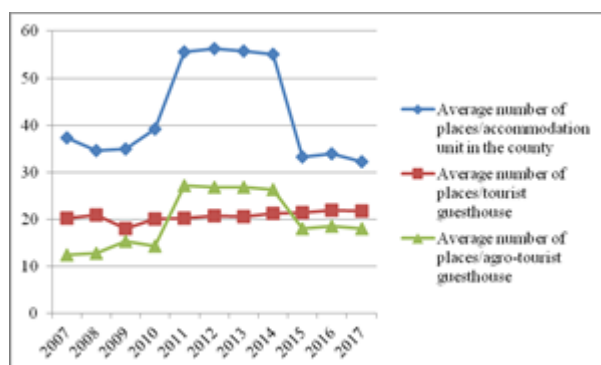


Fig.1. The comparative evolution of the average number of places per accommodation unit, per tourist guesthouse and per agro-tourist guesthouse in the Sibiu County, 2007-2016 [10]

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018

### The number of tourist arrivals.

The tourist arrivals in the accommodation units in the Sibiu county increased by 53.57 % in the analyzed period from 327,925 in 2007 to 503,620 in 2016. The lowest number of

arrivals, 228,195, was registered in 2010, due to the negative impact of the economic crisis on the people's income and their availability for travelling in general.

The arrivals in the tourist guesthouses increased much more, + 127.46 %, from 33,094 in the year 2007 to 75,277 in the year 2016. This happened because the highest share of tourists belongs to the Romanians who are looking for lower accommodation tariffs and preferred lodging in guesthouse. The share of the tourist arrivals in the tourist guesthouses in the total number of tourists accommodated in units with tourism function in the Sibiu county registered a general decline from 10.1 % in 2007 to 7.4 % in 2016, with the lowest level, 1.5 %, in the year 2011 and the highest one, 11.5 %, in the year 2015.

The arrivals in the agro-tourist guesthouses registered the highest growth rate in the analyzed period, + 141.78 %. It increased from 22,519 arrivals in 2007 to 54,448 in 2016. The share of the tourist arrivals in the agro-tourist guesthouses in the total number of tourists accommodated in units with tourism function recorded, in general, an increasing trend from 6.8 % in 2007 to 19.8 % in 2016, with the minimum value, 3%, in the year 2011 (Table 4).

Table 4. The evolution of the number of arrivals in the units with function for tourist accommodation, of which in the tourist and agro-tourist guesthouses in the Sibiu County, 2007-2016

	Arrivals in accommodation units in the county	of which, tourist arrivals in:			
		Tourist guesthouses		Agro-tourist guesthouses	
		Number	% in the total arrivals	Number	% in the total arrivals
2007	327,925	33,094	10.1	22,519	6.8
2008	287,103	28,600	9.9	26,884	9.4
2009	244,708	14,021	5.7	19,771	8.1
2010	228,195	5,347	2.3	9,885	4.3
2011	263,684	4,046	1.5	7,916	3.0
2012	285,136	7,415	2.6	15,167	5.3
2013	329,986	13,714	4.1	24,813	7.5
2014	355,698	15,433	4.3	25,975	7.3
2015	438,611	50,577	11.5	36,506	8.3
2016	503,620	75,277	7.4	54,448	10.8
2016/2007 %	153.57	227.46	-	241.78	-

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

### The number of overnight stays.

The number of overnight stays in the Sibiu county increased by 56.62 % from 530,100 in the year 2007 to 830,295 in 2016.

The number of overnight stays in the tourist guesthouses also recorded an increasing trend, in 2016 accounting for 119,778, being 2.2 times higher than in 2007, when it accounted

for 54,058. As a result of its dynamics, the share of the overnight stays in the tourist guesthouses in the number of overnight stays at the county level registered a slight increase from 10.2 % in 2007 to 14.4 % in 2016. The lowest levels were recorded in the years 2011-2014 varying between 2 and 3.4 %.

*The number of overnight stays in the agro-tourist guesthouses increased by 115.17 %*

from 42,876 in 2007 to 92,258 in 2016. The lowest number was recorded in 2011, 18,117 overnight stays. The share of the overnight stays in the agro-tourist guesthouses in the total overnight stays at the county level increased from 8% to 11 %. The lowest share was 3.9 % recorded in the year 2011 (Table 5).

Table 5. The evolution of the number of overnight stays in the units with function for tourist accommodation, of which in the tourist and agro-tourist guesthouses in the Sibiu County, 2007-2016

	Overnight stays in accommodation units in the county	of which, overnight stays in:			
		Tourist guesthouses		Agro-tourist guesthouses	
		Number	% in the total overnight stays	Number	% in the total overnight stays
2007	530,100	54,058	10.2	42,876	8.0
2008	459,342	48,120	10.5	54,267	11.9
2009	381,672	26,845	7.0	43,854	11.5
2010	401,578	11,078	7.0	25,409	6.3
2011	461,636	9,167	2.0	18,117	3.9
2012	490,260	15,139	3.0	30,499	6.2
2013	540,507	19,714	3.4	39,449	7.3
2014	581,505	19,798	3.4	42,050	7.2
2015	740,946	77,986	10.5	69,335	9.3
2016	830,295	119,778	14.4	92,258	11.1
2016/2007 %	156.62	221.57	-	215.17	-

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

**The average length of stay.**

*The average length of stay of the tourists in the accommodation units in the Sibiu county remained relatively stable at 1.6 days, in 2016*

compared to 2007, but with a peak of 1.8 days in 2010 and with the lowest level, 1.5 days, in 2009.

Table 6. The evolution of the average length of stay in the accommodation units with function for tourist reception in the Sibiu County, of which in tourist guesthouses and agro-tourist guesthouses, 2007-2016

	The average length of stay in			Absolute difference of average length of stay (±)		
	Accommodation units at the county level (AUTF)	Tourist guesthouses (TGH)	Agro-tourist guesthouses (ATGH)	TGH-AUTF	ATGH-AUTF	ATGH-TGH
2007	1.6	1.6	1.9	0	+0.3	+0.3
2008	1.6	1.7	2.1	+0.1	+0.5	+0.4
2009	1.5	1.9	2.2	+0.4	+0.7	+0.3
2010	1.8	2.1	2.6	+0.3	+0.8	+0.5
2011	1.7	2.2	2.3	+0.5	+0.6	+0.1
2012	1.7	2.0	2.0	+0.3	+0.3	0
2013	1.6	1.4	1.6	-0.2	0	+0.2
2014	1.6	1.3	1.6	-0.3	0	+0.3
2015	1.7	1.5	1.9	-0.2	+0.2	+0.4
2016	1.6	1.6	1.7	0	+0.1	+0.1
2016/2007 %	100.0	100.0	89.5	-	-	-

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

*The average length of stay in the tourist guesthouses also remained at the same level, 1.6 days in 2016 like in 2007.*

But across the time, it registered a peak of over 2 days in the years 2010-2012 and the shortest stay of 1.3 days in 2013.

In the period 2008-2012, the average length of stay was higher in the tourist guesthouses compared to the average length of stay at the county level.

The average length of stay in the agro-tourist guesthouses declined from 1.9 days in 2007 to 1.7 days in 2016, therefore by 10.5 %. But, it registered the top value, 2.6 days in 2010, and the lowest value 1.6 days in 2013 and 2014 (Table 6).

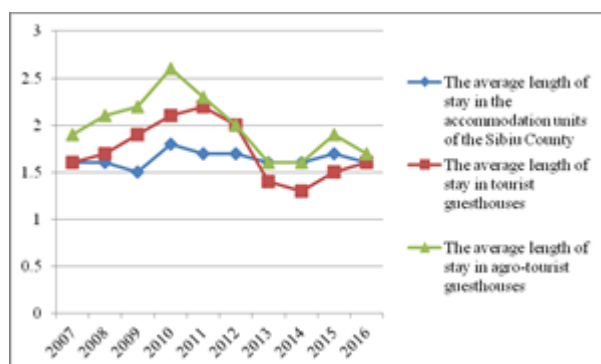


Fig.2. The comparative evolution of the average length of stay in the total accommodation units, in the tourist guesthouse and in the agro-tourist guesthouse in the Sibiu County, 2007-2016

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

Looking at the figures presented in Table 6, one can easily notice the differences in favor of tourist and agro-tourist guesthouses regarding the average length of stay compared to the average length of stay at the county level.

Table 7. The share of the tourism indicators of the tourist and agro-tourist guesthouses of the County of Sibiu in Romania's tourism (%)

2007	2016	2007	2016	2007	2016
<b>The share of the accommodation units with function for tourist reception of the Sibiu county (%)</b>					
<i>At the county level</i>		<i>Tourist guesthouses</i>		<i>Agro-tourist guesthouses</i>	
5.08	4.61	3.26	5.95	3.94	6.15
<b>The share of the number of places of the Sibiu county (%)</b>					
<i>At the county level</i>		<i>Tourist guesthouses</i>		<i>Agro-tourist guesthouses</i>	
1.80	3.18	3.61	6.01	4.10	6.02
<b>The share of the tourist arrivals in the Sibiu County (%)</b>					
<i>At the county level</i>		<i>Tourist guesthouses</i>		<i>Agro-tourist guesthouses</i>	
4.70	4.57	7.32	7.22	7.80	7.84
<b>The share of the overnight stays in the Sibiu County (%)</b>					
<i>At the county level</i>		<i>Tourist guesthouses</i>		<i>Agro-tourist guesthouses</i>	
2.57	3.26	5.82	6.12	7.23	7.88

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

The number of overnight stays in the Sibiu County accounts for 3.26 % of the overnight

The length of stay is higher in the agro-tourist guesthouses compared to the average at the county level, and also compared to the average length of stay in the tourist guesthouses (Fig.2.).

**The share of the tourism indicators of the guesthouses of the Sibiu County in Romania's tourism.**

Taking into account the evolution of the indicators mentioned above regarding the tourism and offer in guest houses in the Sibiu County, it was analyzed the place of tourism in this area in Romania's tourism.

The number of units with accommodation function in the Sibiu County represents 4.61 % of the total number of accommodation units in Romania's tourism. The number of tourist and agro-tourist guesthouses represents 5.95 % and respectively 6.15 % of guesthouses existing in the country.

The total number of places of the Sibiu County represents 3.18 % of the places existing in Romania's tourism, and the number of places existing in the tourist and agro-tourist guesthouses represents 6.01 % and respectively 6.02 % in the total number of places in the tourism of the country.

The tourist arrivals in the Sibiu County accounts for 4.57 % of the total arrivals in Romania. The tourist arrivals in tourist and agro-tourist guesthouses account for 7.22 % and respectively 7.84 %.

stays in Romania's tourism, and the number of overnight stays in the tourist and agro-tourist



guesthouses accounts for 6.12 % and 7.88% (Table 7).

Therefore, it is easy to notice that the share of the analyzed tourism indicators in the Sibiu County in the level of statistical indicators at the county level has increased since 2007 till 2016, reflecting the development of tourism in the County of Sibiu emphasizing the high dynamics of tourism at the level of tourist guesthouses and mainly at the level of the agro-tourist guesthouses.

Agro-tourism is well represented in the county of Sibiu and it is a higher and higher attraction for tourists.

**The relationship between the number of tourist arrivals and the number of places in the tourist guesthouses** is reflected by the linear regression function and the value of the coefficient of determination as presented in Fig. 3. The regression equation tells us that the increase of the number of places by 10 in the tourist guesthouses will determine an increase of 347 tourist arrivals. The determination coefficient confirmed that 73.95 % of the variation of the number of tourist arrivals in the tourist guesthouses is determined by the variation of the number of places in this type of accommodation units in the Sibiu County (Fig.3.)

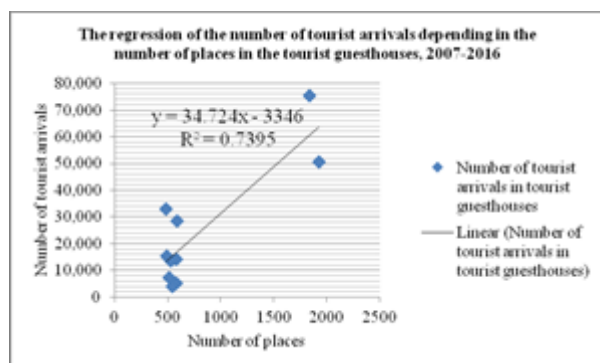


Fig.3. The regression of the number of tourist arrivals depending on the number of places in the tourist guesthouses in the Sibiu County, 2007-2016

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018, [10]

**The relationship between the number of tourist arrivals and the number of places in the agro-tourist guesthouses** is shown by the linear regression function and the value of the coefficient of determination as presented in

Fig. 4. The regression equation shows that the increase of the number of places by 10 in the agro-tourist guesthouses will led to 178.8 tourist arrivals. The coefficient of determination attested that 58.52 % of the variation of the number of tourist arrivals in caused by the variation of the number of places (Fig.4.)

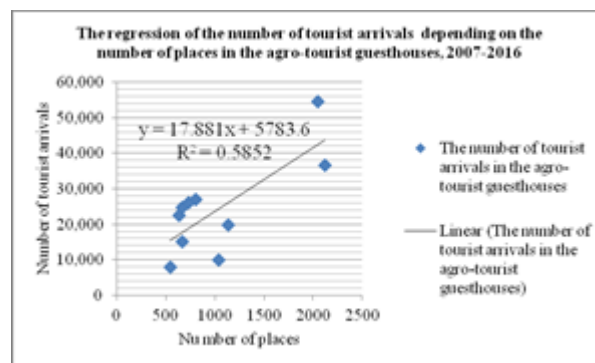


Fig.4. The regression of the number of tourist arrivals depending on the number of places in the agro-tourist guesthouses in the Sibiu County, 2007-2016

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

**The relationship between the number of overnight stays and the number of places in the tourist guesthouses** is enough strong (Fig.5).

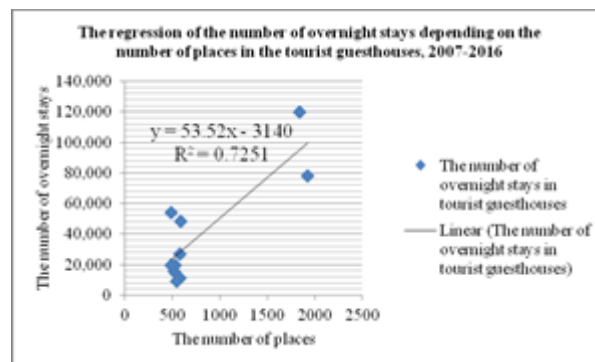


Fig.5. The regression of the number of overnight stays depending on the number of places in the tourist guesthouses in the Sibiu County, 2007-2016

Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

This is confirmed by the regression function and the coefficient of determination presented in Fig.5.

The regression function showed that an increase by 10 places in the tourist



guesthouses will determine an increase by 535.2 of the number of overnight stays. The determination coefficient reflected that 72.51 % of the variation of the number of overnight stays in the tourist guesthouses is caused by the variation of the number of places ( Fig.5). **The relationship between the number of overnight stays and the number of places in the agro-tourist guesthouses** is a strong one, and the regression equation allows us to affirm that an increase by 10 places in the agro-tourist guesthouses will induce a growth by 311.3 overnight stays in this category of accommodation units. The coefficient of determination confirmed that the regression function is valid and that 68.66 % of the variation of the number of overnight stays is influenced by the variation of the number of places in the agro-tourist guesthouses (Fig.6).

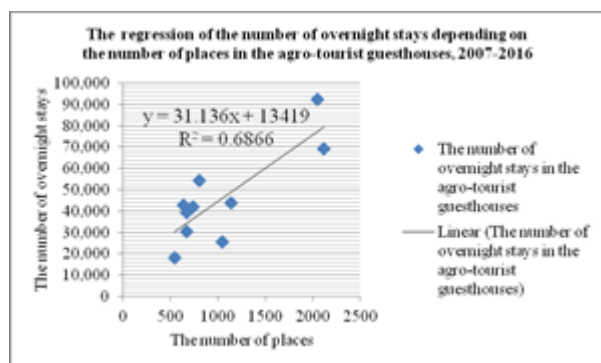


Fig.6. The regression of the number of overnight stays depending on the number of places in the tourist agro-guesthouses in the Sibiu County, 2007-2016  
 Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

**The relationship between the number of overnight stays and the number of tourist arrivals in the tourist guesthouses** was confirmed by the linear regression equation and the coefficient of determination as illustrated in Fig.7. An increase by 10 arrivals in the tourist guesthouses will cause an increase by 155.1 of the number of overnight stays. About 99.35 % of the variation of the number of overnight stays is caused by the variation of the number of arrivals in the tourist guesthouses in the Sibiu County (Fig.7).

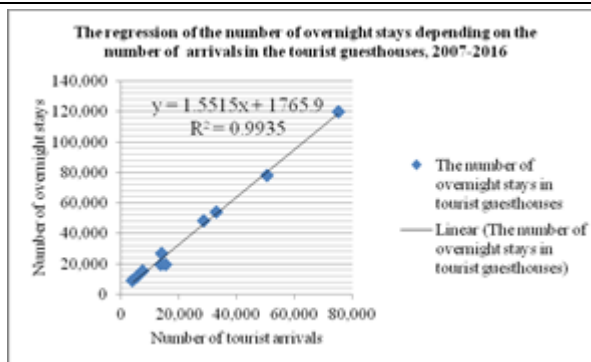


Fig.7. The regression of the number of overnight stays depending on the number of arrivals in the tourist guesthouses in the Sibiu County, 2007-2016  
 Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

**The relationship between the number of overnight stays and the number of tourist arrivals in the agro-tourist guesthouses** was also confirmed by the linear regression function and the determination coefficient. For an increase by 10 tourist arrivals it is expected an increase by 157.5 of the number of overnight stays in the agro-tourist guesthouses. About 96.09 % of the variation of the number of overnight stays is determined by the variation of the number of arrivals in the agro-tourist guesthouses (Fig.8).

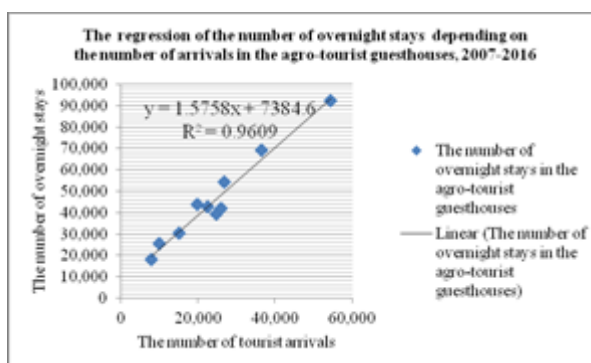


Fig.8. The regression of the number of overnight stays depending on the number of arrivals in the tourist agro-guesthouses in the Sibiu County, 2007-2016  
 Source: Own design based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

### The Pearson correlation coefficient.

This strong relationship between the analyzed tourism indicators at the level of tourist and agro-tourist guesthouses was also confirmed

by the coefficient of correlation which had high positive values as presented in Table 8.

Table 8. the correlation coefficients between the main tourism indicators characterizing the tourist and agro-tourist guesthouses in the Sibiu County in the period 2007-2016

Pairs of indicators	Coefficient of correlation, $r_{xy}$
The number of tourist arrivals and	
(a)The number of places in the tourist guesthouses	$R_{XY} = 9.859$
(b)The number of places in the agro-tourist guesthouses	$R_{XY} = 0.765$
The number of overnight stays and	
(a)The number of places in the tourist guesthouses	$R_{XY} = 0.851$
(b)The number of places in the agro-tourist guesthouses	$R_{XY} = 0.829$
The number of overnight stays and:	
(a)The number of arrivals in the tourist guesthouses	$R_{XY} = 0.996$
(b)The number of arrivals in the agro-tourist guesthouses	$R_{XY} = 0.980$

Source: Own calculation based on the data provided by the National Institute of Statistics Tempo Online Data base, 2018 [10]

## CONCLUSIONS

The tourism in the county of Sibiu has recorded a high development during the analyzed period reflecting its importance in the tourism of Romania.

The accommodation capacity in terms of units with reception function for tourist has increased 2.46 times at the county level, 3.7 times in case of tourist guesthouses and 2.7 times in case of agro-tourist guesthouses. In 2017, the Sibiu county had 338 accommodation units, 91 tourist guest houses and 138 agro-tourist guesthouses.

In terms of places, the accommodation capacity increased even more: 2.1 times at the county level, 4 times in tourist guesthouses and 3.9 times in case of agro-tourist guesthouses. In 2017, the total offer of places in the tourism of Sibiu county was 10,902, of which 1,983 beds in tourist guesthouses and 2,485 beds in agro-tourist guesthouses.

The average number of places at the county level was 42.53 beds/unit, and in tourist guesthouses accounted for 20.65 beds and in agro-tourist guesthouses for 19.67 beds.

The tourist demand in terms of tourist arrivals has increased 1.5 times at the county level, 2.2 and respectively 2.4 times in tourist and agro-tourist guesthouses. In 2016, in the county of Sibiu there were registered 503,620 arrivals, of which 75,277 in tourist guesthouses and 54,448 in agro-tourist guesthouses.

The tourist demand in terms of overnight stays has also increased 1.5 times at the county level, 2.2 times in tourist guesthouses and 2.1 times in agro-tourist guesthouses. In

2016, there were recorded 830,295 overnight stays, of which 119,778 in tourist guesthouses and 92,258 in agro-tourist guesthouses.

The average length of stay accounted for 1.64 days at the county level, and 1.73 days in tourist guesthouses and 1.99 days in agro-tourist guesthouses.

The importance of the rural tourism in the county of Sibiu has increased year by year. In 2016, in the county of Sibiu there were around 6 % guesthouses, offering about 6 % of places of the rural tourism capacity in Romania. Also, the guesthouses offered accommodation for 7.6 % of tourists visiting Romania, and the overnight stays in the guesthouses of Sibiu accounted for 7 % of the total overnight stays in the country.

The relationship between the analyzed tourism indicators: accommodation capacity and tourism demand in terms of arrivals and overnight stays is a positive and strong one as proved by the regression models, the coefficients of determination and the Pearson coefficients of correlation.

Even thou the rural tourism in the Sibiu County is very dynamic, its development in the coming years depends on the infusion of investments in infrastructure, the improvement of the managerial skills of the owners of guesthouses, the diversification of the tourist offers in terms of accommodation, board and entertainment, the promotion of the historical and cultural heritage, of the traditions and habits, gastronomy, the right ratio between service quality and price, and hospitality.

Only in this way, rural tourism and mainly agro-tourism could become a strong component of the sustainable development of the rural areas in the County of Sibiu.

## REFERENCES

- [1] Abargaonitei, S., 2009, Analiza diagnostic privind oferta agroturistica a judetului Suceava, Teza de doctorat, USAMV Iasi, pp.1-8.
- [2] Caratus Stanciu, M., 2015, Aspects of sustainable rural tourism-Farmers' markets and farm visits, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.15(4): 15-19.
- [3] Caratus Stanciu, M., 2017, Agrotourism and rural tourism the way of sustainable development in the rural areas of Sibiu county-Romania, Muzeul Olteniei Craiova. Oltenia. Studii și comunicări. Științele Naturii. Tom. 33, No. 2/2017, pp. 179-182
- [4] Cerban, M., 2007, FOCUS: Sibiu-European capital - an investment of Euro 50 million and one million tourists (Capitală Europeană - o investiție de 50 de milioane de euro și un milion de turiști) <http://www.mediafax.ro/main-story/focus-sibiu-capitala-europeana-o-investitie-de-50-de-milioane-de-euro-si-un-milion-de-turisti-1067240>, Accessed March 10, 2018.
- [5] Chasovschi, C.E., Nastase, C.E., Albu, A., Boghean, F., Budu, A.A., Hurjui, O.F., Marin, A.M, Nastase, C.T., Popescu, M., Trufin, E., Vranciu, L.E., Mohr, C.A., 2011, Organization of the activities of the touristic guesthouses (Organizarea activitatii peniunilor turistice), Stef Publishing house, Iasi, pp.7.
- [6] Cioban, G.L., 2016, Tourism was born in the village, Ecoforum, Vol. 5, Issue 2 (9), 125-130.
- [7] Iagaru, R., Anttila, C., Iagaru, P., 2014, Development and adoption of strategic options for rural development, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.14(1): 157-160.
- [8] Iagaru, R., Iagaru, P., Ciortea, G., Florescu, N., Ciubotaru, G., Domnica, M.D., 2015, Strategic options for a sustainable development of the rural tourism, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.15(4): 219-223.
- [9] Marin, D., Petroman, C., Petroman, I., Ciolac, R., Balan, I., 2009, Study regarding rural guest-houses and agri-tourist households' number and percent in the total number of tourist establishments in Romania, *Lucrări Științifice – Vol. 52, Seria Agronomie*, Iasi, pp.469-472.
- [10] The National Institute of Statistics Tempo Online Data base, 2018
- [11] Popescu Agatha, 2016, The position of tourist and agrotourist guesthouses in Romania's accommodation structures, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 16, Issue 1, 417-424.
- [12] Richards, G., Rotariu, I., 2010, Using tourism statistics: A case study of Sibiu, Romania, pp.553-557, [https://www.researchgate.net/publication/241855898\\_Using\\_tourism\\_statistics\\_A\\_case\\_study\\_of\\_Sibiu\\_Romania](https://www.researchgate.net/publication/241855898_Using_tourism_statistics_A_case_study_of_Sibiu_Romania), Accessed March 20, 2018
- [13] Sandu, M., 1998, The depression corridor Sibiu-Apold. A geomorphological study (Culoarul depresionar Sibiu-Apold. Studiu geomorfologic), pp.32.
- [14] Stanciu Mirela, Blaj, R, David, A., Ciortea, G., Pomohaci, M., 2008, Researches regarding the utility of agrotouristic potential in the County of Sibiu, Bulletin UASVM, Agriculture 65(2)/2008, pp.186
- [15] Stanciu, M., Tanase, M., Gaureanu, M., 2014, Issues concerning the typology of rural touristic pensions from Marginimea Sibiului, Sibiu County, Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.14(4): 273-277.
- [16] Tindeche, C., 2013, A comparative study on the profitability of touristic pensions, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 13(1)2013, pp.435-438.
- [17] Tirpe, O.P., 2011, The development potential of rural tourism in Romania-Analysis of touristic indicators, *Annals of Oradea University, Fascicula: Ecotoxicology, Zootechnics and Technologies in Food Industry*, pp.225-230

## PARTNERSHIP WITH STUDENTS AS A FACTOR OF HIGHER EDUCATION INSTITUTION'S PERFORMANCE AND COMPETITIVENESS

Veronica PRISACARU, Alina CARADJA

State Agrarian University of Moldova, 44 Mircesti str., Chisinau, Republic of Moldova, Emails:  
v.prisacaru@uasm.md, alina.caradja@mail.ru

**Corresponding author:** v.prisacaru@uasm.md

### *Abstract*

*Due to the acute competition in the market of educational services, it is obvious that focusing on students' interests represents a factor of performance and, implicitly, of the competitiveness of each higher education institution. In this context, we can highlight the partnership with students as one of the most effective instruments, which can be used both to diagnose the problems of professional training and to solve them through joint efforts. This investigation is focused on the following objectives: a) assessing the quality of engagement with students in order to increase the effectiveness of vocational training in higher education institutions in the Republic of Moldova and b) experimenting with the method of partnership with students, evaluating the obtained results. In order to achieve the purposes, the following research methods were used: the synthesis of the conceptual approaches of the partnership, the opinion survey method, the interview, the case study. The main conclusions of the investigation reveal the current state and the deficiencies of the students' engagement in the higher educational institutions of the Republic of Moldova, as well as the advantages of the partnership (proven by experimentation) as a factor of effectiveness of the professional education as well as a factor of institutional competitiveness.*

**Key words:** higher educational institutions, partnership, performance, professional education.

### INTRODUCTION

The profound transformations that mark contemporary society at present require a reconsideration of attitudes and approaches in all areas of economic and social life, as well as in the field of professional education. Moreover, the professional education sets the foundations of the future specialists training, establishes the area of their competencies, which will later help the graduates to come with their contribution in building a modern society. The process of professional training should be designed and accomplished in such a manner that it becomes, due to its contents and organizational structure, a guarantee of success in a professional life, rather than a preceding stage, which is only meant to issue a diploma that one will attach to the employment application but which has no practical connection with performing job responsibilities and specific tasks it entails. Despite the acute competition that exists nowadays in the market of educational services, it is obvious that only those institutions that will be able to achieve the

performance of training specialists with skills and abilities that match real life requirements will survive.

In the context of the above-mentioned, reconsidering the organization of professional training, including within the higher education institutions, represents a preoccupation, which is the order of the day worldwide and which identified two ways to qualitatively improve the professional education:

- Applying the policies and procedures that encourage good teaching and assessment;
- Changing the focus from the teacher to the learner, defining what learning outcomes students are meant to achieve [3].

Even if the transfer of focus from teacher to student is put on the second place in the above statement, this does not mean it is less important. In fact, focusing on the student, stimulating his/her engagement in the learning process is currently recognized as a factor in enhancing the effectiveness of learning. It is highlighted that effective student engagement in the learning activities makes it possible to identify students' expectations, deepen learning, achieve better results than those that

can be obtained through traditional teaching-learning methods [3,7]. Moreover, in terms of marketization of higher education, the status of students as consumers and co-producers at the same time [5,6] attaches a great importance to them as factors for increasing the competitiveness of a higher educational institution.

Based on the above-mentioned considerations, we support the assertion that the success of the professional education process can be assured if the following principles are observed:

- Encourage the contact between students and faculty;
- Develop cooperation and reciprocity among students;
- Encourage active learning;
- Give prompt feedback;
- Emphasize time on tasks (allocating realistic amounts of time on specific tasks means effective learning for students and effective teaching for faculty);
- Communicate high expectations (high expectations are important for everyone: for the poorly prepared, for those unwilling to exert themselves and for the bright and well motivated);
- Respecting diverse talents and ways of learning (students need the opportunity to show their talents and learn in ways that work for them) [7].

Not coincidentally, encouraging the relationship between faculty and students is put on the first position in the list of principles outlined above. Establishing an effective contact represents a necessary prerequisite for the successful completion of other principles, each one, in its turn, has its own importance. In this context, we conclude that in the theoretical and practical reflections regarding the contact between teachers and university management on the one hand and students on the other hand, the term “partnership activities with students” is increasingly used.

Establishing partnership relations between the university (represented by both university management and academic staff) and students is becoming an increasingly common experience implemented by various higher

education institutions today. Thus, in the UK Quality Code for Higher Education, the partnership is examined in the context of optimizing student engagement in increasing the quality. According to the above-mentioned document, the terms “partner” and “partnership” are used in a broad sense to indicate joint activities between students and staff [11]. The concept of partnership also is examined as an equal relationship between two or more bodies that work together for the same purpose, using their skills, experience, knowledge, and capability [10], a relationship in which all involved gain some benefits: it fosters both student learning and teaching enhancement [8].

The accomplishment of activities based on the partnership with students should comply with certain requirements. Thus, as mentioned in the UK Quality Code for Higher Education, trust and honesty, openness, common goals, regular communication represent the main partnership values [11]. Healey et al. indicate the following requirements for the partnership with students:

- Authenticity (all parties are motivated to invest in partnership and to appreciate objectively their own contribution as well as the partnership parameters);
- Inclusion (the parties contribute with different talents, expectations, experiences);
- Reciprocity (the partnership is beneficial for all parties);
- Empowerment (power is shared fairly and properly);
- Trust (some time is needed to know each other and to have an interactive dialogue);
- Challenge (the constructive criticism as well as the provocative practices are encouraged);
- Community (it persists a sense of belonging with the established community);
- Responsibility (the responsibility for the objectives is shared among parties) [8].

Bovill et al. systematizes the requirements for a partnership activity in three groups. Thus, at the stage of starting a partnership, the following requirements are indicated: ensure that participation is voluntary, start small, use

an appropriate language, select carefully the students for partnership activities, identify aims that are important for all parties, develop support for working, learn from mistakes, be patient. For improving the partnership between students and staff, the following rules are required: develop the partnerships within other works that are going on, offer rewards, diversify the work, offer learning development opportunities for staff and students involved, value the process and formally end partnerships. For extending student partnerships, it is needed to consider your own attitudes to power within student-staff partnerships, to develop ways to negotiate with students and colleagues, to be honest about where power imbalance lies [4]. Sidney University Professor Nick Enfield, in a project that included the elaboration of learning resources through partnership with students, identified in his turn the following requirements for students: affection for the discipline concerned, trustworthy, efficient, creative and intelligent. Among the main qualities of the teacher working with students through partnership were: trust, the ability to have an interactive communication, the ability to navigate between ideas and guide the decision-making process [2].

Along with the above-mentioned requirements, the partnership project itself should be genuine and really bring added value to the university [2].

For the purpose of taking good practice in achieving partnership with students and being able to fully exploit the results of such activities, we need to properly understand the applicative essence of the partnership. In this context, we will refer to the following statement "... all partnership is student engagement, but not all student engagement is partnership" [8]. A quite clear delimitation of the term partnership from other terms used to reflect the collaboration between student and institution could be found at May and Felsing. Thus, by *engagement* the authors designate different levels of participation on behalf of a person (i.e. a student or staff member), dependent upon both the opportunity available, and their choice as an individual. *Consulting* is considered as the

opportunity to express your own opinion, perspectives, experience, ideas and concerns. *Involvement* represents the opportunity to have a more active role, including by controlling the process of implementing ideas. *Participation* involves decision making by individuals to participate in a process or to assume a more active role. *Partnership* is considered as a collaboration (for example, between the student and institution), involving joint ownership and common decision-making regarding the process and outcomes [9].

Examining consulting, involvement, participation and partnership as qualitatively different forms of engagement, Healey et al. highlight them as successive stages of student engagement: I. Consulting; II. Involvement; III. Participation; IV. Partnership [8].

## MATERIALS AND METHODS

In order to achieve the objectives of the investigation, a synthesis of the conceptual approaches of the partnership as a qualitative expression of student engagement in increasing the quality of professional education was made. Also, it was carried out an empirical study regarding the level of engaging students in different didactic activities. The mentioned study was based on an interview with the representatives of the university management, academic staff and students from 6 higher education institutions from Republic of Moldova (about 180 representatives of the managerial and didactic staff and 220 students) and a survey including a total of 543 students from 8 higher education institutions. As a result of processing the interview and opinion poll data, conclusions were drawn regarding the student engagement quality, an important factor for rising the effectiveness of professional training in the higher education institutions of the Republic of Moldova. The research was continued with experimentation with the idea of partnership on the basis of a case study with the Agrarian University students. Based on the analysis of experimental results, a number of positive consequences of that partnership were highlighted, which were also identified as

benchmarks of institution's competitiveness in the market of services in the educational field.

## RESULTS AND DISCUSSIONS

Within the higher education system of the Republic of Moldova, the term *focusing on the students' interests* is used more and more frequently, being recognized as a factor of the management system's quality. The external evaluation standards of the Bachelor's degree programmes include the active involvement of students as beneficiaries of the educational services offered by each institution, both at the design stage of the study programmes and in the process of their improvement [1]. The students have an important role in evaluating the quality of implemented activities including the teaching-learning-evaluation process, and are encouraged to propose solutions for their improvement and to submit proposals for the modernization of the overall programme.

The interviews with the representatives of the university management, academic staff and students from 6 higher education institutions (about 180 managerial and didactic staff and 220 students) highlighted the fact that most of the interviewed persons (about 85% of the managerial and didactic staff and 95% of students) associate student engagement in enhancing the quality of study programmes with consulting activities at the stage of study programme design and semestrial assessment of the course quality.

In order to obtain more accurate results regarding the quality of student engagement in the educational activities, a survey was conducted on a sample of 543 students from 8 higher education institutions of the Republic of Moldova. The processed results of the investigation indicated the following facts:

- 32% of the surveyed students mentioned that they were never asked for their opinion on the quality of activities included in the study programmes;

- 95% of the surveyed students, on the request to express their opinion on some issues that need to be improved, indicated 5 and more

aspects regarding the quality of study programmes;

- 66% of the surveyed students declared that the proposals they made to improve the study programme were not implemented.

As for the third statement, we will mention that the above-mentioned interview also identified the problem of insufficient feedback in the process of student engagement in the activities meant to increase the quality of study programmes - over 60% of the interviewed students said they were not aware of the measures taken as a result of their participation in the discussion of the programme content or the assessment of course quality. Therefore, we can not rule out the possibility that the institutions were more receptive to students' suggestions, but did not inform students about it. Even admitting such a situation, however, we identified the existence of the following problems regarding student engagement in increasing the quality of study programmes in the higher education institutions of the Republic of Moldova:

insufficient level of student engagement, which is mainly done through consulting, this being just the incipient phase towards partnership, if we focus on the approach of partnership stages developed by Healey et al. [8];

- extremely low level at which feedback is given regarding the actions proposed by students.

Carrying out such a study, which focuses on identifying the problems that exist in achieving student engagement to enhance the quality of professional education, together with other useful information, also offers the possibility to make a comparative diagnosis of the situation, which is extremely important given the existence of competition in the market of services in the educational field. Table 1 compares the data related to the State Agrarian University of Moldova and the average data on all the investigated institutions.



Table 1. Analysis of survey results at the State Agrarian University of Moldova compared to the average results on 8 investigated institutions, %

The content of assertion	The average results per 8 higher education institutions	The average results - State Agrarian University of Moldova	The average absolute deviation (+/-) in SAUM compared to the average data for all institutions
They have never been asked to comment on the quality of study programme activities	32	40	+8
The proposals with reference to the improvement of the study programme were not implemented	66	69	-3

Source: Own determination.

Based on the data presented in Table 1, we conclude that the level of student engagement at the State Agrarian University of Moldova in enhancing the quality of the educational process is lower than the average data on the investigated institutions: by 8% more of the surveyed students said they never were asked to express their opinion on various issues and the number of students who declared that their proposals were implemented is by 3% lower than the general average for all institutions.

In order to experiment with the idea of partnership with students at the State Agrarian University of Moldova, the students of three academic groups were invited to participate in the elaboration of learning resources and/or improvement of the existing ones on the MOODLE platform at a certain course. 35 students were involved in that activity. The activity involved the following development stages:

I. An initial survey was conducted in order to diagnose the level of student engagement in works related to enhance the teaching-learning-evaluation process quality. As a result of processing the survey data, it was found that 62% of students contributed to improve the quality of the teaching-learning-evaluation process only by offering proposals, out of which only 11% were involved in examining the proposed variants and selecting the optimal ones. Of the total number of surveyed students, only 6% mentioned that they personally participated in certain activities related to the improvement of the study programme made in collaboration with the faculty;

II. The task was explained - to examine the learning resources placed on the MOODLE platform for a certain course, to identify to

what extent they contribute to the achievement of the course objectives through the prism of skills to be acquired (the latter could be found in the analytical programme on the same platform) and come up with proposals regarding the learning resources to be reviewed or added. The deadline for submitting proposals has been set - 7 calendar days. It was agreed that the proposals should be submitted in written form. In order to motivate students, it has been agreed that, depending on the extent of the individual work, each participant will receive a grade. At the same time, the benefits of a better quality material that will help students to prepare for exams were explained.

III. The proposals made by students were then examined by the teacher. Some additional specifications were necessary to correctly target participants' efforts. Throughout the activity, an active, group and individual communication was maintained; each effort has been appreciated, the interventions in directing student activity being done with great care, avoiding criticism.

IV. The proposed variants and supplements for the learning resources were examined by the student groups. The reasons why some could be accepted and others not (for example, proposals to add some text fragments) have been explained. The analysis of the performed work and the choice of the variants proposed for implementation were done through an interactive discussion, aiming at the objective that each participant expresses his/her opinion regarding the changes and the final decisions to be seen as a common product, but not as one adopted unilaterally by the teacher.



V. After completing the course and passing the exam, the students who participated in the experiment were invited to participate in another survey, which allowed to find out the following facts:

- 100% of the participants declared that their engagement in the activity helped them to increase their success at that course;
- the students highlighted a number of benefits of the performed activities, among which they mentioned the most frequently the following:
  - a) enhancing the quality of learning resources;
  - b) increasing own responsibility for success as a result of participating in the process;
  - c) increasing the quality of communication with colleagues;
  - d) improving the teaching style of the teacher.

The generalization of the facts exposed above helps us to conclude that even if the partnership with students represents an activity requiring considerable time and effort, its achievement has multiple positive effects on the quality of the professional education, including through the qualitative improvement of the teacher-student and student-student communication, and, thus, creating a favorable learning climate, as well as increasing personal responsibility for the learning process. All these favorable consequences constitute the benchmarks of the performance of an educational institution which, being appreciated by the students as beneficiaries and promoted in the right way can become an essential factor of competitiveness in the market of educational services.

## CONCLUSIONS

Under the current conditions, generated by the acute competition in the market of educational services, the students have to be examined more than ever as consumers and co-creators at the same time, giving them the possibility to make their contribution to the improvement of performance and, implicitly, of the competitiveness of each institution.

Despite the fact that in the higher education system of the Republic of Moldova the term "focusing on students' interests" is no longer a new one, the investigations show that

students' potential to contribute to the improvement of the quality of professional education is insufficiently used, they being often only consulted, ignoring the possibility of doing some activities in partnership with them.

As a consequence of experimenting with a partnership activity with students at the State Agrarian University of Moldova, it was found out that even if such activities require considerable time and effort, their achievement have multiple positive effects on the quality of professional education, including through the qualitative improvement of the teacher-student and student-student communication, and, thus, creating a favorable learning climate, as well as increasing personal responsibility for the learning process.

## REFERENCES

- [1] Agenția Națională de Asigurare a Calității în Învățământul Profesional (ANACIP), 2016. Ghid de evaluare externă a programelor de studii de licență, învățământ superior. Chișinău.
- [2] Atkinson, S., 2017, Students as Partners in Educational Innovation. <http://sydney.edu.au/education-portfolio/ei/teaching@sydney/students-partners-educational-innovation/>, Accessed on November 11<sup>th</sup> 2017.
- [3] Biggs, J., Tang, C., 2011, Teaching for Quality Learning at University. Fourth Edition. Berkshire: McGraw-Hill House. [http://hust.edu.oak.arvixe.com/media/197963/-John\\_Biggs\\_and\\_Catherine\\_Tang\\_Teaching\\_for\\_Quali-BookFiorg-.pdf](http://hust.edu.oak.arvixe.com/media/197963/-John_Biggs_and_Catherine_Tang_Teaching_for_Quali-BookFiorg-.pdf), Accessed on October 12<sup>th</sup>, 2017.
- [4] Bovill, C., Felten, P., Cook-Sather, A., 2014, Engaging Students as Partners in Learning and Teaching: Practical guidance for academic staff and academic developers. Paper presentation, International Consortium on Educational Development Conference, Stockholm, Sweden, 16-18 June. [http://iced2014.se/proceedings/1146\\_BovillFeltenCook-Sather%20.pdf](http://iced2014.se/proceedings/1146_BovillFeltenCook-Sather%20.pdf), Accessed on October 14<sup>th</sup> 2017.
- [5] Bovill, C., Cook-Sather, A., Felten, P., 2011, Students as co-creators of teaching approaches, course design and curricula: implications for academic developers. International Journal for Academic Development. 16 (2):133-145. <http://eprints.gla.ac.uk/54132/1/54132.pdf>, Accessed on September 10<sup>th</sup> 2017.
- [6] Carey, P., 2013, Student as co-producer in a marketised higher education system: a case study of students' experience of participation in curriculum

design. *Innovations in Education and Teaching International*. 50 (3): 250-260.

[7]Chickering, A.W., Gamson, Z. F., 1987, Seven Principles For Good Practice in Undergraduate Education. *American Association of Higher Education Bulletin*, 39 (7): 3-7.  
<http://www.lonestar.edu/multimedia/sevenprinciples.pdf>, Accessed on October 17<sup>th</sup> 2017.

[8]Healey, M., Flint, A., Harrington, K., 2014, Framework for partnership in learning and teaching in higher education. *The Higher Education Academy*. Heslington York.

[9] May, H., Felsinger, A., 2010, Strategic approaches to disabled student engagement. *Equality Challenge Unit*. Higher Education Academy.  
<https://www.ecu.ac.uk/wp-content/uploads/external/strategic-approaches-to-disabled-student-engagement.pdf>, Accessed on September 8<sup>th</sup> 2017.

[10]Williamson, M., 2013, Guidance on the development and implementation of a Student Partnership Agreement in universities.  
<https://www.sparqs.ac.uk/upfiles/Student%20Partnership%20Agreement%20Guidance%20-%20final%20ve>, Accessed on August 29<sup>th</sup> 2017.

[11]U.K., Quality Code for Higher Education.  
<http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/quality-code-part-b>, Accessed on August 30<sup>th</sup> 2017.



## FACTORS OF COMPETITIVENESS OF THE HIGHER EDUCATION INSTITUTIONS OF THE REPUBLIC OF MOLDOVA UNDER CONDITIONS OF MARKETIZATION OF PROFESSIONAL EDUCATION

Veronica PRISACARU, Alina CARADJA

State Agrarian University of Moldova, 44 Mircesti str., Chisinau, Republic of Moldova, Emails: v.prisacaru@uasm.md, alina.caradja@mail.ru

*Corresponding author:* v.prisacaru@uasm.md

### **Abstract**

*In spite of the fact that the term „marketization” is relatively new in the academic language of the Republic of Moldova, market laws have been functioning for some time in the educational market, especially through competition in attracting potential candidates to study. This investigation is focused on the following objectives: a) synthesizing the conceptual approaches of higher education marketization; b) analyzing Moldova’s higher education market through the evolution of supply and demand; c) identifying the basic factors determining the attractiveness of higher education institutions for potential candidates. In order to achieve the stated objectives, the following research methods were used: the synthesis of theoretical approaches regarding the marketization of higher education, opinion survey, comparative analysis and generalization. In conclusion, there were identified and ranked the attractiveness factors of the higher education institutions and there were made recommendations in order to increase their competitiveness in the market of educational services.*

**Key words:** attractiveness, competitiveness, higher education, marketization.

### **INTRODUCTION**

Starting from their important role in creating the human potential for a sustainable economic and social development of the country, universities need to value performance management as a priority. In fact, under conditions of marketization of higher education, performance reporting should be done not as an isolated qualification, but as a factor of competitiveness with a direct impact on the sustainability of each institution. This reasoning is argued by the fact that the marketization of higher education has transformed the professional training activity into a commodity and the professional education institutions have become providers of educational services which, under conditions of increased competition, have to struggle in order to stay on the market.

For a long period of time, the universities have been considered by society as institutions primarily designed to create the intellectual potential of the state, having a specific culture and system of values. At the same time, they distinguished themselves as

organizations of considerable sustainability. Thus, according to the Carnegie Council data on Policy Studies in Higher Education, out of the 66 long-lived organizations (which existed between 1530 and 1980), 62 were universities. According to these statistical data, the universities have been rated as remarkable for their historical continuity and, based on this information, it was formulated the assumption that this feature will remain in the future. That statement began to lose its consistency at the beginning of the 21<sup>st</sup> century as a consequence of the active interaction between universities and society [9]. The activity of universities has begun to be examined more and more frequently as one developed within the knowledge market. Thus, there is an increase in the role of economic thinking in areas previously assigned to other spheres of social life in the minds of people [7].

At present, the universities are becoming more and more similar to corporations, being both under the influence of coercive and mimetic forces at the expense of academic values, enunciated as normative forces [9]. The conceptual essence of the forces

mentioned above derives from the term isomorphism, defined by Hawley as a constraining process that forces a unit to resemble other units that face the same set of environmental conditions [11]. Being initially applied to institutions by Meyer and Rowan [15], the isomorphism was later developed by DiMaggio and Powell in the concept of their influential theory of institutional isomorphism in organizational domains. The authors highlighted three types of isomorphism: coercive (that stems from political influence and the problem of legitimacy), mimetic (resulting from standard responses to uncertainty) and normative (associated with professionalization) [8].

The influence of coercive and mimetic forces in the activity of universities is confirmed by more and more intensive marketization of higher education. The process of marketization of higher education is in its turn is defined as an attempt of adapting the higher education to market standards, where price mechanism balances the demand and supply of student education, research and other academic activities [6]. In other words, the academic offer becomes marketed, being viewed by politicians and other beneficiaries as a service under the competition [13].

At present, marketization of higher education is a global phenomenon. Being initiated in the countries where English is spoken natively by the majority of the population (Canada, USA, Australia and the UK), the marketization processes are spreading quickly in the higher education system around the world: Spain, Russia, Japan, China, Africa etc. [12]. At the same time, we note that universities in the US are considered to be the closest to a marketed system. The basic features of US higher education are: a high degree of autonomy; tough competition between different institutions; the existence of a substantial private sector with a "profit" and "non-profit" orientation; the institutions compete in the payments for studies, those representing about 50% of the tuition fees; the universities' budgets are completed by their own funds as well as by state allocations (for public institutions) and donations (for private ones); study costs and maintenance fees can be

covered by state and institutional subsidies; universities spend considerable efforts for marketing and branding in order to win a good position in the US institutional rankings and league tables; there is also a tough competition for federal funding and donations for research, etc. [5].

In spite of the considerable and rapidly expanding marketization of higher education, the opinions regarding this process remain polarized. The pro-marketing supporters have their own convictions as a part of them highlight marketing as an effective tool in allocation of insufficient resources on the one hand, and others who state that, in order to be efficient, each university should consider itself and, respectively, act as a service provider. Thus, there are people who believe that contemporary universities should recognize that they are placed in a competitive environment and have to compete, including their products and activities [3]. As "pro" arguments, the following ideas are suggested: as a result of marketization, universities gain more autonomy from state control to define their own strategies and vitalize their funding [13]; the marketization process will add flexibility and efficiency to the higher education institutions; market will increase the money value, as well as the efficiency of the university sector, will improve its reaction to the needs of students, their parents and of the whole society [10]. Their opponents believe that switching to marketed universities will have a detrimental impact on universities. Thus, Engwall, having investigated the Swedish higher education system, mentioned the ejection of normative forces as a response to the increased influence of the coercive forces that, if previously influenced through budgeting, currently operate through representation in the governing bodies and selection of university leaders [9]. Knights and Clarke, based on the synthesis of results of an opinion poll conducted in the UK, concluded that the new quantitative objectives and values exposed from the outside are in conflict with such traditional academic values as freedom, autonomy and belonging to a community, thus generating a sense of insecurity among those

activating in the academic environment [14]. Brown, in his turn, points out the following paradoxes of turning the higher education into a market-based one:

- the informational problem, which consists in the fact that it is difficult to have the necessary information about quality, higher education being a “post-experience” good;
- the benefits of higher education are not limited to its graduates [6].

Referring to the second deficiency highlighted by the author, we'd like to mention that according to the opinion of the notable scientist and economist McMahon [16], education is essential for both personal success and economic growth, the measurable value of non-monetary benefits being poorly understood so far. In this context, the scientist refers to the importance of studies in providing better opportunities for work and living. He also emphasized the role of higher education in promoting democracy, sustainable growth, crime prevention, reduced welfare state costs, etc. The arguments put forward show that the mentioned social benefits are quite high in comparison with higher education costs. In this context, the author suggests the idea that a poor understanding of the potential benefits leads to sub-investments in higher education [16].

The study conducted in Finland among the representatives of 12 departments from 3 universities, highlighted the fact that, as a result of reforms, universities were put into a situation when having more autonomy in the ways to achieve goals, managerial approach and resource allocation, they have little freedom in choosing the goals they want to pursue. Among the findings made by the authors we note:

- the emergence of a new type of university that favours competition and short-term results, putting them above collegiality and academic discussion;
- the functioning of the new type of management as a catalyst that changes the ethics of the academic community members and academic activity;
- the dissatisfaction of the majority of respondents (80%) with the new performance

management system, which is considered an inefficient one;

- reduced attractiveness of the academic career (according to the opinion of 55% of the respondents), etc.

Thus, due to the implemented reforms, which aimed at increasing the competitiveness of higher education, university management in Finland put an unprecedented pressure on universities to produce measurable results [13].

Regardless of the polarized opinions on the influence of marketization on higher education, it is clear that this process is irreversible. Under these circumstances, it is important to adjust your activity correctly so that you become first of all competitive and second, to ensure your sustainability.

## **MATERIALS AND METHODS**

The objectives of this investigation have been achieved using the following methods: the analysis of the theoretical approaches to marketization of higher education worldwide; quantitative analysis of supply and demand on higher education market in the Republic of Moldova; conducting a survey on a sample of 543 students from eight universities of the Republic of Moldova; the synthesis of the reports regarding the Bachelor's degree study programmes' evaluation presented on the website of the National Agency for Quality Assurance in Professional Education; generalization of the research results and formulation of conclusions and judgments related to the actions taken to enhance the Moldovan universities' competitiveness.

We should mention, as limits of research, the inclusion in the opinion poll of only eight universities out of a total of 30 currently existing in the Republic of Moldova.

## **RESULTS AND DISCUSSIONS**

The transition of the Republic of Moldova to market economy has been logically accompanied by the “opening of gates” for mimetic forces in higher education. Under these circumstances, even though marketization has not yet come into the usual

language as a term, it is increasingly penetrating as a process and attitude in the higher education management.

The concept of marketization of higher education, by its essence, supposes the existence of a market which, in its turn, is imposed due to a certain level of demand and supply of educational services. Referring to the offer of higher education study programmes in the Republic of Moldova, especially bachelor's degree programmes, we

consider that this far exceeds the demand, largely because of the establishment of a large number of private universities in the 90s of the last century. Even though, in the total number of universities that have ceased their activity, the share of private universities is much higher than that of state universities, at present 11 private institutions activate in the country along with 19 state institutions (Figure 1).

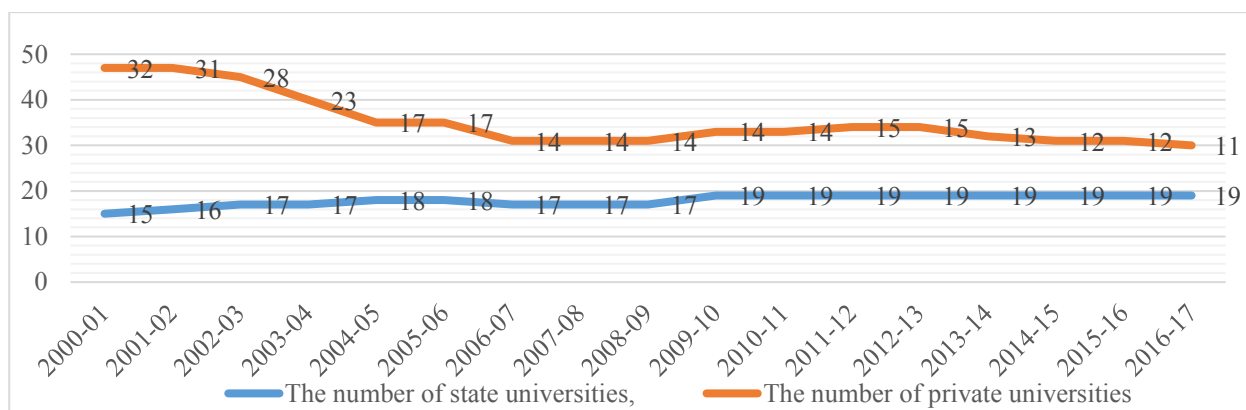


Fig. 1. Dynamics of the number of state and private universities in the Republic of Moldova over the period 2000-2017

Source: [4]

On the other hand, there is a substantial decline in demand for higher education services in the Republic of Moldova, this trend being caused by a number of factors with direct and indirect influence. Thus, while negative demographic trends and massive migration of the population abroad are indirect factors negatively influencing the demand for educational services, a direct obvious factor is the steady and continuous reduction of the number of high school

graduates, which in their turn represent “the basic raw material” for higher education institutions. In this context, analyzing the results of the bacalaureate exams over the period 2014-2017, we note that, according to data of the National Agency for Curriculum and Evaluation [1], the number of people who successfully passed the bacalaureate exam, after a non-substantial increase in 2015, decreased continuously in the next two years (Figure 2).

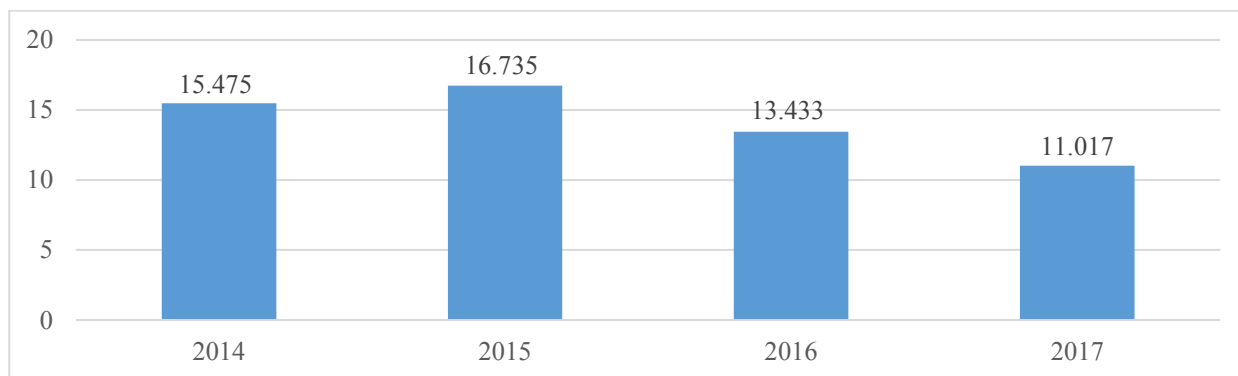


Fig. 2. Evolution of the number of high school graduates who passed the bacalaureate exam in the Republic of Moldova over the period 2014-2017, people.

Source: [1]

Along with the numerical reduction of the baccalaureate diploma holders, it is well known the influence of such factors as:

- the attraction of a large number of candidates by the educational institutions from Romania, as well as the increased annual number of people applying for studies in other European countries: France, England, Bulgaria etc.;
- the preference of a part of Russian-speaking candidates to study in the institutions of the Russian Federation, due to the fact that more and more Moldovans obtain the citizenship of this state each year;

- the refusal of a part of the young people to make professional studies, invoking such arguments as the lack of jobs, leaving the country to work abroad, the inability to bear the costs of living involved, etc.

As a result of the influence of factors mentioned above, the number of students enrolled in the higher education institutions of the Republic of Moldova is continuously decreasing (Figure 3), analogical tendencies being recorded in the number of graduates (Figure 4).

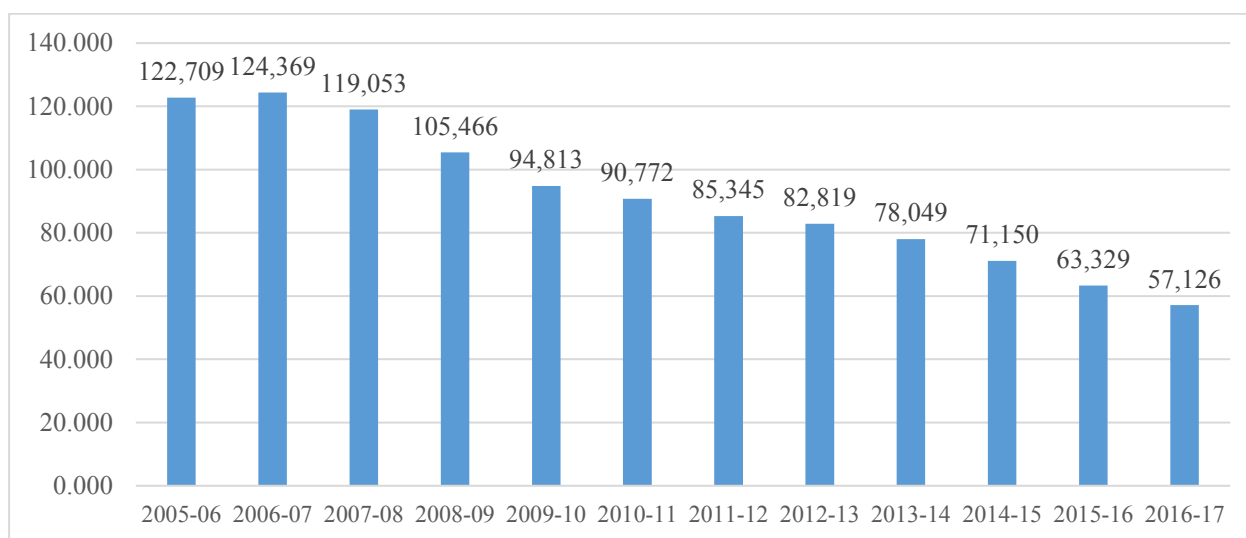


Fig. 3. Evolution of the number of students of higher education institutions, cycle I (Bachelor's degree) in the Republic of Moldova over the period 2005-2017, people.

Source: [4]

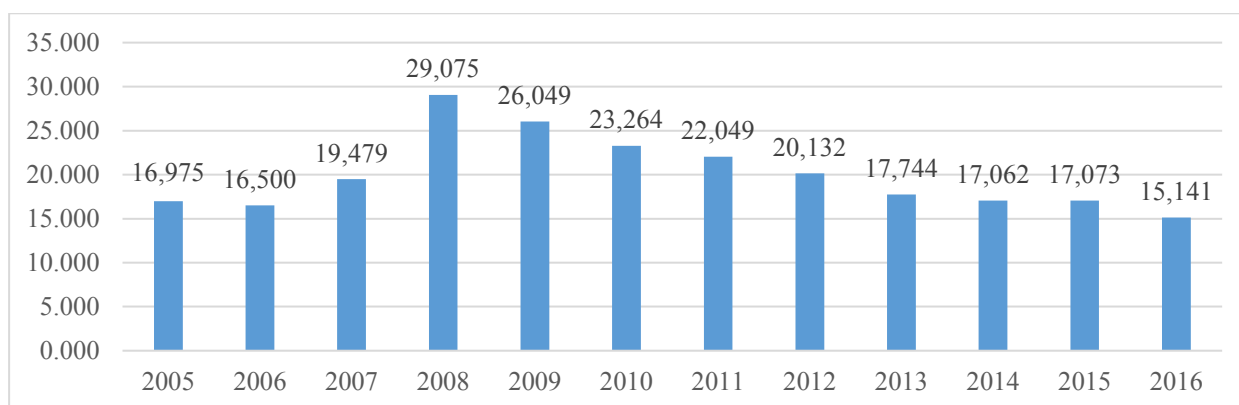


Figure 4. Evolution of the number of graduates of higher education institutions, cycle I (Bachelor's degree) in the Republic of Moldova over the period 2005-2016, people.

Source: [4]

Based on a correlative analysis of the higher education offer and the evolution of the number of potential candidates, it becomes obvious that each higher education institution needs to shape its performance management

mechanism focusing on the quality and attractiveness at the same time. The last reasoning - the need for a concerted focus on quality and attractiveness, is based on the fact



that, by evaluating the situation existing in the most Moldovan universities at the moment (on the basis of examining the reports of the higher education study programmes' evaluation presented on the web page of the National Agency for Quality Assurance in Professional Education [2], it was found out that the institutions are concerned about the quality of professional training, while the relationship with the labour market, the collaboration with potential beneficiaries (high school graduates, employers, local community) still have insufficiently capitalized aspects and over 75% of the evaluated study programmes being identified

as areas requiring some improvement. This fact highlights an insufficiently effective relationship with the market, therefore deficiencies in linking the educational offer to market requirements.

The survey among the students from 8 universities of the Republic of Moldova carried out on a sample of 543 people highlighted the following aspects:

-out of the total number of factors determining the choice of the future educational institution, most of the choices (89.6%) focused on the recognized quality of the professional training and the prestige of institution (Figure 5).

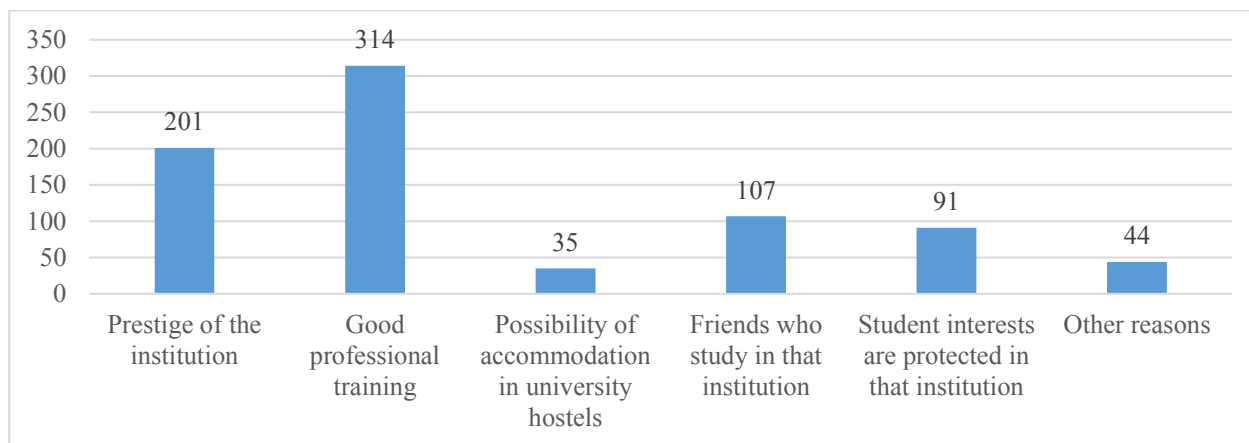


Fig. 5. Comparative analysis of the factors determining the decision of candidates to choose the higher education institution in the Republic of Moldova

Source: Own determination.

Based on this, we conclude that these two features are the most important in enhancing the attractiveness of an institution in the market of professional training;

-based on the correlative evaluation of the determining factors of choices made by candidates, it could be mentioned that the prestige and the high quality of training hold equal positions in only one of them. This fact reflects a correct policy of promoting the educational offer by the institution in question: the institution offers good training and has managed to create an adequate image based on quality. In all the other investigated institutions, the image received fewer choices compared to the quality of training, which in turn proves insufficiently effective actions aimed at promoting the image;

-the comparative analysis of results obtained by different institutions is also useful due to the fact that, based on the separate examination of each institution, some vulnerable aspects of competitiveness can be identified, as well as the potential reserves to enhance the promotion activities. However, being unable to present real results on each surveyed institution for ethical reasons, we will still identify the position of State Agrarian University of Moldova in comparison with the average results obtained by all the investigated institutions. Thus, if the total number of choices offered to the quality of all the surveyed institutions prevails over those offered to the prestige by 56%, in the case of State Agrarian University of Moldova, 3.73 times more choices have been offered to the quality of training than to the prestige. In

this context, it is obvious that promoting the image of the State Agrarian University of Moldova represents one of the most important issues in order to increase its competitiveness. Another problem identified as a result of this survey was the erroneous emphasis on the possibility of offering accommodation in the university hostels through advertising companies: it was found out that this factor was important only for 15% of the surveyed university students, while the quality of training was indicated by 46% of the students.

## CONCLUSIONS

Although the term marketization has not yet entered the usual language of the higher education management of Republic of Moldova, it penetrates more deeply as a process and attitude. At present, the offer of professional education services in the higher education of the Republic of Moldova is far superior to the demand, which makes the competition between universities more and more acute. The situation is also aggravated by the continuing downward trend in the number of high school graduates, the holders of baccalaureate diplomas.

Based on the analysis of the evaluation results of the Bachelor's degrees study programmes by the National Agency for Quality Assurance in Professional Education it was found out that, being concerned about the quality improvement, most institutions place insufficient emphasis on the relationship with the labour market, while the collaboration with potential beneficiaries (high school graduates, employers, local community) represents insufficiently capitalized aspects and over 75% of the evaluated study programmes being identified as areas requiring some improvement. This fact highlights an insufficiently effective relationship with the market, therefore deficiencies in linking the educational offer to market requirements.

As a result of the survey conducted among the students from eight universities (a sample of 543 people) it was concluded that the main motivating factor in the choice of institution is the quality of the educational performance,

the second being the prestige of the institution. At the same time, the existence of some inconsistencies between the results obtained in these two positions (prestige and quality) proves the low effectiveness of activities made by most investigated institutions in the image promotion, also identifying some erroneous emphasis in the companies promoting the educational offer.

Based on the above mentioned facts, we conclude that the focus of the activities carried out by Moldova's universities on a better level of professional training is no longer sufficient; it is necessary to promote more actively the idea of this good and qualitative professional training within the institution, to develop and present convincing arguments to potential clients so as they consider the universities as competitive "producers" of professional competencies appropriate to the business environment.

## REFERENCES

- [1] Agenția Națională pentru Curriculum și Evaluare. [www.aee.edu.md](http://www.aee.edu.md) ,Accessed on December 10<sup>th</sup> 2017.
- [2] Agenția Națională de Asigurare a Calității în Învățământul Profesional (ANACIP). <http://anacip.md/index.php/ro/transparenta/rapoarte-de-evaluare-externa>, Accessed on November 12<sup>th</sup> 2017.
- [3] Barnett, R., 2011, The marketised university: defending the undefensible. In: Molesworth M., Scullion R., Nixon E. (Eds.), The marketisation of higher education and the student as consumer. Routledge, Taylor&Francis Group, 39-51. <https://network23.org/freeunisheff/files/2015/07/Mike-Molesworth-Richard-Scullion-Elizabeth-Nixon-The-Marketisation-of-Higher-Education-and-the-Student-as-Consumer-book.pdf> ,Accessed on October 15<sup>th</sup> 2017.
- [4] Biroul Național de Statistică al Republicii Moldova. [www.statitica.md](http://www.statitica.md) , Accessed on November 16<sup>th</sup> 2017.
- [5] Brown, R., 2011, The march of the market. In: Molesworth M., Scullion R., Nixon E. (Eds.), The marketisation of higher education and the student as consumer. Routledge, Taylor&Francis Group, 11-24. <https://network23.org/freeunisheff/files/2015/07/Mike-Molesworth-Richard-Scullion-Elizabeth-Nixon-The-Marketisation-of-Higher-Education-and-the-Student-as-Consumer-book.pdf> ,Accessed on October 15<sup>th</sup> 2017.
- [6] Brown, R., 2015, The Marketisation of Higher Education: Issues and Ironies. *New Vistas*, 1 (1):4-9.
- [7] Czarniawska, B., Genell, K., 2002, Gone Shopping? Universities on Their Way to the Market. *Scandinavian Journal of Management*, 18 (4): 455–474.

[8] DiMaggio, P.J., Powell, W.W., 1983, The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *American Sociological Review*, 48 (2): 147-160.

[9] Engwall, I., 2007, Universities, the state and the market. *Higher Education Management and Policy*, 19 (3):87-104.

[10] Furedi, F., 2011, Introduction to the marketisation of higher education and the student as consumer. In: Molesworth M., Scullion R., Nixon E. (Eds.), *The marketisation of higher education and the student as consumer*. Routledge, Taylor&Francis Group, 1-8. <https://network23.org/freeunishreff/files/2015/07/Mike-Molesworth-Richard-Scullion-Elizabeth-Nixon-The-Marketisation-of-Higher-Education-and-the-Student-as-Consumer-book.pdf> ,Accessed on October 15<sup>th</sup> 2017.

[11] Hawley, A., 1968, Human ecology. In: D.L. Sills (ed.), *International Encyclopedia of the Social Sciences*. New York: Macmillan, 328-337.

[12] Hemsley-Brown, J., 2011, Market heal thyself: the challenges of a free market in higher education. *Journal of marketing for higher education*, 21:115-132.

[13] Kalio, K. M., Kalio, T.J., Tienari, J., Hyvonen, T., 2016, Ethos at stake: Performance management and academic work in universities. *Human relations*, 69 (3): 685-709.

[14] Knights, D., Clarke, C.A., 2014, It's a bittersweet symphony, this life: fragile academic selves and insecure identities at work. *Organization Studies*, 35 (3): 335-357.

[15] Meyer, J.W., Rowan, B., 1977, Institutionalized organizations: formal structure as myth and ceremony. *American Journal of Sociology*, 83 (2): 340-363.

[16] McMahan, W.W., 2009, *Higher Learning, Greater Good: The Private and Social Benefits of Higher Education*. Johns Hopkins University Press, Baltimore.

## EDUCATION MANAGEMENT IN THE FIELD OF LIFE SCIENCES- SKILLS NEEDED TO START AND DEVELOP AN INNOVATIVE SME

Nicoleta RADU<sup>1</sup>, Ana Aurelia CHIRVASE<sup>1</sup>, Narcisa BABEANU<sup>2</sup>, Ovidiu POPA<sup>2</sup>,  
Francois HASTARAN<sup>3</sup>, Birute VELYKIENE<sup>4</sup>, Mihaela BEGEA<sup>5</sup>

<sup>1</sup>National Institute for Research and Development in Chemistry and Petrochemistry from Bucharest, 202, Splaiul Independentei street, District 6, 060021 Bucharest, Romania, Emails: nicolbiotec@yahoo.com, achirvase@gmail.com,

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Emails: narcisa.babeanu@gmail.com, ovid\_popa@yahoo.com

<sup>3</sup>Association pour la Formation en Milieu Rural Etcharry France, Château Elgart 64120 Etcharry, France, f.hastaran@afmr-etcharry.fr

<sup>4</sup>Kaunas Science and Technology Park, 26, K. Petrausko street, 44156 Kaunas, Lithuania, Email: birute.velykiene@kaunomtp.lt

<sup>5</sup>University Politehnica of Bucharest, 313 Splaiul Independentei street, District 6, 060042 Bucharest, Romania, Email: ela\_begea@yahoo.com

**Corresponding author:** nicolbiotec@yahoo.com

### Abstract

*It is generally thought that in order to start a business, it is necessary for the entrepreneur who proposes to do so to have some native skills. For this purpose, we have designed a study in three European countries (Romania, Lithuania and France) to show to what extent this statement is perceived as conforming to reality. The methodology used was based on the responses obtained in a survey conducted in the form of questionnaires, distributed to target groups which manifested their interest in starting an innovative business in life sciences. Thus, even if the education system and the economic context are completely different from the three countries participating in this study, the survey showed that in all cases some native abilities are indeed necessary for a potential entrepreneur of success. The affirmative answers obtaining at some questions such as: the capability of being independent, the ability to work independently and hard, to judge on the basis of insufficient information, to lead projects holistically, to use their creativity imaginatively, to looking forward and think positively, to feel the profitability of an innovative business, to take the initiative, to organize / attend meetings in professional business networks, indicate that these are just a few of the skills needed and important for entrepreneurs of the 21 century.*

**Key words:** entrepreneurs, skills, innovative business

### INTRODUCTION

Abilities and entrepreneurial culture play a key role in the success of a new company. This happened because these skills help the entrepreneurs to identify market needs and respond to these needs with competitive products, developed in their own company. Entrepreneurial culture and their own abilities is important, because only in this way the entrepreneurs will be able to start and develop a new business; and then depends only of them to identify and cover the market needs with innovative products. Skills may be general, and may refer to technical or

managerial knowledge acquired through learning or may be personal, native even, and the latter most often determine the success of a company [5, 6, 15]. Thus, an individual's innovativity is a feature that can announce the emergence of a successful entrepreneur in the future [9]. And then, the success of a business is a function of individual personality of person who leads it. That because the entrepreneur mobility (that component of scanning and searching for the business opportunities) and the entrepreneur evaluation (the entrepreneur's ability to associate a business opportunity with the market demands and with potential competitors) can determine

the success of her business [1]. The studies performed in America have shown that those who are creative and passionate about what they do can become potential successful entrepreneurs [2]. Instead, the Poles consider that a single psychological profile of an entrepreneur, or rather the unique personality traits, are not sufficient to ensure the success of a company. [13]. Regarding this aspect, some researcher considering that the personality traits of an individual can often be discovered using the fingerprints left on social networks; so according to this theory, the successful entrepreneurs are creative and independent, that is, they have a "Schumpeterian" personality type [10]. Additionally, emergences of the skills like leadership and responsibility at early age are factors which can lead to the appearance of successful entrepreneur [16].

In Germany, a key factor in the emergence and development of the successful entrepreneurship is the innovation policies practiced and with the development of the technologies [3, 14]. And since the western countries are spending important material resources on innovation policies, then this is definitely a decisive factor in developing successful entrepreneurship in these countries [3]. Another aspect is represented by aging of the population, which poses problems in terms of their life quality. The existing statistical data demonstrate that the passage of work of individuals from the organizational level to the entrepreneurial level has the effect of increasing the quality of life of these persons which reaching to the maturity [8].

## MATERIALS AND METHODS

In order to characterize the evolution of the main skills needed to develop an innovative SME, a survey analysis was in three countries: Romania, France and Lithuania, during the period 2014-2015. The interest for France is due to:

(i) their concept regarding Entrepreneurship, meaning the ability to set up a more innovative entrepreneur, which favouring a continuous adjustment of working practices to the problems of the recipients, which develop

negotiation and organizational skills of the future entrepreneur;

(ii) in France, usually the main training in Entrepreneurship is focused to: (a) Partnership and Networking, (b) Methodology and project Management; Assessment tools; (c) Methodologies and teamwork tools; (d) Ethics and methodology of partnership network management [7].

The interests for Lithuania come from their original approach regarding entrepreneurship; in this country the Entrepreneurship I mean knowledge in the fields of: Management; Risk management and business law; SME marketing; Business finance and economics; Management of a firm; SME taxation; Business plan [12].

In Romania, the Entrepreneurship was beginning after 1990, but the mechanism in which some person can become a successful entrepreneur does not yet understand. So, we considering that a comparison study between Romania (in which the entrepreneurship do not represent a tradition before the year 1990), France, (a country with tradition in Entrepreneurship, in which the personal skills represent a important part for a success entrepreneurs), and Lithuania, (in which the accent is done on knowledge regarding law and business administration) is interesting and will provide a comparative perspective on entrepreneurial skills between the three countries. In this study were involved a total of 246 persons. From these, 49.9% were the Entrepreneur from the life sciences business, 27.7% were Scientist preparing to pass from research field to business sector and 22,64% were Trainers involved in teaching entrepreneurship. In this part of questionnaire respondents were asked to mark answer choosing number scale from 1 to 6, with the increasing importance in the same direction.

## RESULTS AND DISCUSSIONS

The entrepreneur is a person which has the ability to put their own ideas into practice. The ideal entrepreneur is creative, takes risks, plans and coordinates projects, meaning he can communicate with persons from inside and outside Company in order to make the

profit. To communicate and participate / organize professional/social business networks is very important for all survey participants (Figure 1), from these 72% of French persons think that this skill is important in business; the next are the Romanian 59% and Lithuanian with 48 %.

The practice of successful companies has shown that a good communication has effect on the growing of business performance. Communication has two major roles: it brings information to employees and builds trustworthy relationships. A company where exists a good communication is productive and works smoothly.

In their study, Watson and Wyatt [17] estimated to exist a probability of 50% that a company in which exist a good communication, the turnover to be 50% above of the average reported by the competitors. In comparison, in the study are revealed that in the Companies where the degree of communication is less effective, existing a probability of 33% that the turnover will be above of the average of competitors. Entrepreneurs who are not able to communicate on their own employees the company's objectives so as to motivate them to participate in their realization will have more material losses in comparison to those who know how to communicate and motivate their employees [4-11].

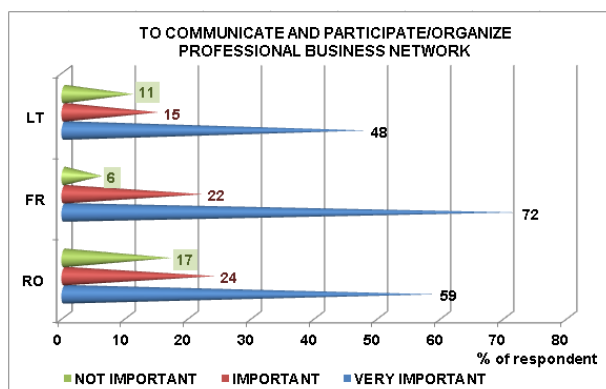


Fig.1. The answers distributions (%) regarding "To communicate and participate /organize professional business".

Source: own calculation and design.

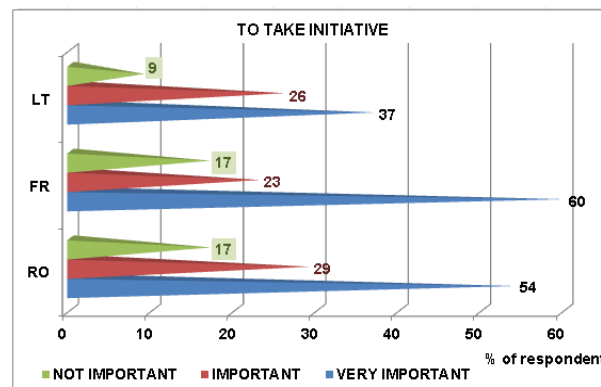


Fig. 2.The answers distributions (%) regarding "To take initiative".

Source: own calculation and design.

To take initiative represent a skill recognized to be very important for 60% of French people, 59% for Romanian people and for only 37% of Lithuanian people (Figure 2). To take initiative, represent the ability to do what needs to be done without being prompted by others or who wants another approach.

The persons who show initiative or demonstrate they can think for themselves and take action when necessary can become managers or entrepreneurs. The data obtaining in the survey for Fr, Ro and Lt, reveal that the France is a leader from this point of view.

Regarding the ability "To feel business opportunity on an innovation process", the results indicate a great score for Romania (59%), followed of France (54%) and Lithuania (28%) (Figure 3). The company approach to innovation will be driven by business strategy, adaptability, market understanding and commitment regarding these processes. Often, the innovation processes will add additional costs for Company. But the business competitiveness and survival is directly linked to capacity of Company to innovate.

To be forward looking and think creatively is very important for 55% of French respondent, respectively for 54% of Romanian respondent and 46% for Lithuanian. This skill is important for 40% of French, only for 29% of Romanian respectively for 30% of Lithuanian (Figure 4).

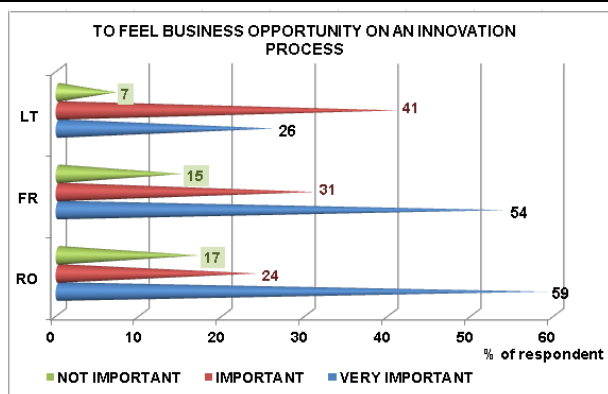


Fig. 3. The answers distributions (%) regarding "To feel business opportunity on an innovation process".  
 Source: own calculation and design.

Thinking creatively represent a powerful business tool, because this fact can help a business to identify and exploit new opportunities, to help in problem solving, having potential to increase the turnover levels for Company. So, for this point of view, the values obtained from international Survey reveal the France represents a model for Romania and Lithuania. Determined to be independent is very important for 48% of Romanian respondents, for 31% of French respectively for 28% of Lithuanians. This skill is important for 38% of French, for 33% of Romanian and for 28% of Lithuanian (Figure 5). An independent business is actually a business in which decisions cannot be influenced by others; decisions belong to one person or those persons who created the Company. The advantages of the sole owner consist in fact that he does not have to answer in the front of a board of directors. The sole owner no needs to elaborate a partnership agreement to control operations and management. The owner can choose to run the business however she likes. At this skills Romanian respondents were situated on the first place followed by French and Lithuanian. At the first sight, this fact appears to be good, but, unfortunately the instability of political scene make the entrepreneurship very difficult to practice. Other ability important for entrepreneurship is the capacity to make judgment based on limited information.

Sometime, the businessman do not have all information's to realize an appropriate evaluation of some situation, and the majority

of entrepreneurs do not act in this conditions; but when they done, the respectively decision was taken based on business instinct. Some entrepreneurs have an ability to make the right choice at the right time, sell when everybody else is buying, to make the right moves at the right time. Those represent the business people whose instincts play a crucial role in their success. Most of the successful business people got their success due to the fact that they were willing to gamble on their instincts and what their instincts told them were good ideas. Business instinct means in the fact the capacity to recognize a business opportunity, the capacity to identify the needs and the capacity to solve these needs, for which the present market cannot cover them. The survey analysis reveal that this ability is very important for 41% of French, for 35% of Romanian and only for 15% of Lithuanians (Figure 6).

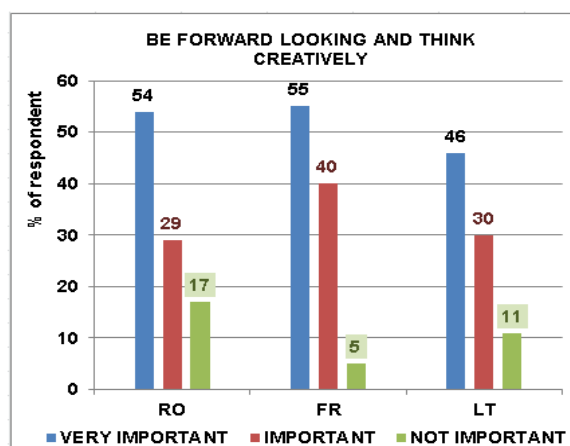


Fig. 4. The answers distributions (%) regarding "Be forward looking and think creatively".  
 Source: own calculation and design.

At the same time, this ability is important for 43% of French and for 39% of the Romanian and Lithuanian too (Figure 6). Again the France is the leader regarding business instinct, followed by Romania and Lithuania. The skills regarding "To work hard and independently" (Figure 7) appear to be very important for French (47%) and Lithuanian (48%). In Romania only the 31% of persons think to be very important to work hard and independently



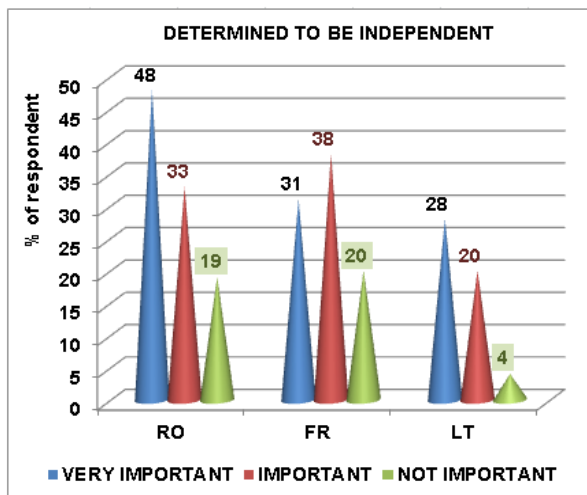


Fig. 5. The answers distributions (%) regarding "Determined to be independent".

Source: own calculation and design.

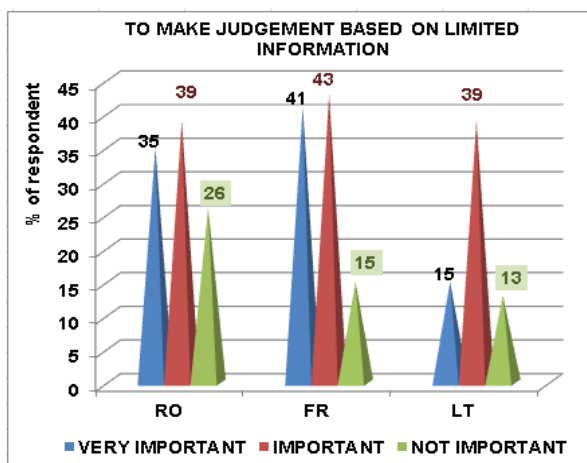


Fig. 6. The answers distributions (%) regarding "To make judgment based on limited information".

Source: own calculation and design.

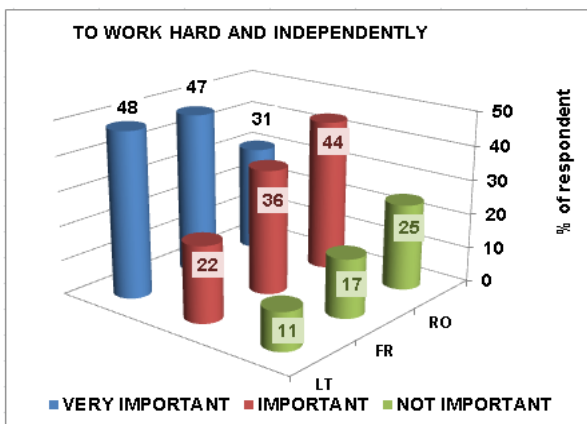


Fig. 7. The answers distributions (%) regarding "To work hard and independently".

Source: own calculation and design.

To manage project holistically (Figure 8) appear to be very important skill for French

(46%) and Romanian (32%); only 20% of Lithuanian considering this fact to be very important. 48% of Romanian considering that is important to manage project holistically, followed by French with 45% and Lithuanian with 30%. According to these values, this skill appears to be significant for French, then for Romanian and at the last for Lithuanian. To have an imaginative use of knowledge appear to be very important for Romanian (53%), followed by French (52%) and Lithuanian (41%) (Figure 9).

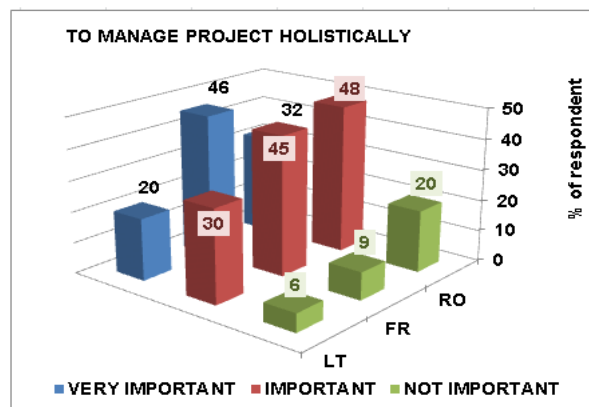


Fig. 8. The answers distributions (%) regarding "To manage project holistically".

Sources: own calculation and design.

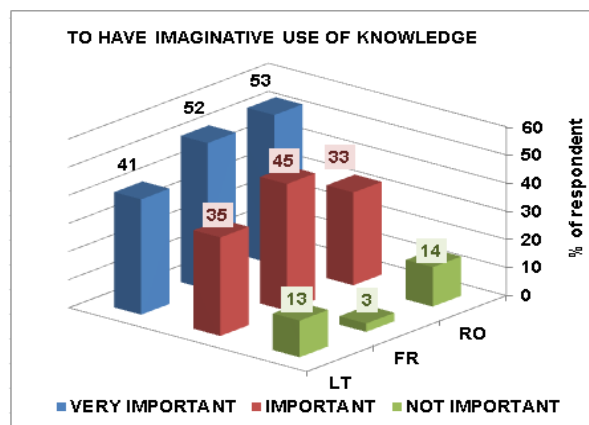


Fig. 9. The answers distributions (%) regarding "To have imaginative use of knowledge".

Sources: own calculation and design.

This skill is important for 45% of French, for 35% of Lithuanian and 33 from Romanian. Creativity and the new ideas are based on knowledge, and with ability to generating new concepts, used in order to create innovative products which then generate capital for Company. More of the people questioned answered that is important and very important



to have an imaginative use of knowledge respectively 97% from French and 86% from Romanian.

## CONCLUSIONS

There are a lot of issues to be considered when presenting the importance of entrepreneurship abilities, as the subject was analyzed based on answers of peoples from three countries. The entrepreneur competence as a whole represents the capacity of a person to accomplish in best conditions the following actions: find an idea; see problems as opportunities; learn from relationships; assess business development needs; know where to look for answers;

At the same time that entrepreneurship is about: identifying opportunities; realization of value; building and learning from relationships; being positive and taking risks. Analyzing the data obtained from this study, we found that as in a highly developed, economically and politically stable country, like France, the people give a great importance to some abilities such as "Communicate and participate in business networks" (72% of respondents)" "To take initiatives" (60% of respondents)," "Be forward looking and think creatively"(55% of respondents)," "To work hard and independently" (47% of the respondent).

France is followed closely by Romania as values and Lithuania, both being average developed countries, both have been the Communist countries in the past, until 1989 (Romania) and 1991 respectively (Lithuania). On the other hand, Romania was on the first place as the importance accorded to entrepreneurial skills like "Determined to be independent" (48% of respondents), "To have imaginative use of knowledge" (53% of respondents),"To feel business opportunity on an innovation process" (59% of respondents) followed by France and Lithuania. The values obtained reveal an approach of Romania with the Western countries, but perhaps due the socio-political climate that are in continuous moving and the lack of a traditions in entrepreneurship determine a relative understanding of the

entrepreneurial process and the human personality factors that actually determine the success of a business.

## REFERENCES

- [1]Amato, C., Baron, R. A., Barbieri, B., Belanger, J.J., Pierro, A., 2016, Regulatory Modes and Entrepreneurship: The Medial Role of Alertness in Small Business Success. *Journal of Small Business Management*, 55 (1), 27-42.
- [2]Biraglia, A., Kadile, V., 2017, The Role of Entrepreneurial Passion and Creativity in Developing Entrepreneurial Intentions: Insights from American Homebrewers. *Journal of Small Business Management*. Volume 55 (1), 170—188.
- [3]Block, J. H., Fisch, O. C., van Praag, M., 2017, The Schumpeterian entrepreneur: a review of the empirical evidence on the antecedents, behavior and consequences of innovative entrepreneurship, *Industry and Innovation*, 24:1, 61-95.
- [4]Bosma, N., Zoltan, J., Autio, E., Coduras, A., Jonathan, L., 2009, The Global Entrepreneurship Monitor United Kingdom 2008 Executive Report. <https://strathprints.strath.ac.uk/16129/>, Accessed February 20, 2018.
- [5]Education & Training for Entrepreneurship, EU Commission, Entrepreneurship Education, June 2013.
- [6]Hisrich, R.D., Peters, M.P., 1992, *Entrepreneurship: Starting, Developing, and Managing a New Enterprise* Irwin, Boston, MA.
- [7]Integrated approach social action EU, <http://www.integratedapproachsaction.eu>, <http://www.bela-ldv.ro/useful-links/>, Accessed Oct.20, 2017.
- [8]Kautonen, T., Kibler, E., Minniti, M., 2017, Late-career entrepreneurship, income and quality of life. *Journal of Business Venturing*, 32, 318-333.
- [9]Leutner, F., Ahmetoglu, G., Akhtar, R., Chamorro-Premuzic. T., 2014, The relationship between the entrepreneurial personality and the Big Five personality traits. *Personality and Individual Differences*. 63,58-63.
- [10]Obschonka, M., Fisch, C., Boyd, R., 2017, Using digital footprints in entrepreneurship research: A Twitterbased personality analysis of superstar entrepreneurs and managers. *Journal of Business Venturing Insights*,8, 13-23.
- [11]OECD, 2015, *OECD Skills Outlook 2015: Youth, Skills and Employability*, OECD Publishing. <http://dx.doi.org/10.1787/9789264234178-en>, Accessed February 20, 2018.
- [12]Re-Mark, Lithuania, <http://www.remark.lt>, Accessed Oct.20, 2017.
- [13] Staniewski, M. W., Janowski, K., Awruk, K., 2016, Entrepreneurial personality dispositions and selected indicators of company functioning. *Journal of Business Research*, 69, 1939-1943
- [14]Süsser, D., Döring, M., Ratter, B.M.W., 2017, *Harvesting energy: Place and local entrepreneurship in*

community-based renewable energy transition. Energy Policy, 101, 332-341

[15]Tether, B., Mina, A., Consoli, D., Gagliardi, D., 2005, A Literature review on skills and innovation. How does successful innovation impact on the demand for skills and how do skills drive innovation. A CRIC report for The Department of Trade and Industry.

[16]Viinikainen, J., Heineck, G., Böckerman, P., Hintsanen, M., Raitakari, O., Pehkonen, J., 2017, Born entrepreneurs? Adolescents' personality characteristics and entrepreneurship in adulthood. Journal of Business Venturing Insights, 8, 9-12.

[17]Watson, W., 2004, Connecting Organizational Communication to Financial Performance 2003/2004. Communication ROI Study. Watson Wyatt: Worldwide Research Report.



## THE ECONOMIC IMPACT OF EMIGRANT'S INCOME IN THE REPUBLIC OF MOLDOVA

Olga SÂRBU, Liliana CIMPOIEȘ

State Agrarian University of Moldova, Chisinau, 42 Mircești Street, MD-4209, Chisinau, Republic of Moldova, Phone: +373 22 432387, E-mails: o.sarbu@uasm.md, l.cimpoies@uasm.md

**Corresponding author:** o.sarbu@uasm.md

### Abstract

*In the Republic of Moldova emigration and its incomes have an important role in determining the evolutions of economic and social processes and a major influence on the country's economy. Despite this major impact on development, still emigration and its consequences have not been properly addressed. Research shows that in the future remittances that emigrants will repatriate to the country with their eventual return will have an even greater impact on the savings level. According to the analysis of the statistical data, we try to quantify the impact of remittances on the main economic aggregates, and we demonstrate that, even without direct intervention by the authorities, emigrant incomes have a major role in the development of the country. The applied research is based on the general principles of the complex systems analysis of: the system analysis method, the diagnostic analysis method, the methods of data analysis using statistical techniques: graphs and tabulations, as well as consecrated methods: scientific abstraction, analysis and synthesis, induction and deduction, observation, reasoning, comparison and grouping.*

**Key Words:** emigration, income, development, remittances, savings, impact.

### INTRODUCTION

Development processes affect and are affected by the migratory flows. It has been noticed that when a poor country starts to develop economically, emigration tends to grow. This is partly due to more intense contacts with the outside world, growing competences and partially the increasing opportunities for achieving migratory aspirations. When countries achieve a certain level of development, emigration tends to decline.

In early researches, the links between migration and development are described as "unsolved" and "undermined" [16]. Most studies that examines the external labor migration aimed for work purposes, approaches usually its impact on economic growth.

By placing the migration-development relationship close to migration economic theories, we can affirm with certainty that the migration-development relationship represent a circular chain relationship. Being traditionally treated through separate and diverse policies - migration and development

– nowadays are highly analyzed through the common relations existing between these two areas.

The economic literature highlights scientifically two contradictory aspects of the causal relationship between remittances: positive and negative [14].

While actions oriented toward development examines approaches of migratory flows causes, the migration can make a positive contribution to development, by contributing to economic growth, social responsibility and technical progress. Nevertheless in case of inefficient management, migration can pose challenges for countries' development efforts, labor exodus and intelligence exodus. Strong partnership between countries of origin, transit countries and destination countries as well as full integration of migration dimensions into development policies and the dialogue between governments and all levels actors are extremely important in enhancing the potential for migration development [13].

Migration is viewed as positive in terms of development, highlighting the impact of remittances, at microeconomic level,

improving the living standards of remittances beneficiaries (remittances), covering financially their primary needs: for food, consumer goods, improving conditions living, studies etc [23].

At a macroeconomic level, remittances are considered a source of economic development when they reach a high level and have role of multiplier (multiplier of investment, employment, etc.) represent an important source of foreign currency, contributes to increasing national income, financial imports and improving the balance of payments.

Economic reality demonstrates that the volume and dynamics of remittance flows are unpredictable and favors the growth of income inequality. In developing countries, remittances, in most cases, are used to purchase predominantly imported consumer goods, which contributes to reducing the potential of the financial multiplier, to increasing imports and inflation [9].

An important fact is that recently research concerning migration has changed its focus from investigating migration as a negative phenomenon linked with brain drain, and recognizing its positive effects on development, especially of the countries of origin [19].

Migration also contributes to the transnationalization of economic, social and political spheres, as well as to the development of money transfer networks, courier companies and foreign exchange [12]. Remittances can contribute to changing the economy structure at local or regional level. As a result of migration and increased money transfers from migrants, in many communities, agricultural activities will be replaced by economic activities involving the provision of services [22], will increase the demand for goods and services produced locally or for those linked with the migration process (transport services, telecommunications, goods and money transfers from and to the areas where migrants and non-migrants are located, loans and credits etc.) [17, 11].

## MATERIALS AND METHODS

The research methodology applied in this study is based on the general principles of complex system analysis: system analysis method, diagnostic analysis method, data analysis through statistical tools. These basic methods are supplemented by others as: scientific abstraction, analysis and synthesis, induction and deduction, observation, reasoning, comparison and grouping. The study is based in particular on the economic analysis and interpretation of emigration and emigrant incomes provided by institutions as: National Agency for Employment (NAE), National Bank of Moldova (NBM) and National Bureau of Statistics (NBS).

## RESULTS AND DISCUSSIONS

Migration of labor force and the impressive flows of remittances from population working abroad are the most important factors defining the economy of Moldova at the beginning of the 21st century. Remittances from emigrants have boosted the economic growth registered in the Republic of Moldova by supporting domestic demand and increasing the public budget revenues [20].

The large number of labor migrants is the determinant factor in the volume of remittances and distortions in the Moldovan economy over the past two decades. External migration of the labor force is a phenomenon that has been growing strongly in the Moldova after 1991. Out of total emigrants, 88.7% went abroad to work or looking for a job. Labor migrants account for 11.2% of Moldova's total active population. According to national statistics data, women predominantly dominate the group of emigrants (54%). Nevertheless, in the long run gender distribution is more balanced among group of emigrants, which also corresponds to the global situation (Figure 1). According to the residence environment, the emigrants from rural areas dominate, with a share of 63%. This large share is explained by the initial large share of rural population in Moldova. The share of migrants in the villages has increased greatly compared to the

early period of emigration. The village remains the main source of both circular and long-run migration [3]. The average age of the typical emigrant increased significantly from 30.5-31.0 years between 2000-2002 to 35-36 years during 2008-2016. The official statistical data are contradictory with the common opinion that the Moldovan emigrant "rejuvenated" during the last decade. This practically corresponds to the average population age in Moldova. At the same time, the emigrant from the Republic of Moldova is relatively young in the global comparison, the average age estimated is of 33-34 years, with 5-6 years less than the average of the age of emigrants on global scale estimated at 39 years [6].

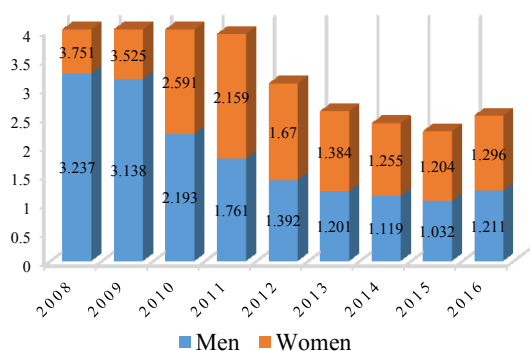


Fig. 1. Dynamics of the Moldovan emigrants  
Source: Own determination.

Moldovan emigrants have an advanced educational profile, which simplifies their integration into host societies. According to the NBS data, in 2016 the distribution of emigrant population according to the level of education includes: 10.6% with higher education, 12.3% - with specialized secondary education, 26.4% - with vocational secondary education, about 24.0% - with high school education, 25.8% - with gymnasium studies and 0.7% - with primary or non-primary studies [20]. Compared to the situation a decade ago, the share of migrants at the extremes of the educational level visibly increased. There is a certain difference in preferred destinations, the migrants with more advanced studies being slightly more likely to emigrate to European countries, their educational profile being somewhat more advanced than the "typical immigrant" in Europe. Migrants with less advanced studies tend to choose CIS countries. In both cases, the integration of Moldovan emigrants occurs very easily, including through knowing or easily learning the language of the host country.

Indicators of remittances dynamics indicates a variation over time. The dynamic analysis of remittances denotes a positive trend until 2013, with the exception of 2009, in the context of the recent international financial crisis.

Table 1. Dynamics of personal remittances geographical distribution, millions USD dollars

	2012	2013	2014	2015	2016	2016 to 2015, %
Russia	1,173.21	1,293.60	1,201.81	673.07	546.19	81.1
Italy	180.86	230.10	221.32	194.00	192.49	99.2
Israel	82.71	109.40	113.59	129.71	163.70	126.2
USA	73.70	80.05	91.44	147.37	106.64	72.4
Germany	19.11	24.22	29.34	36.11	50.48	139.8
Ukraine	60.74	74.45	40.64	27.80	16.41	59.0
Romania	9.51	11.77	12.01	12.49	11.82	94.6
Belarus	5.96	6.77	7.37	5.44	3.80	69.9
Other countries	227.06	239.09	248.42	223.92	286.24	127.8
CIS	1,262.18	1,395.41	1,266.82	725.90	590.15	81.3
Rest of the world	570.69	674.05	699.11	724.03	787.63	108.8
<b>Total</b>	<b>1,832.86</b>	<b>2,069.6</b>	<b>1,965.94</b>	<b>1,449.93</b>	<b>1,377.78</b>	<b>95.0</b>

Source: authors calculations based on data from NBM

Moldova's economy is slowly losing one of the main supports that has animated its growth in recent years. Moldovans registered a record in 2016, transferring home to relatives the lowest amount during the last decade. During 2010-16, remittances accounted for about 20

percent of income growth for the poorest 40 percent of population. In 2006-08, the remittances were greater than the population's social protection payments as pensions, child allowances, compensation and other forms of social support. According to the NBM,

migrants sent less money in recent years compared to the amounts received over the last decade. The amount of remittances was 1,449.93 billion dollars in 2015 and 1,377.78 billion dollars in 2016. Russia still remains the main remittance provider. Nevertheless the value of those remittances has decreased twice during the analyzed period. Lately in Moldova more money are transferred from Israel, USA, Germany, UK, and Romania. According to National Bank data, the volume of remittances transferred to Moldova by citizens working in abroad increased with 11% in 2017 compared to 201 during the first 11 months of 2017. In total, people working abroad have sent home 1.09 billion dollars during this period. In November, money transfers of Moldovans working in EU countries accounted 36.4% of total remittances during this month. Also in November, money transfers from CIS countries accounted 32.5% of total remittances in the month, and 31.1% of remittances were from other countries. Most of transfers (47.4%) were made in dollars, followed by transfers in euro (44.2%) and Russian rubles (8.4%). Approximately one third of the economically active population of the Moldova is working abroad, making remittances the most important source of foreign exchange reserves. Due to the limited production capacity of the economy, reflected in low productivity and the small number of new jobs, the remittances were the primary driving force for increasing private consumption and imports. The contribution of migrant remittances to the economy is also evidenced by the fact that Moldova is on the international top on at least two indicators - the ratio of remittances to GDP and total annual exports.

As a share of GDP, remittances have risen steadily from 5.1 percent in 1996 percent to a peak of 34.5 percent in 2006, a period of substantial poverty reduction, but also characterized by a decline in labor force employment (Figure 2). Until 2014, remittances accounted 26 percent of GDP, situated after two other former soviet countries, Tajikistan the Kyrgyz Republic, Moldova was the most remittent-dependent in

the region [1,2]. Overall, about a quarter of the population benefited from remittances in 2014. Among the “not poor” population 26.7 percent benefited from remittances, and remittances accounted 54.6 percent of their income.

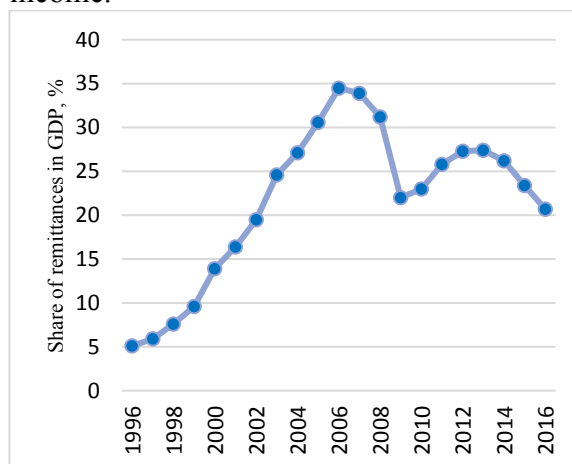


Fig. 2. Share of remittances in GDP, %

Source: Own calculation based on NBS and NBM data

Although among the poor a smaller share benefited from remittances, only 14.9 percent in 2014. Nevertheless those who benefited were highly dependent on them, accounting more than half of their incomes. The share of remittances in household disposable income was twice higher for rural areas households. Together with pensions, migration and remittances have contributed to poverty alleviation and stimulated wellbeing of rural population. Households from rural areas benefited more from remittances (56 percent). Remittances have helped many households out of poverty and stimulate their well-being. During 2014, 17.9 percent of the “non poor” would have become poor if they were not receiving remittances. Among households that receive remittances, 60 percent would be placed in the inferior quintile without remittances. Remittances helped to move 75 percent of these households to higher-income groups. They also contributed to reducing inequalities - the Gini coefficient - from 0.29 to 0.22. However, not all households benefit from remittances income. The share of emigrants in the total population varies by county. For example, the highest emigration rates were recorded in a poorer region from southern Moldova. Thus, in Gagauzia, up to

34 percent of the adult population work and live abroad. The share is much lower in the northern part of the country [4].

The downward trend in the volume of remittances is explained by migratory behavior linked to the decrease of migrants emotional connection with the country of origin, and consequently, together with decrease of attachment will occur a decrease of the remittances symbolical significance [5]. At the same time, as a result of migration stability the propensity to make remittances will gradually decrease. Thus Moldovan migrants' remittances will continue to decrease in the near future, this fact being frequently highlighted in Moldovan officials' speeches, as well as governmental documents such as national strategies, action plans etc.

On the other hand, in the context of permanent migration, a number of studies have shown that we can still expect a strong link between migration and development, even if its dynamics are changing. In the case of permanent migrants, it is noticed over time that their income increases as a result of greater individual and collective autonomy, but also through the accumulation of resources and capital. Thus, migrants improve not only their economic position but also their social status, by resolving or diminishing the status dilemmas, in the sense that they become recognized as full members of the host society, their efforts are recognized professionally, many of them are retrained or pursue full time studies in the host country. The development potential and the willingness to contribute in various ways to the modernization of the state of origin will intensify the socio-cultural and economic integration of migrants [8].

Remittances are the third source of income for Moldovan families after wages and social payments. Incomes of migrants are affected by the economic conditions of the host country. In the case of Moldova, since 2008, the volume of remittances has decreased significantly due to the Russian financial crisis, which is also explained by the considerable number of economic migrants in this country. As for the purposes of money use from abroad, we know that once they

reach their recipients in Moldova, between 60% and 90% of the money are used to cover current expenses, only 10% - 20% are included into savings and 5% -15% % directed to investments [6, 15]. Growth in consumption is mainly due to remittances [7]. Thus, according to World Bank estimates, the over 40% growth in consumption of poor households due to the fact that these families are recipients of remittances.

The calculations show that only a small part of migrants' earnings could be invested over time, thus having a potential for multiplying development [10]. Unfortunately, in such cases, we could talk about removing causes of poverty through remittances and not necessarily a form of money-induced development. Moreover, the significant proportion of foreign financial aid coupled with the main purpose of spending money has a negative effect on the degree of poverty of non-migrant families, while among migrant families it contributes to formation of certain categories of financially assisted people. In the long run, this will add to the remittance dependence of the aforementioned families and that of the entire national economy.

Although we are tempted to believe that the money sent and spent in Moldova should bring clear and direct benefits to the national economy, this assumption cannot be validated when a significant part of consumer goods for which the money from abroad are spent mostly on imported goods and not produced locally. Migrants' upward demand for imported goods, which directly increases consumption, can harm local producers by lowering the competitiveness of goods produced domestically. Moreover, the data indicates that financial funds entering in Moldova through remittances contribute in a certain way to the development of the countries where imported goods are produced [6, 7]. Most countries where remittances play an important role in economic growth have implemented various policies to better use the potential of those financial resources. Thus, they can facilitate migrants' and their families' access to more advantageous credit, insurance products, pensions, or business opportunities. In this way, the implementation of well-



targeted policies to exploit the potential of remittances can have a substantial impact on the development of communities and even countries of origin. International practices suggest that the first step towards transforming remittances into investment should be to formalize those transfers. The popularization of formal ways of remitting money from abroad is most often facilitated by lower costs for these type of services, followed by market liberalization for rapid money transfers and the intensification of competition. Other important factors are the extension of adequate infrastructure to localities necessary for the rapid money transfer and the implementation of information technologies.

Along with expanding access to formal money-making mechanisms, emigrants and their families are encouraged to open bank accounts and deposits in many countries. In this way, customers of money transfers became bank customers, motivated to keep their savings in bank accounts and to contribute to the lending development in the country. The main incentives are the possibilities to obtain interest for money stored in bank accounts, a higher level of security compared to keeping money in cash and the possibility of obtaining a more advantageous credit.

A logical continuation of the formalization of money remittances procedures from abroad and the popularization of saving tools connected to these resources is the development of an advantageous credit line for emigrants and their families. Given the fact that the person has a certain record of sent remittances and has a saving account, the bank may grant a loan at a lower rate and terms of the pledge less demanding. In many cases, this category of customers benefit from loans without the obligation to pledge certain assets, because the remittance inflows are a sufficient guarantee for the bank. Countries whose emigrants have well organized diasporas abroad, develop programs to support the remittance investment [21]. According to this, every dollar invested by the emigrant community is backed by another dollar (expressed in national currency) from

the government, which generates investment incentives into the community and amplifies the benefits of these initiatives. It is appreciated the fact that in Moldova are taken measures to attract remittances into investments as the Program 1 + 1 implemented by the Government starting with 2010. Remittances from abroad can facilitate the access of migrants and their families to various insurance products: life, health, accident insurance, or against risks associated with the operational activity of SMEs. Some remittances can be used to pay premiums for these types of insurance. In most European countries in Europe exist private pension funds that allow migrants to benefit from a retirement pension in the country of origin when the retirement age is reached. This product is important because in many countries emigrants cannot claim state pensions because they do not contribute to the public pension fund in their country of origin.

## CONCLUSIONS

External labor migration is due to large disparities between living conditions of individuals in different countries. The totality of the economic, financial, political, socio-cultural, legal-organizational and geographic factors existing in a country can either attract (pull factor) or reject (push factor) the potential economic migrants, and characterize the work migratory climate. Among the objective and subjective factors that determine the migratory climate the most important is the levels and dynamics of wages and incomes. The "barometer" characteristic of migratory directions serves to align the countries in a rating based on migration climate score, which being favorable to the recruitment of labor force from abroad defines an immigrant climate, or unfavorable qualified as emigration climate.

Currently there are distortions in the official statistics of remittances. This is largely due to the fact that some of the remittances are transferred through informal systems. In addition to the data collected through statistical reports, the Central Banks carry out a series of estimates and adjustments to

improve data quality and completeness. Registered remittances may be partial or may be overestimated.

The phenomenon of labor migration generates a multitude of economic, demographic, social and political effects. This phenomenon also presents advantages and disadvantages for all the parts involved: starting from the migrants themselves and their family members, the localities of the home and the destination country, the economy sectors in which they have worked or currently work during the migration, the remaining population in the country of origin and the population of the host country, the economies of both home and host country.

The inclusion process of remittances into the financial circuit of national economy have its role in to support a country's economic growth and development, shows that remittances are financial flows from abroad, and certain part of these funds are "leaked" back abroad. In order to maximize the benefits of remittances, macroeconomic policies should focus on minimizing "spent of remittances" abroad, both directly and indirectly.

Income-related research shows that remittances enter the financial circuit from migrant families that spend these "funds" on consumption or investment purposes and as a result their effects spread across the entire economy. The premise that remittances are private money of migrants suggests that, under market conditions, the state does not have direct tools to affect the process of training, distribution, redistribution and use of remittances funds.

## REFERENCES

- [1] Banca Mondială, „Migration and Remittances Factbook 2016”, ediția a 3-a, 2016.
- [2] Banca Mondială, Data – Personal Remittances, Received (% of GDP), <http://data.worldbank.org/indicator/BX.TRF.PWKR.D.T.GD.ZS>, Accessed on 10 December 2017.
- [3] Bălan, M., 2015, Correlations between migration and employment among young people. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 15(3), 59-66.
- [4] Biroul Național de Statistică al Republicii Moldova, BNS, (National Bureau of Statistics of the Republic of Moldova) „Migrația forței de muncă” (Labor Migration), Chișinău, 2013, [http://www.statistica.md/public/files/publicatii\\_electronice/migrația/Sinteza\\_MFM\\_2012.pdf](http://www.statistica.md/public/files/publicatii_electronice/migrația/Sinteza_MFM_2012.pdf), Accessed on 25 January 2018.
- [5] Carling, J., 2014, Scripting Remittances: Making Sense of Money Transfers in Transnational Relationships, *International Migration Review*, Vol. 48, nr. S1, pp. S218-S262.
- [6] Centrul de Analiză și Investigații Sociologice, Politologice și Psihologice (CIVIS) și Agenția Internațională pentru Informație din Țara de Origine (IASCI), „Consolidarea legăturii dintre migrație și dezvoltare în Moldova”, Raport elaborat pentru Banca Mondială, 2010, (The Center for Sociological, Political and Psychological Investigations and Investigations (CIVIS) and the International Agency for Information in Country of Origin (IASCI), "Strengthening the Link between Migration and Development in Moldova, Report for the World Bank), Chișinău, <http://siteresources.worldbank.org/INTMOLDOVA/Resources/ConsolidareaLegaturiiDintreMigrațieDezvoltare.pdf>, Accessed on 13 December 2017.
- [7] Culiuc, A., 2006, Integrating Migration and Remittances into a Development Strategy. The Case of Moldova, Thesis of disertation, John F. Kennedy School of Government, Harvard University, USA.
- [8] Iheke O.R., 2016, Remittance and the economy: The Nigerian experience (A review). Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 16(3):145-152.
- [9] Martin Ph., 2000, Labor Relations in California Agriculture: 1975-2000. October 4, 2000. [http://migration.ucdavis.edu/cf/more.php?id=44\\_0\\_2\\_0](http://migration.ucdavis.edu/cf/more.php?id=44_0_2_0). Accessed on January 10, 2018.
- [10] Marcu, S., 2014, Between Migration and Cross-Border Mobility: Return for Development and Europeanization among Moldovian Immigrants, *Southeast European and Black Sea Studies*, Vol. 14, (1): 83-107.
- [11] Massey, D.S., Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A., Taylor, J.E., 2009, *Worlds in Motion: Understanding International Migration at the End of the Millennium*, Oxford: Oxford University Press.
- [12] Manolo I. Abella, 1997, *Sending Workers Abroad. A manual for low and middle-income countries*. IOM, Geneva, 124 p.
- [13] Mateoc-Sîrb, N., Mateoc, T., Mănescu, C., Grad, I. 2014, Analysis on the phenomenon of population's migration in Romania. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 14(1): 211-214.
- [14] Moșneaga, V., Moraru, V., Rusnac, G., Țurcan, V., 2011, *Facts of a Process: The Migration of the Labor Force in the Republic of Moldova (Fațetele unui proces: migrația forței de muncă din Republica Moldova)*, Chișinău: Editura Prim.
- [15] Orozco, M., 2007, *Looking Forward and Including Migration in Development: Remittance Leveraging Opportunities for Moldova*, Organizația Internațională

pentru Migrație, Chișinău, Republica Moldova, Decembrie 2007.

[16]Petit Veronique, 2002, Migration internationales et development. Dans: Le monde en développement. Paris: La Documentation Française, Chapitre 8. [http://www.cicred.org/rdr/rdr\\_f/revues/revue83-84/30-83-84\\_f.html](http://www.cicred.org/rdr/rdr_f/revues/revue83-84/30-83-84_f.html), Accessed on January 10, 2018.

[17]Portes, A., 2001, Introduction: The Debates and Significance of Immigrant Transnationalism, Global Networks, Vol. 1(3):181-193.

[18]Portes, A., 2007, Migration, Development, and Segmented Assimilation: A Conceptual Review of the Evidence, Annals of the American Academy of Political and Social Science, Vol. 610(1):73-97.

[19]Report On A Joint Commonwealth Secretariat/World Bank Workshop On Migration, Remittances And Development: Challenges For Africa. 2004

[20]Sârbu, O. 2013, Particularities of employment in rural areas of the Republic of Moldova. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 13(1): 361-370.

[21]Strategia Națională de Dezvoltare „Moldova 2020”, Parlamentul Republicii Moldova, Legea nr. 166 din 11 iulie 2012 pentru aprobarea Strategiei Naționale de Dezvoltare „Moldova 2020”, publicată în Monitorul Oficial al Republicii Moldova din 30 noiembrie 2012, (The National Development Strategy "Moldova 2020", the Parliament of the Republic of Moldova, Law no. 166 of July 11, 2012 for the approval of the National Development Strategy "Moldova 2020", published in the Official Gazette of the Republic of Moldova on November 30, 2012), no. 245-247.

[22]UNDP, Organizația Națiunilor Unite, Human Development Report 2015. Work for Human Development, 2015, [http://hdr.undp.org/sites/default/files/2015\\_human\\_development\\_report.pdf](http://hdr.undp.org/sites/default/files/2015_human_development_report.pdf), Accessed on 13 December 2017.

[23]Zaharco, S. 2015, Migration from rural areas-its impact and prospects. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 15(2): 435-438.

## STATUS OF WOMAN IN ROSE FARMING IN ISPARTA-TURKEY

Deniz SARICA, Vecdi DEMİRCAN, Hacer CELİK ATEŞ\*, Barina TURAN,  
Sevgi CETINKAYA

Suleyman Demirel University, Faculty of Agriculture, Isparta, Turkey,  
Emails: denizsarica@sdu.edu.tr, vecdidemircan@sdu.edu.tr, celikha@yahoo.com,  
barinna@hotmail.com, sevgi\_cetinkaya\_20@hotmail.com

*Corresponding author:* celikha@yahoo.com

### Abstract

*Women do housework in rural areas and at the same time are involved in agricultural production outside home. For this reason, in agriculture which is a labour-intensive sector, the work load of women is higher than men in the sector. However, jobs done by men are socially more prestigious and more profitable. It is the fact that women's activities are mostly part-time, often free and more home-based. Women work with hourly, daily or unit-based wages as unpaid family workers during the production and harvesting stages of agricultural products (cotton, hazelnut, tea, rose, etc.). In this study, it was aimed to determine the life and working conditions and problems of agricultural female workers in rose production, which is one of the most important agricultural products in Isparta province. The sample size was calculated by simple random sampling method and a questionnaire study was conducted with 147 women. The vast majority of women interviewed are primary school graduates, and most of the women have no social security. It was found that the interviewed women were not effective in making decisions in general and did not have control over their income.*

**Key words:** rose, women, status, Isparta, Turkey

### INTRODUCTION

Women face permanent obstacles and social and economic constraints that prevent them from becoming more involved in agriculture while they play an important role in agricultural growth in developing countries (Alkire et al., 2012; Sraboni et al., 2013) [1,16]. In most respects, women face more severe constraints than men in developing countries. They are physically weaker than men, have lower education level, less income, and less control over their income. Moreover, they have less bargaining power when selling their products and labour, less participation in decision-making bodies, less access to production inputs and resources and lower employment opportunities (Basu and Basu, 2011; Hossain and Jaim, 2011) [2, 6]. In Turkey, as in other developing countries, women make vital contributions to the agricultural economies. They are often engaged in domestic activities and participate in agricultural production. Agriculture is a labour-intensive sector, and in parallel, women's workload in the sector is higher than

men. However, the works done by men are socially more prestigious and more profitable. The women work either at lower fees or unpaid, despite the fact that they have more work to do. Their activities relate to part-time, unpaid, and usually home-based work. They work with hourly, daily or unit-based wages and as unpaid family workers during the production and harvesting stages of agricultural products (cotton, hazelnut, tea, rose, etc.) (Gulcubuk and Yasan, 2009; Rad et al., 2012) [5, 15]. This has been verified by the official statistical data. The labour force participation rate in 2016 is 30.4% for women between the ages of 15-24 while it is 54.3% for men (TUIK, 2018) [17].

Table 1. Employment types and distribution by gender in agriculture

	Female (%)	Male (%)	Total
Regular employee/Casual employee	37.0	63.0	100.0
Employer	7.5	92.5	100.0
Self employed	11.3	88.7	100.0
Unpaid family worker	76.7	23.3	100.0
Total	44.9	55.1	100.0

Source: TUIK, 2018

As it can be seen from the Table 1, the low labour force participation rate for women is mainly due to being busy in unpaid family workforce.

Rural women in Turkey work quite hard as paid workers at certain periods due to both family workforce needs and economic reasons. This also applies to Isparta province in which roses (*Rosa Damascena*) are produced intensively. The economic return of the rose oil is attractive, but it is labour-intensive.

Although not precisely known, about 15,000 tons of rose flowers are produced around the world.

The main countries where the rose flowers are produced are Turkey, Bulgaria, Morocco, Afghanistan, China, Iran, India, South Africa and Saudi Arabia.

Turkey (7,250 tons in 2016) and Bulgaria (5,750 tons in 2016) are the most significant ones. The rose oil and rose concretes produced in both countries are fully processed in the world perfume and cosmetics industry. Turkey alone meets around 48% of the world's rose oil production and most of the roses (80%) are grown by women in Isparta province (General Directorate of Cooperatives, 2017) [4].

The aim of the study is to present an overview on the roles and condition of women and to determine the issues women face in rose farming.

For this purpose, the social and demographic structure of women, their working conditions and participation in decisions-making are examined in the study.

## MATERIALS AND METHODS

The research was conducted in 8 villages located in the districts of Keçiborlu, Gonen and Central Townships in Isparta. The villages are selected because they have the highest rose production in the area. The sample size was calculated using the Simple Random Sampling Method and found as 147. Therefore, a face to face questionnaire was conducted with 147 women engaged in rose farming. The proportional distribution was used in the analysis of the obtained data.

Charts and graphs were created and interpreted in accordance with the purpose.

## RESULTS AND DISCUSSIONS

### *Women's social and demographic characteristics*

The social and demographic status of women provides information on both women's status in society and gender roles. Furthermore, the women's role in society affects women's labour force participation economically.

Table 2. Women's social and demographic characteristics

	Number	Ratio (%)	
Age	21-40	42	28.5
	41-50	44	30.0
	51-80	61	41.5
	Total	147	100.0
Education Level	Primary	114	77.5
	Secondary	12	8.2
	High	14	9.5
	University	7	4.8
	Total	147	100.0
Occupation	Housewife	139	94.6
	Civil Servant	5	3.4
	Farmer	3	2.0
	Total	147	100.0
Marital Status	Married	137	93.2
	Single	10	6.8
	Total	147	100.0
Marriage Procedure	Arranged Marriage	86	58.5
	Companionate Marriage	42	28.6
	Elopement	9	6.1
	Total	137	93.2
Number of Children	n/a	4	2.7
	1-3	125	85.0
	4-6	18	12.3
	Total	147	100.0
Social Security	Yes	21	14.3
	No	126	85.7
	Total	147	100.0
Membership of Cooperatives	Yes	27	18.4
	No	120	81.6
	Total	147	100.0

Source: Authors' calculations based on survey data

General findings suggest that the marital status of women, the number of children, education status, demographic factors and gender perception are extremely important for women's participation in the workforce when

the results of a limited number of empirical studies for Turkey are examined (Ozer and Bicerli, 2003; Dayioglu and Kirdar, 2010; Kilic and Ozturk, 2014) [14, 3, 10].

In rose cultivation in Isparta, it is observed that most of the women participating in the research are 41 years old and over, and their education level is primary school. They are mostly housewives, married in arranged marriages, have 1 to 3 children and do not have social security. Furthermore, they are not members of any cooperative or association in general (81.6 %) (Table 2).

The low level of women’s education, mostly dealing with housework, marriages in the direction of their families, and not having social security make women disadvantaged in the society.

**The Economic Status of Women**

Gender inequality, or in other words sex-based division of labour, plays an important role in what women and men can and cannot do (Kilic and Ozturk, 2014) [10]. In this context, women are usually responsible for housework, child and elderly care while men are responsible for joining the workforce and bringing money home. The situation of women does not look good from an economic perspective as well as in social and demographic characteristics.

Gender-based division of labour, urban migration, disintegration in agricultural structure, weakening of traditional family structure, the stresses of balancing family and working life and the low level of education for women are considered as significant elements among the public-specific reasons for the low level of female employment. However, the structural changes in the economy, applied policies and social transformations have become important factors in the decrease of employment in general, in female employment in particular (Hotar, 2011; Karabiyik, 2012) [7,8].

In relation to the economic situation of women in the study, the following were also found: They make the highest income from the rose product according to their works and earn an average of 5,269 USD per business per year. Women’s own income source is the money they obtain from their spouse and most

of them have no other gain apart from the pocket money. Also, the ownership of the families’ agricultural land is mostly their spouse. Nearly half of the women have an experience of 11 to 20 years in rose cultivation. Despite such a great deal of experience and work, it is expected that they have a limited decision-making ability within the household due to not having enough income sources.

Table 3. The Economic Status of Women

	Number	Ratio (%)	Average (USD)*
Income Source by Activity Type			
Income Earned from Rose	147	100.0	5,269
Non-Business Agricultural Income	24	16.3	896
Non-Agricultural Income	14	9.5	845
Source of the Women’s Income			
Pocket Money from Spouse	77	52.4	
Salaried Employee	8	5.4	
Working as an Agricultural Worker	16	10.9	
No Earnings	46	31.3	
Land Property Status**			
Own	48	32.6	
Spouse	97	65.9	
Other	29	19.6	
Experience in Rose Farming (year)			
2-10	27	18.4	
11-20	44	30.0	
21-30	28	19.1	
31-40	29	19.7	
41+	19	13.0	

Source: Authors’ calculations based on survey data

\*Calculated according to the average exchange rate of the CBRT (Central Bank of the Republic of Turkey) year 2016 (1 USD= 3TL).

\*\*There can be more than one answer because the land is very fragmented.

**Participation of Women in Work and Decisions**

In the context of household employment, women and girls who are in unpaid family works have a heavy work load. In addition to routine tasks like housekeeping, cooking, washing and water transport, women also have to do a lot of time-consuming tasks which require high body strength, such as vineyard works, wood transport, bread making and animal care. According to the data obtained, rural women in Isparta

province spend at least three hours per day for housework and child care. Their leisure time is not even an average of two hours a day (knitting, resting, watching TV and religious activities). In rural area, the labour intensity of a woman is not just about housework. At the same time, the fact that women have to work in agricultural production places them in the position of heavy workers (Kizilaslan and Yamanoglu, 2010) [11].

Table 4. Works and Time Spent in Rose Farming

Agricultural Work	Average Working Time (Hour/Person/Year)	Ratio (%)
Release	7.5	3.1
Fertilisation	7.1	3.0
Spraying	4.9	2.0
Pruning	20.6	8.5
Hoeing	20.5	8.5
Irrigation	3.7	1.5
Harvest	177.4	73.3
Shipping	0.3	0.1
Total	242.0	100.0

Source: Authors' calculations based on survey data

It is seen that in the study, the women work most in rose harvesting (%7 3.3), followed by pruning (% 8.5) and hoeing (% 8.5). Also, 21.1% of the women work in a business other than their own. They usually work in hoeing and picking on a paid basis.

In another study (Kaya and Atsan, 2012) [9], it was determined that the majority of women in rural areas were also involved in harvesting and hoeing (60.9%) and that they worked for a total of 12.7 hours a day.

In rural areas, the control of decisions often shifts to men. In our study, it has been found that half of the women have always participated in the decisions in the family (50.3%) while nearly the other half have sometimes participated (42.9%), and the rest (6.8%) have never participated. In terms of participation in decision making, deciding to purchase house and land is the most common answer and this is followed by purchasing goods and gold. They have the minimum contribution to the decisions on grown children's marriage and the decision is made by the man of the house. Similarly, the plan of the family budget is largely made by the husbands. It is also seen that they are effective in making decisions about rose production but

not in deciding on rose marketing. Similar findings were found in other studies (Kizilaslan and Yamanoglu, 2010; Kulak, 2011; Oguz and Kan, 2010) conducted in other cases in Turkey [11, 12, 13].

Table 5. Participation of Women in Decision Making

	Number of Women	%
Participation in Decisions in the Family		
Always	74	50.3
Sometimes	63	42.9
Never	10	6.8
Total	147	100.0
Decision Topics		
Children's Education	69	47.0
Purchasing House, Land	126	85.7
Purchasing Goods	114	77.6
Purchasing Gold	85	57.8
Grown Children's Marriage	24	16.3
Decisions on Planning Family Budget		
Me	14	9.5
My Partner	94	64.0
Me and My Partner	35	23.8
Family	3	2.0
Others (Father-in-law, Mother-in-law)	1	0.7
Total	147	100.0
Participation in Decisions on Rose Production		
Always	69	46.9
Sometimes	27	18.4
Never	51	34.7
Total	147	100.0
Participation in Decisions on Rose Marketing		
Always	38	25.9
Sometimes	14	9.5
Never	95	64.6
Total	147	100.0

Source: Authors' calculations based on survey data

## CONCLUSIONS

In this paper it was aimed to determine the life and working conditions and issues of agricultural female workers in rose production, which is one of the most significant products in Isparta province. Women have a heavy work load in rose farming as in the case of other rural areas. Besides routine tasks like housekeeping, cooking, washing and water transport, women also have to do a lot of time-consuming tasks which require high body strength, such as vineyard works, wood transport, bread making and animal care. They work quite

hard as paid workers at certain periods due to both the family labour and economic reasons in rural life in Turkey.

In rural areas, the women usually work in harvesting, hoeing and pruning outside the home with or without pay. In rose farming, they work 177.4 hours in harvesting, 20.5 hours in hoeing and 20.6 hours in pruning per person per year. Women's marital status, number of children, educational status, demographic factors and gender perceptions are very important on women's labour force participation rates. In terms of socio-economic characteristics, they are disadvantageous because they are individuals who have low level of education, mostly engaged in housework, married in the direction of the family's request, do not have social security, and have no income of their own. On the other hand, in terms of participation in decisions, the situation does not also seem pleasant. It is found that only half of the interviewed women are able to participate in decision making. The majority cannot participate in decisions especially about the grown children's marriage and marketing in rose products. Their spouses are influential in the decisions. It is verified with the results that they have limited in participation in decision-making within the household because they have not enough income sources.

Women in general are disadvantaged in the society. In addition to this, the situation in which rural women are socially and economically involved is further deepened the difference between women and men. The situation can only be resolved by social policies and various regulations, including government support and positive discrimination. The social perception that will change the outlook for women must also be changed. For this purpose, new approaches can be gained with training studies. The heavy burden on the rural woman must be reduced and a balance between roles based on gender must be ensured. Employment should be increased by providing new skills and equipment that will increase women's participation in the workforce, especially as paid worker.

## ACKNOWLEDGEMENTS

The authors thank to the Scientific and Technological Research Council of Turkey (TUBITAK) for supporting the research project 2209-A under which this work was financed.

## REFERENCES

- [1]Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A. R., Seymour, G., Vaz, A., 2012, The Women's Empowerment in Agriculture Index. IFPRI Discussion Paper 1240. Washington, DC: International Food Policy Research Institute. Downloadable at: <http://www.ifpri.org/publication/women-s-empowerment-agriculture-index>, Accessed 08.02.2018.
- [2]Basu, S., Basu, P., 2001, Income Generation Program and Empowerment of Women- A case study in India, Charles Sturt University, Bathurst, NSW 2795, Australia. Available at: [http://crawford.anu.edu.au/acde/asarc/pdf/papers/conference/CONF2001\\_03.pdf](http://crawford.anu.edu.au/acde/asarc/pdf/papers/conference/CONF2001_03.pdf), Accessed 08.02.2018.
- [3]Dayioglu, M., Kirdar, M. G., 2010, The Determinants of and Trends in Labour Force Participation of Women in Turkey, Welfare and social policy analytical work program; working paper no. 5. Washington DC: World Bank. <http://documents.worldbank.org/curated/en/466591468316462301/Determinants-of-and-trends-in-labor-force-participation-of-women-in-Turkey>, World Bank, Accessed 08.02.2018.
- [4] General Directorate of Cooperatives, 2017. Year 2016 Rose Flower Report (in Turkish).
- [5] Gulcubuk, B., Yasan, Z., 2009, Women's Labour in Unemployment, Poverty and Immigration Grip in Rural Area. International Multidisciplinary Women's Congress, 13-16 October 2009, İzmir/Turkey (in Turkish).
- [6]Hossain, M., Jaim, W. M. H., 2011, Empowering Women to Become Farmer Entrepreneur Case Study of a NGO Supported Program in Bangladesh. The IFAD Conference on New Directions for Smallholder Agriculture, 24-25 January 2011, Rome/Italy.
- [7]Hotar, N., 2011, Economic Community Development and Women's Employment, TÜRK-İŞ Journal, Ankara 392: 84-86 (in Turkish).
- [8] Karabiyik, İ., 2012, Employment of Women in Working Life in Turkey, Marmara University Journal of E.A.S. Vol. 32(1): 231-260 (in Turkish).
- [9]Kaya, T. E., Atsan T., 2012, Socio-economic Situations of Rural Women and Their Expectations for the Future (TRAI Region Example), Turkish Journal of Agricultural Economics, 18(1): 1-11.
- [10]Kilic, D., Ozturk, S., 2014, Obstacles and Solutions in Female Labour Force Participation in Turkey: An Empirical Applications, Journal of Public Administration, Vol. 47(1): 107-130 (in Turkish).



- [11]Kizilaslan, N., Yamanoglu, A., 2010, Participation of Women in Agricultural Production and Family Decisions in Rural Areas: Tokat Province Example, the Journal of International Social Research, Vol. 3(13), Woman Studies (Special Issue) (in Turkish).
- [12]Kulak, E., 2011, The Effects of Changes in Agricultural Production Processes on the Female Employment in Rural Area: Developments After 1980. Prime Ministry General Directorate of Women's Status Master Thesis, Ankara (in Turkish).
- [13]Oguz, C., Kan, A., 2010, Women Poverty in Rural Area: the Case of Yaylacik Village. IX. Agricultural Economics Congress, Urfa/Turkey, 427-435 (in Turkish).
- [14] Ozer, M, Bicerli, K., 2003, Panel Data Analysis of the Women's Workforce in Turkey. Journal of Social Sciences, Vol. 3(1): 55-86 (in Turkish).
- [15] Rad, S., Celik Ates H., Delioglan, S., Polatoz S., Ozcomlekci, G., 2012, Participation of Rural Women in Sustainable Development - Demographical and Socio-Economic Determinants. Sustainable Development, Vol. 20(2): 71–84.
- [16]Sraboni, E., Quisumbing, A. R., Ahmed A. U., 2013, The Women's Empowerment in Agriculture Index: Results from the 2011-2012 Bangladesh Integrated Household Survey, International Food Policy Research Institute Policy Research and Strategy Support Program for Food Security and Agricultural Development in Bangladesh.
- [17]TUIK, 2018. Turkish Statistical Institute. Available at:  
<http://www.tuik.gov.tr/PreTabloArama.do?metod=search&araType=vt>, Accessed: 08.02.2018.

## ECONOMIC ANALYSIS OF BEEKEEPING FARMS: A CASE STUDY OF ISPARTA PROVINCE IN TURKEY

Duygu SERT, Vecdi DEMIRCAN

Suleyman Demirel University, Agriculture Faculty, Department of Agricultural Economics, Isparta-Turkey, Emails: duygusert07@gmail.com, vecdidemircan@sdu.edu.tr

*Corresponding author:* vecdidemircan@sdu.edu.tr

### Abstract

*This study focused on economic structure of different beekeeping farm sizes in Isparta province in Turkey. The main material of the study was comprised of original data acquired by way of survey method from 74 farms in Isparta province which carry out beekeeping activities. Neyman Method from among the stratified sampling methods was used for determining the number of samples that will be subject to surveys. Accordingly, the farms with 0-75 hives (31 farms) group I, farms with 76-150 hives (25 farms) were classified as the group II whereas farms with 151+ hives (18 farms) were classified as the group III. Gross production value per hive ranged from 254. to 271.54 USD and on average it was 267.32 USD. The share of honey sale was approximately 99% of the total gross production value. The lowest and the highest production cost per hive were 49.12 to 71.58 USD, respectively. The result showed that as the magnitude of farm size increased, production costs per hive declined. It means that bigger farms had advantages over small farms in terms of production costs per hive. It was determined that permanent labor and feeding costs played an influential role in total production costs. The proportion of permanent labor cost in total production cost for group I, group II, and group III was 42.36, 37.94, and 33.62 %, accordingly, and feeding costs comprised 32.01, 28.51 and 35.71 %, respectively, of total production cost. Gross profit per hive ranged from 180.21 to 240.42 USD and on average it was 235.77 USD. In addition, net profit per hive increased as farm size increased. Relative return is a criterion that measures the success of a commercial enterprise. Relative return for group I, group II and group III were 3.55, 4.96 and 5.48, respectively. Since the relative returns of all the farm groups were higher than 1 it can be concluded that all the farms were profitable in relative returns increased with the increase in farm size.*

**Key words:** beekeeping, production post, profitability

### INTRODUCTION

Beekeeping is an activity involving the use of plant sources, bees and labour for producing honey, pollen, royal jelly, propolis, and bee venom along with live material such as queen bees, cluster bees and package bees (Firatli et al., 2000) [3]. Beekeeping has an important position among agricultural activities since it contributes to plant growth by way of pollination, provides income in a short period of time, does not require high capital and is not dependent on land assets. Beekeeping provides work, income and healthy nutrition to the rural population in developing countries due to low operating costs, lower labour requirement, ease of storage of the obtained products and the fact that the obtained product is sold at a value price (Gunbey, 2007; Kizilaslan and Kizilaslan, 2007) [4,7].

Turkey has a favorable ecosystem and a strong production potential for beekeeping activities. There are about 8 million colonies in Turkey with a honey production of 105 thousand tons (TUIK, 2016) [12]. The proportion of Turkey in the number of colonies in the world is about 9% with a proportion of about 7% with regard to honey production. Turkey is ranked third in the world in terms of the number of colonies, and second in the world with regard to honey production. The Isparta province where the study was carried out in has a favorable ecosystem for beekeeping activities. Bees play an important role in the fertilization of fruit trees in Isparta with a high potential for fruit growth. The number of hives in Isparta province in 2016 was 32,384 with a honey production of 252 tons (TUIK, 2016) [12]. The purpose of this study was to analyze the economic structure of different beekeeping

farm sizes in Isparta province in Turkey. For this purpose, the beekeepers were grouped according to the number of hives after which they were compared with regard to production cost, income and profitability indicators. It is expected that the data acquired in the study shall provide valuable information to policy makers, producers, researchers and all relevant institutions.

## MATERIALS AND METHODS

The main material of the study was comprised of original data acquired from beekeeping farms at the districts of Eğirdir, Yalvaç, Merkez, Sütçüler and Keçiborlu in Isparta province. In addition, similar studies carried out by related people and institutions as well as reports and statistics were also used. Survey data includes 2016 production data.

Purposive sampling was used for selecting the districts of Eğirdir, Yalvaç, Merkez, Sütçüler and Keçiborlu where extensive beekeeping activities are carried out in accordance with data acquired from the Isparta Union of Beekeepers. All beekeeping farms in these districts that fit the purpose of the study comprised the population. The districts selected as the study area make up about 78% of Isparta province and 71% with regard to the number of hives (TUIK, 2016) [12]. Hence, it can be stated that the study region has the required characteristics for representing the beekeeping farms in Isparta province

Neyman Method from among the stratified random sampling methods was used for determining the number of samples to be included in the survey (Yamane, 2001) [13]. The number of samples for representing the main population was calculated as 74 as a result of this method. Since the number of hives of different farms varies, it was decided to homogenize the population of beekeepers by classifying them into different layers. The beekeepers were classified into three groups according to the number of hives and frequency distribution. Furthermore, groups were classified based on the number of hives as follows: Group I (0-75 hives), Group II (76-150 hives) and Group III (151 and more

hives). The number of beekeepers for Group I, II, III was 31, 25, and 18, respectively.

Production costs during beekeeping activities are required in order to calculate the honey production cost. Production costs have been classified into two groups as fixed and variable costs. Fixed costs are those that do not depend on production. Whereas variable costs decrease or increase depending on production (Kiral et al., 1999) [6]. Machinery depreciation machinery capital interest, bee capital interest, administrative costs and permanent labor were taken into consideration as fixed cost factors related with beekeeping activities. Depreciation ratio was considered as 10% when calculating the machinery depreciation from among the fixed cost factors (Oren et al., 2010) [8]. New machinery and bee capital was divided into two after which the real interest rate (2.31%) was applied when calculating the machinery and bee capital interest values (Kiral et al., 1999) [6]. Administrative costs were calculated as 3% of the total variable costs. Wage rate to foreign labor was taken as basis when calculating the family labor force wage included in the production costs.

Feeding, transportation, temporary labor, accommodation, hive, medication, packaging, insurance and revolving fund interest were taken into consideration as variable costs in this study. Revolving fund interest was calculated by applying half the agricultural credit interest rate applied by the T.R. Ziraat Bank for beekeeping activities (4%) to the total variable cost.

Production costs were comprised of the sum of fixed and variable costs. The cost of 1 kg of honey was calculated by dividing the total honey production costs per farm to the total honey production.

Gross product value for beekeeping activity was calculated by multiplying the product amounts acquired as a result of agricultural activities from beekeeping with the unit prices. Gross profit, net profit and relative return calculations were also made in the study for putting forth the profitability in honey production. The difference between variable costs and gross product equals to gross profit, which is a measure of success of

production branch for farm analysis. Net profit was obtained from the difference between production costs and gross product value. Division of gross product value to the production costs gives relative return.

## RESULTS AND DISCUSSIONS

Cost factors for beekeeping activities were analyzed by classifying them into groups as fixed and variable costs. Variable costs increase or decrease depending on the production. These costs emerge upon production and vary subject to production amount. While fixed costs do not change depending on production or in other words,

they are costs which emerge regardless of whether production activities are carried out or not (Inan, 2016) [5].

Costs for beekeeping activities are given in Table 1. As can be seen in the Table, the proportion of variable costs in production costs for Groups I., II. and III. were 52.04%, 56.82% and 60.06% respectively; whereas the proportion of fixed costs has been calculated as 47.96%, 43.19% and 39.94% respectively. Average proportion of variable and fixed cost in total production cost were 56.98 and 43.02%, respectively for all beekeeping farms.

Table 1. Production costs of beekeeping farms

Cost items (USD farm <sup>-1</sup> )	Farm groups							
	I. Group		II. Group		III. Group		General	
	USD	%	USD	%	USD	%	USD	%
Feed	1,237.42	32.01	1,858.28	28.51	3,982.12	35.71	2,115.00	32.37
Transportation	179.47	4.64	557.95	8.56	477.81	4.29	379.90	5.81
Temporary Labour	44.04	1.14	222.19	3.41	316.89	2.84	170.59	2.61
Accommodation	77.48	2.00	163.58	2.51	206.62	1.85	137.98	2.11
Honeycomb	218.87	5.66	411.26	6.31	615.56	5.52	380.36	5.82
Medication	86.09	2.23	193.05	2.96	420.20	3.77	203.49	3.11
Packing	69.21	1.79	131.13	2.01	273.18	2.45	139.74	2.14
Insurance	21.52	0.56	23.84	0.37	147.35	1.32	52.91	0.81
Revolving fund interest	77.48	2.00	142.38	2.18	257.62	2.31	143.23	2.19
Total variable costs (A)	2,011.59	52.04	3,703.64	56.81	6,697.35	60.06	3,723.01	56.98
Administrative costs	60.26	1.56	111.26	1.71	200.99	1.80	111.72	1.71
Permanent Labour	1,637.42	42.36	2,473.51	37.94	3,749.01	33.62	2,433.51	37.24
Bee capital interest	3.31	0.09	7.28	0.11	17.22	0.15	8.04	0.12
Machinery capital interest	15.89	0.41	23.18	0.36	50.33	0.45	26.73	0.41
Machinery depreciation	137.09	3.55	200.00	3.07	435.76	3.91	230.99	3.54
Total fixed costs (B)	1,853.97	47.96	2,815.23	43.19	4,453.31	39.94	2,810.99	43.02
Total production costs (A+B)	3,865.56	100.00	6,518.87	100.00	11,150.66	100.00	6,534.00	100.00
Honey production (kg farm <sup>-1</sup> )	1,382.00	-	3,088.00	-	5,888.00	-	3,054.41	-
Honey cost (USD kg <sup>-1</sup> )	2.80	-	2.11	-	1.89	-	2.14	-

Source: Data from field survey, 2016

Of all cost items, permanent labor had the highest proportion with 34.24 %. Family labor comprised most of the permanent labor cost. Another important cost in beekeeping activities was feeding costs. The proportion of feeding costs in total production costs was 32.01, 28.51, 35.71 and 32.37% for first, second third and all beekeeping farms, respectively. Beekeeping farms use honey, sugar, pollen and fresh yeast for feeding the bees. Honeycomb and transportation had a share of 5.82% and 5.81%, respectively, in the total production costs. Transportation cost stemmed from the fact that majority of the

farms (49 farms) carried out migratory beekeeping activities.

The production cost for 1 kg honey decreased as farm size increased. Indeed, the production costs for 1 kg honey for the I., II. and III. groups were 2.80, 2.11 and 1.89 USD, respectively. Average production cost for 1 kg honey was 2.14 USD for all farms. The reason why only the honey cost was included in the cost table was that all other products excluding honey had a small proportion in the total gross production value.

A study conducted in Turkey by Ceyhan et al., (2016) [1], found that the proportion of variable costs in total production cost was

60%, the proportion of fixed costs was 40% and that labor (26%), feeding (19%) and transportation (15%) costs were the most important cost items. In addition, it was also found that the production cost decreased with increasing beekeeping farm size. Saner et al., (2011) [10], found out that 63.26% of the total production costs was comprised of variable costs, while 36.74% was comprised of fixed costs and that colony renewal was ranked number one among variable costs with a proportion of 19.05% followed by fuel/transportation costs with a proportion of 12.04%. Ozturk et al., (2015) [9], conducted a study and found that average honey production cost in the Mediterranean Region was 9.55 TL/kg and that the honey production

cost decreased with increasing farms sizes. Oren et al. (2010) [8], found that 54.33% of the production cost was comprised of variable costs and that 45.67% was comprised of fixed costs with a cost of 4.66 TL for 1 kg of honey. Gross product values for farm sizes are given in Table 2. Gross product value for beekeeping activities was comprised of honey, pollen, royal jelly and propolis sales. The average gross product value in the farms was 31,543.44 USD which increased as farm size increased. Indeed, gross product values were calculated as 13,741.72, 32,313.25 and 61,132.78 USD for I., II. and III. groups, respectively. Honey made up 98.85% of the total gross product value for all farms.

Table 2. Income of beekeeping farms

Income items (USD farm <sup>-1</sup> )	Farm groups							
	I. Group		II. Group		III. Group		General	
	USD	%	USD	%	USD	%	USD	%
Honey	1,3641.39	99.27	3,2105.30	99.36	60,106.62	98.32	31,181.55	98.85
Pollen	95.36	0.69	81.79	0.25	881.457	1.44	281.99	0.89
Royal jelly	0.00	0.00	125.50	0.39	110.2649	0.18	69.22	0.22
Propolis	4.97	0.04	0.66	0.00	34.43709	0.06	10.68	0.03
Gross product value	13,741.72	100.00	32,313.25	100.00	61,132.78	100.00	31,543.44	100.00

Source: Data from field survey, 2016

Gross profit, net profit and relative return per farm and per hive for all groups were presented in Table 3. Gross profit is a significant measure of succession to determine the competitive strength of production activities in the farms with regard to the use of scarce production factors. In other words, gross profit is a significant parameter indicating the success of the farms (Erkus et al., 1995) [2]. As it can be observed in the table, average gross profit was 27,820.43 USD which increased with increasing farm size. Indeed, average gross profit was 11,730.13 USD for I. group as 28,609.60 USD for II. group and as 40,906.78 USD for III. group. Average net profit per beekeeper was 98,76.16, 25,794.37 and 49,982.12 USD for I., II. and III. farm groups, respectively. Accordingly, it can be observed that average net profit per beekeepers increased with increasing farms size.

Another criterion that measures the success of beekeeping activity is relative return. Relative return was calculated as 3.55, 4.96, 5.48 and

4.83 for I., II. and III. group farms. Accordingly, farms acquired 4.77 TL income per 1 TL production cost. Ozturk et al., (2015) [9], found that relative return average for the Mediterranean Region of Turkey was 2.7. The results showed that the amount of honey per hive was 25.88 kg based on average of all groups. Additionally, it was also determined that the production costs per hive declined as farm size increased. Indeed, production costs per hive for I., II., III group farms were 71.58, 54.78, 49.12 and 55.37 USD respectively. Gross profit per hive was 217.22 USD for I. group farms, as 240.42 USD for II. group farms, as 180.21 USD for III. group farms and the average of all groups was 235.77 USD. The net profit per hive for Group I, II, and III was 182.89, 216.76, and 220.19, respectively. The average of all groups was 211.94 USD. The most important reason why profitability increased per hive with increasing farm size was the decrease in production costs parallel to farm size (Table 3). Saner et al., (2005) [11], found that the net profit earned by

beekeepers from 1 kg honey increased with increasing farm size (number of hives).

In general, it was determined that the beekeepers made profit in all farm groups.

High honey yield per hive and the fact that they sell 98.65% of the honey as retail with high prices (average: 10.13 USD kg<sup>-1</sup>) enabled them to make higher profit.

Table 3. Profitability indicators of beekeeping farms

Profitability indicators (USD farm <sup>-1</sup> )	Farm groups			General
	I. Group	II. Group	III. Group	
Gross product value	13,741.72	32,313.25	61,132.78146	31,543.44
Total variable costs	2,011.59	3,703.64	6,697.35	3723.01
Total fixed costs	1,853.97	2,815.23	4,453.31	2,810.99
Total production costs	3,865.56	6,518.87	11,150.66	6,534.00
Gross profit	11,730.13	28,609.60	40,906.78	27,820.43
Net profit	9,876.16	25,794.37	49,982.12	25009.44
Relative return	3.55	4.96	5.48	4.83
Profitability indicators (USD hive <sup>-1</sup> )				
Hive number (hive farm <sup>-1</sup> )	54	119	227	118
Honey yield (kg hive <sup>-1</sup> )	25.59	25.95	25.94	25.88
Gross product value	254.48	271.54	269.31	267.32
Total variable costs	37.25	31.12	89.10	31.55
Total fixed costs	34.33	23.66	19.62	23.82
Total production costs	71.58	54.78	49.12	55.37
Gross profit	217.22	240.42	180.21	235.77
Net profit	182.89	216.76	220.19	211.94
Relative return	3.55	4.96	5.48	4.83

Source: Data from field survey, 2016

## CONCLUSIONS

In conclusion, it can be stated that majority of the production costs of beekeeping farms is comprised of labor (39.85%) and feeding (32,37%) costs. It was also determined that production costs per hive decreases with increasing farm size. It was observed that majority of the gross product value of beekeepers comes from honey (98.85%) and very low ratios for products such as pollen, royal jelly and propolis. It was determined that net profit and relative return per hive increases with increasing farm size. In general, it was determined that the beekeepers made profit in all farm groups. High honey yield per hive and the fact that they sell 98.65% of the honey as retail with high prices enabled them to make higher profit.

## ACKNOWLEDGEMENTS

The authors thank to the Süleyman Demirel University Scientific Research Projects Coordination Unit for supporting the research project BAP-4829-YL1-16 under which this work was financed.

## REFERENCES

- [1]Ceyhan, V., Cinemre, H.A., Yeninar, H., Demiryurek, K., Bozoglu, M., Kılıc, O., Oztürk, A.I., Emir, M., Canan, S., Yildirim, C., Baser, U., 2016, Current situation problems and future of beekeeping in Turkey. Editörler: Vedat Ceyhan- Murat Emir, Baskı ve Cilt: Erol Ofset, Kapak Tasarımı: Sengir., S., Samsun.
- [2]Erkus, A., Bulbul, M., Kiral, T., Acil, A.F., Demirci, R., 1995, Agricultural economics. Ankara Üniv. Zir. Fak. Eğitim, Araştırma ve Geliştirme Vakfı Yayınları, Ankara.
- [3] Firatli, C., Genc, F., Karacaoglu, M., Gencer, H.V., 2000, Comparative Analysis of beekeeping in Turkey, problems-suggestions. TMMOB. Ziraat Mühendisleri Odası. V. Türkiye Ziraat Mühendisliği Teknik Kongresi. 17-21 Ocak 2000, Cilt 2, Sayfa:811-826, Ankara.
- [4]Gunbey, V.S., 2007, The determination of migratory beekeeping movements in the province of Van.Yüzüncü Yıl Üniversitesi. Fen Bilimleri Enstitüsü. Zootečni Anabilim Dalı. Yüksek Lisans Tezi. Van.
- [5]Inan, I.H., 2016, Agricultural Economics and Management. İdeal Kültür Yayıncılık.
- [6]Kiral, T., Kasnakoglu, H., Tatlıdil, F., Fidan, H., Gundogmus, E., 1999, Data base guide and production cost methodology for agricultural products. Tarımsal Ekonomi Araştırma Enstitüsü, Yayın, Ankara, No. 37.
- [7] Kızılaslan, H., Kızılaslan, N., 2007, Factors Affecting Honey Production in Apiculture in Turkey. Journal of Applied Sciences Research. 3(10): 983-987.

[8] Oren, M. N., Alemdar, T., Parlakay, O., Isık Yılmaz, H., Seçer, A., Gungor, C., Yaşar, B., Bahadır Gurer, B., 2010, Economic analysis of beekeeping farms in Adana province, Turkey. Tarımsal Ekonomi Araştırma Enstitüsü, TEAE Yayın No: 178, Ankara.

[9] Ozturk, C., Subası, S., Uysal, O., Secer, A., Alemdar, T., Oren, M.N., 2015, Determination of technical and economic structure of beekeeping farms in Mediterranean Region, Turkey. T.C. Gıda, Tarım ve Hayvancılık Bakanlığı Tarımsal Ekonomi ve Politika Geliştirme Enstitüsü, Tepge Yayın No:254, Ankara.

[10] Saner, G., Yucel, B., Yercan, M., Karaturhan, B., Engindeniz, S., Cukur, F., Koseoglu, M., 2011, A research on the technical and economic development of organic and conventional honey production and the determination of alternative market opportunities: A case study of Kemalpaşa District of İzmir province. T.C. Gıda, Tarım ve Hayvancılık Bakanlığı Tarımsal Ekonomi ve Politika Geliştirme Enstitüsü, Tepge Yayın No:195, Ankara.

[11] Saner, G., Engindeniz, S., Cukur, F., Yucel, B. 2005, A research on the technical and economic structure and problems of beekeeping farms in İzmir and Muğla provinces, Turkey. Tarımsal Ekonomi Araştırma Enstitüsü Yayın No: 126, Ankara.

[12] TUIK., 2016, TUIK (Turkish Statistical Institute). [www.tuik.gov.tr](http://www.tuik.gov.tr); Accessed: 13 October 2017.

[13] Yamane, T., 2001, Basic Sampling Methods. Translators: A. Esin, M.A. Bakır, C. Aydın, E.Gurbuzsel, Publishing of Literatur, No:53, İstanbul.

## THE OPPORTUNITIES OF CREDITING IN BANKING SYSTEM IN REPUBLIC OF MOLDOVA

Angela ȘESTACOVSCAIA

Moldova State University, 60 Alexe Mateevici, Chisinau, Republic of Moldova, Email: ashestakovskaya@bk.ru

**Corresponding author:** ashestakovskaya@bk.ru

### **Abstract**

*The development of national economy of Republic of Moldova needs one stabile credit system, that mostly is presented by financial – banking sector. The evolution banking system is examined in this article. On the base of banking statistics the following aspects are analyzed: the structure of loan book – by the types of value, by the individual and legal bodies. The situation of un – favorable credits is also reflected. The dynamic of rate interest is also showed, being of the great importance for potential economic agents that plan their affairs but don't have enough financial resources. There are some concrete facts about banks, that in present form national financial – crediting system. The information, presented in article may be useful for potential clients both Moldovan and foreign, and also for the specialists and researches in financial field.*

**Key words:** banking system, crediting, rate of interest

### **INTRODUCTION**

Lending represents an important function of the banking system contributing to ensuring the conditions for the development of economic entities and other participants with a direct and indirect role in the contemporary economy. Lending is extremely important for developing countries, such as the Republic of Moldova.

Nowadays, bank lending is carried out by 11 commercial banks operating under specific conditions after the known events from 2014.

### **MATERIALS AND METHODS**

To analyze the crediting in national banking systemy, data on the evolution of portofoglio credit have been collected from the Statistics National Bank of Moldova. These data were examined over a period of years from 2014 to 2016. The following methods have been applied in this study: monographic, trends analysis, applying of average values, analysis and synthesis.

### **RESULTS AND DISCUSSIONS**

Economic entities in their activity often face a temporary insufficiency of their own funding

resources. This fact, in the opinion of several economists, leads to decision-making to attract loans either in the form of bank loans or in the form of loans from other individuals or from other companies. This idea is promoted by the Romanian economists Toma M. and Alexandru Felicia [6]. Banking lending, according to the appreciation of the well-known economist in the field of financial management Kovaliov V., is one of the most widespread forms of credit relations, when a financial organization operating under the license issued by the Central Bank is presented as a creditor [3]. Based on this license, the financial institutions that primarily are made of commercial banks, provide bank loans to beneficiaries.

The bank loan is the capital loan granted to different applicants – economic agents, physical persons, by specialized financial institutions (more often called banking institutions) in a monetary form for a certain period, which will be repaid in the future at a certain date with interest [2].

According to data from the National Bank of Moldova, the lending portfolio in the commercial banks' system reached its maximum value in 2013 and amounted to 42 170 mil. MDL. The data presented in Table 1



shows that during the researched period, the value of the credit portfolio as a whole in the banking sector in the country decreased by about 15%.

Table 1. Value of the loan portfolio in the banking sector of the Republic of Moldova, mil. MDL

Commercial bank	2014	2015	2016	Absolute deviation in 2016 compared to 2014	Year 2016 in % compared to 2014
Total on the banking sector, including:	40,842.0	38,187.6	34,761.3	(6,080.7)	85.1
Moldova-Agroindbank	10,826.0	11,225.7	10,774.7	(51.3)	99.5
Banca de Economii	1,338.1	-	-	-	-
Banca Socială	1,960.2	-	-	-	-
ComertBank	395.8	435.7	456.6	60.8	115.4
EuroCredit Bank	174.8	191.3	230.4	55.6	131.8
Energbank	1,053.2	866.4	875.8	(177.4)	83.2
FinComBank	1,079.1	1,019.5	1,095.7	16.6	101.5
UniBank	924.2	-	-	-	-
Mobiasbank	3,429.9	3,884.2	4,059.2	629.3	118.3
Moldindcon bank	8,889.4	9,517.0	7,827.7	(1,061.7)	88.1
ProCredit Bank	2,267.5	2,470.8	2,073.8	(193.7)	91.5
BCR Chişinău	447.8	409.7	439.9	(7.9)	98.2
Victoriabank	5,755.9	5,884.3	4,974.3	(781.6)	86.4

Source: Developed by author based on NBM statistical data [4].

To a large extent, it is caused by the liquidation of the three commercial banks - Banca de Economii, Banca Sociala and Unibank, whom belonged 4,222.5 mil. MDL in 2014. At the same time, credit portfolios of the following banks have decreased significantly: Energbank by 16.8%, Victoriabank by 13.6% and Moldindconbank by 11.9%. moreover, three other banks increased the lending portfolio significantly: EuroCreditBank by 31.8%, Mobiasbank by 18.3% and ComertBank by 15.4%.

The remaining commercial banks did not show any major changes in the value of the lending portfolio. One of the best known managers in the domestic banking sector, Dorin N., finding the decrease in the value of the loan portfolio in 2016, mentions that the causes of this phenomenon are the following: on the one hand, the lack of credit demand due to the negative expectations of the economic agents; and on the other hand a more cautious approach of commercial banks towards potential borrowers. Banks are ready to lend credit to the national economy, but it feels a lack of successful projects that deserve to be credited [1]. The share of commercial

banks' participation in the structure of the lending portfolio are of interest.

It is noted that the largest shares in the portfolio structure belong to the three banks: Moldova Agroindbank, Moldindconbank and Victoriabank.

Table 2. Ranking of commercial banks in the structure of the credit portfolio of the Republic of Moldova, %

Commercial banks	31.12.2014		31.12.2015		31.12.2016		Absolute deviation in 2016 compared to 2015, p.p.
	position	%	position	%	position	%	
Moldova Agroindbank	I	26.5	I	29.4	I	31.0	+4.5
Moldindcon bank	II	21.8	II	24.9	II	22.5	+0.7
Victoriabank	III	14.1	III	15.4	III	14.3	+0.2
Mobiasbank	IV	8.4	IV	10.2	IV	11.7	+3.3
ProCredit Bank	V	5.6	V	6.5	V	6.0	+0.4
Banca Socială	VI	4.8	-	-	-	-	x
Banca de Economii	VII	3.3	-	-	-	-	x
FinComBank	VIII	2.6	VI	2.7	VI	3.2	+0.6
Energbank	IX	2.6	VII	2.3	VII	2.5	-0.1
UniBank	X	2.3	-	-	-	-	x
BCR Chişinău	XI	1.1	IX	1.1	IX	1.3	+0.2
ComertBank	XII	1.0	VIII	1.1	VIII	1.3	+0.3
EuroCredit Bank	XIII	0.4	X	0.5	X	0.7	+0.3

Source: Developed by author based on NBM statistical data [4].

They own from 62.4% in 2014 to 67.8% in 2016. All banks, except Energbank, have increased their weight in the examined structure.

There is important information about the branches of the national economy, for whose development, credits from the banking sector have been accessed.

Analyzing the data presented in Table 3, we can mention that during the researched period, there is observed a structural change in the distribution of credits in the banking sector. However, in the first place there are credits granted to trade, although their share dropped in 2016 compared to the first year of the period. On the other hand, the share of consumer credits is steadily increasing, which from position 4 in the ranking of 2014 goes to the second position of the ranking of 2016. The position of credits granted to the productive industry falls, although their weight in the total portfolio changes insignificantly.

Agricultural credits remain on the 6th position over the researched years, but the increase in their share is noted. The share of credits for the purchase or construction of real estate, which in practice in the domestic financial system equals the mortgage lending, is increasing steadily.

Table 3. The structure of the credit portfolio of the banking sector under the branch aspect, %

Branch of credits	31.12.2014		31.12.2015		31.12.2016		Absolute deviation in 2016 compared to 2015, p.p.
	%	Ranking	%	Ranking	%	Ranking	
Credits granted to trade	32.9	I	30.5	I	29.6	I	(3.3)
Credits granted to food industry	9.8	II	9.3	II	10.1	III	0.3
Credits to the productive industry	7.4	III	7.1	VI	7.3	V	(0.1)
Consumer credits	7.4	IV	8.0	III	10.2	II	2.8
Credits for the provision of services	6.9	V	7.2	V	6.5	VII	(0.4)
Credits for agriculture	6.4	VI	7.8	IV	7.3	IV	0.9
Credits for the purchase or construction of real estate	5.7	VII	6.1	VII	6.6	VI	0.9
Credits granted in the field of transport, telecommunications and network development	5.2	VIII	5.8	VIII	5.8	IX	0.6
Credits in the field of construction	3.8	IX	3.5	X	2.7	X	(1.1)
Credits to individual who have an activity	3.8	X	3.1	XI	2.5	XI	(1.3)
Credits to the non-banking financial environment	3.3	XI	3.8	IX	4.2	VIII	0.9
Credits to the energy industry	2.9	XII	2.9	XII	2.4	XII	(0.5)
Credits granted to administrative-territorial units	0.2	XIII	1.0	XIII	0.2	XIII	-
Other credits	4.3	XIV	3.9	XIV	4.6	XIV	0.3

Source: Developed by author based on NBM statistical data [4].

The share of construction credits in relation to saturation in the real estate market and stagnation in sales in this market segment is reducing. In examining the lending portfolio, an important aspect is represented by the beneficiaries of this borrowed capital.

The structural analysis of the credit portfolio in the banking sector shows that the overwhelming part of the beneficiaries of the borrowed capital is represented by legal

entities, among which are the individuals who carry out entrepreneurial activity.

However, during the researched period there is observed a steady fall in this category of borrowers. However, approximately in the same proportion (6.7 p.p. against 7.3 p.p. in the first category) the share of individuals, who use bank credits for consumption purposes have increased.

Table 4. Structure of the loan portfolio in terms of beneficiaries of financing, %

Beneficiary categories	2013	2014	2015	2016	Deviation in 2016 compared to 2013, p.p.
Resident legal entities, including individuals, practicing entrepreneurial activity or other types of activities	87.8	84.7	83.2	80.5	(7.3)
Non-resident legal entities, including individuals, who practice entrepreneurial activity or other types of activity	0.6	0.9	1.0	1.3	0.7
Resident individuals	11.6	14.5	15.7	18.3	6.7
Total	100	100	100	100	x

Source: Developed by author based on NBM statistical data [4].

The share of non-resident legal entities is insignificant, but it also shows a stable growth during the four years.

The lending portfolio in the banking sector includes loans both in national currency and in other currencies.

Table 5. Structure of the credit portfolio of the banking sector in the Republic of Moldova, by currency, %

Currency	2013	2014	2015	2016	Absolute deviation in 2016 compared to 2013, p.p.
MDL	58.9	60.2	57.9	55.7	(3.2)
USD	16.8	15.5	17.5	16.7	(0.1)
EUR	24.2	24.2	24.6	27.6	3.4
Other currencies	0.1	0.1	-	-	x
Total	100	100	100	100	x

Source: Developed by author based on NBM statistical data [4].

The value of credits in national currency amounted to 19,363.9 mil. MDL at the end of 2016, which is with 22% less than in 2013. The share of credits provided by the banking

sector in national currency decreased in 2016 compared to 2013 by 3.2 p.p. Loans in USD declined by 17.8% in 2016 compared to 2013, but their share in the researched period is fairly stable, with insignificant changes (a decrease of 1.3 percentage points in 2014 compared to 2013 and an increase of 0.7 p.p. in 2015 as compared to 2013). The amount of EUR loans declined by 6.1% in the researched period, increasing by 0.4 percentage points in 2015 and by 3.4 percentage points in 2015. Other currencies were used for lending in 2013 and 2014, but in the next two years have disappeared from the portfolio structure.

Lending is closely linked to the annual interest rate indicator. The interest rate is variable measure in time. Its level and dynamics are the result of the concurrent, convergent and contradictory action of several generic and specific factors with indirect or direct influences such as: a) profit rate; b) ratio between demand and supply of loan capital; c) risk to the borrower; d) inflation; e) duration of the credit; f) government policy [5].

The average weighted rate on bank loans has evolved from around 35% in national currency and 17% in currency in the year 2000 and up to 10% in national currency in 2014 and 5% in foreign currency in 2016.

Table 6. Dynamics of weighted average rates on bank loans, %

Years	Total on time	Up to 12 months	From 2 to 5 years	Over 5 years
2013	12.26	12.68	12.19	10.70
2014	10.59	11.23	10.24	10.13
2015	14.06	13.55	13.92	12.48
2016	14.20	14.91	13.81	12.49

Source: Developed by author based on NBM statistical data [4].

According to the NBM statistical data, weighted average bank credit rates had the same dynamics, regardless of the length of the lending period. All of them declined in 2014 compared to 2013, but in different proportions: for periods of credit over 5 years, the decrease is insignificant, only by 0.57 p.p., but for loans with periods of credit from 2 to 5 years with 1.05 p.p., and up to 12 months by 1.45 percentage points, but in 2015 an

increase in the weighted average rates begins, which continues in 2016.

The slowest increase is recorded in the average interest rate on long-term loans (over 5 years).

The quality of the loan portfolio is characterized by the value and the share of non-performing loans, due to which the license for the activity of some commercial banks was withdrawn in the last years.

The balance of debt on non-performing loans is declining in the period 2013-2015, but in 2016 this indicator increased by 16.3% compared to 2013 and by 49.3% compared to 2015.

Their share also increased the value of the lending portfolio. The same trend is observed for expired loans, which registered an increase by 7.4% in 2016 compared to 2013 and by 42.6% compared to the previous year.

Table 7. The balance of non-performing loans and the value of expired loans in the banking sector of the Republic of Moldova, mil. MDL

Indicators	2013	2014	2015	2016	Absolute deviation in 2016 compared to 2015, p.p.
Debt balance on loans	42,170	40,841	38,186	34,761	(7,409)
Debt balance on non-performing loans	4,876.4	4,790.3	3,798.0	5,669.9	793.5
Share of the balance of debt on non-performing loans in the total balance on credits	11.6	11.8	9.9	16.3	4.7
Total expired credits	4,393	4,862	3,311	4,721.5	328.5

Source: Developed by author based on NBM statistical data [4].

The analysis of non-performing loans in division by the commercial banks showed that Victoriabank, Moldova Agroindbank and Moldindconbank had the largest shares of non-performing loans in the structure of the credit portfolio, respectively - 29.7%; 23.1%; 21.9%.

The rest of banks have lower values, such as: Eximbank – Gruppo Veneto Banca 9.7%; "Mobiasbanca" with 5.3%; ProCreditBank with 3.5%; "Energbank" by 2.4%; "BCR

Chisinau" with 2.1%; "Comerțbank" with 1.3%; "FinComBank" with 0.8% and "EuroCreditBank" with 0.4%.

## CONCLUSIONS

Lending is extremely important for the country's socio-economic development. The crisis that has developed in the banking system has affected the credit system as well as the national economy as a whole.

But at the same time, commercial banks have become more cautious in examining loan applications.

All this talk about the serious problems that exist in the banking management, and the necessity to improve the lending mechanism under conditions of economic and financial instability.

## REFERENCES

[1]Batishcev, R., 2016, The banking system in 2016. Business – Class, 3 (March):66-67.

[2]Grigorița, C., 2005, Banking activity. The 3rd edition, Publishing House Cartier, Chisinau, 194 – 196.

[3]Kovaliov, V., 2006, The financial management: theory and practice. Publishing House TC Velby, Moscow, 796- 798.

[4]National Bank of the Republic of Moldova, Accessed 01.06.2017, [www.bnm.md](http://www.bnm.md)

[5]Rotaru, C., 2001. The management of banking performance. Publishing House Expert, Bucharest, 162-164.

[6]Toma, M., Alexandru, F., 2003, Finances and company's financial management. Publishing House Economica, Bucharest, 165 – 169.



## ANALYSIS OF TOURIST MOVEMENT IN IAȘI COUNTY

Cristina SIMEANU, Benone PĂȘĂRIN, Claudiu ROȘCA, Daniel SIMEANU

University of Agricultural Sciences and Veterinary Medicine of Iasi, 3 Mihail Sadoveanu Alley, 700490 Iasi, Romania, Phone: +40232 407 591, Fax: +40232 267 504, Emails: cristina.simeanu@yahoo.com, pbeno@uaiasi.ro, claudiu.rdc@gmail.com, dsimeanu@uaiasi.ro

**Corresponding author:** dsimeanu@uaiasi.ro

### Abstract

*The structure of tourism movement in Iași County during 2012–2016 indicated a low rate of foreigner tourists (15.38%) from the total entrances in the county, number of days/tourist for foreigner tourists have also a low rate (18.37%). Average duration of the sojourn had fluctuations during analyzed period (2012–2016) being of 1.84 days for Romanian tourists and 2.33 days for the foreigner tourists. Gross utilization rate of touristy accommodation capacity recorded fluctuant values in those 5 analyzed years (2012–2016), in 2016 being recorded the highest value 35.59 %. From the analysis of touristy movement could be observed a growth of dynamic rate for tourists' number, per total mean dynamic rate show an increase, in average, with 1.126. Absolute average modification of tourists' number recorded 28.18 thousands persons. Average dynamic rhythm for tourists' number was 12.6%.*

**Key words:** entrances, overnight stays, mean duration of stay, dynamic rate  
gross utilization rate of tourist accommodation capacity

### INTRODUCTION

The great tourism potential of Iași County is due to the historical and cultural touristic resources alongside the natural tourist resources, with landforms bearing the characteristics of Moldavian Plateau and a number of protected areas such as forest reserves Uricani Forest, Cătălina-Cotnari Forest, Roșcani Forest, The Galata Forest and the Humosu Forest; The Fântânele Botanical Reserve (David's Valley) and the Paleontological Reserve: Repedea Hill. The spa tourism potential is represented by the mineral waters from Nicolina (Iași) and Strunga (60 km from Iași).

The cultural and historical tourism potential reflects the history and culture of the analysed tourist destination, Iași County being endowed with various objectives, artistic highly valued and a great tourist attraction. In the category of cultural and historical monuments, a significant role is owned by the historical and art monuments such as: The Palace of Culture, The Palace of Ruginoasa, The Sturdza Castle, The Rosetti-Roznovanu Palace; archaeological or medieval vestiges: Ruins of the Princely Court-Cotnari, vestiges of the Neolithic settlement-Cucuteni; religious

monuments such as The Three Hierarchs Church, Golia Monastery, Galata Monastery, Cetățuia Monastery, Dobrovăț Monastery, "St. Nicholas Prince" Church – Iași, Barboi-Iași Church; buildings of civil architecture: "Dosoftei House", "Cantacuzino-Pășcanu House" from Pașcani, "The Three Sarmale Inn", "The Inn from Ruginoasa", monumental buildings housing cultural and university institutions: "Alexandru Ioan Cuza" University, "Mihai Eminescu" University Central Library, The National Theater; museums such as The History Museum of Moldova, The Art Museum, The Ethnographic Museum, The "Ștefan Popovici" Museum of Science and Technology, memorial houses: "Ion Creangă" House from Țicău, "Mihail Sadoveanu" memorial house, plastic art monuments, which can also be found in Iași County, but especially in the whole city of Iași. The ethnographic and folkloric tourism potential (folk architecture, peasant interior, indoor textiles, folk port, folk ceramics, family habits etc.) is added to all these cultural and historical values [5].

When we talk about the development of tourism and about its integration in the structure of modern economies, is reflected into a continuous enrichment of the content

and by a large diversification of manifestation forms. The participation of tourist movement that is included in a larger social category, associated with all the demands' variety, contributed to the apparition process of new forms of tourism. Also, their adaptation should be permanent to tourists' requirements and to travelling conditions [1], [4], [8], [9].

## MATERIALS AND METHODS

The tourists boarding structure with functions for the tourists accommodation is represented by any kind of building or construction, which provides permanently or if necessary seasonally, an accommodation service or other specific services for tourists. There aren't included in the statistical research, the touristy boarding structure with functions such as tourists accommodation with an installed accommodation capacity that is less than 5 places (www.insse.ro).

The existent capacity for tourists accommodation is represented by the number of accommodation places for the tourists usage that is registered in the last document for reception, classification and homologation of the touristy accommodation unit. The places specific to structures of touristy accommodation with functions for complementary touristy boarding (small houses or camping, etc.) to a basic boarding structure (hotel or motel, camping etc.) and the usage of those places is included in the basic structure (www.insse.ro).

The touristy accommodation capacity in function is represented by the number of boarding places available for tourists and provided by the touristy units, taking in account the number of days in which the unit is opened into a certain period of time. It is expressed in places/day. Are excluded places from rooms or units temporary closed due to the lack of tourists, for improvements or by any other reasons (insse.ro).

When we talk about the number of tourists (arrivals) accommodated in touristy boarding units, there are included all the persons (Romanians or foreigners) who are traveling outside their own residence locality, for less than 12 months and who also can stay at least

one night into a touristy boarding unit in the areas which they visit in a specific country; the reason of the journey being other than to have a paid activity in the visited (insse.ro).

Number days/tourist (touristy overnight) is a 24 hours period, starting with hotel hour, for which a person is recorded in the bookkeeping of touristy unit and it is hosted for the paid price, even if effective sojourn stay is lower than the mentioned period. Are also included the overnights afferent to supplementary installed beds (paid by customers) (insse.ro).

The mean duration of sojourn is determined by the rate between numbers of days/tourist (NTZ) to the number of tourists (T) and it reflects the possibility of touristy offer to retain a tourist into a specific area, region or country [2], [6], [7].

$$D_s = \frac{\sum NZT}{\sum NT}$$

where:

$D_s$  - mean duration of the sojourn;

NZT - numbers of days / tourist;

T – the number of tourists.

Utilization index of functional touristy capacity is calculated by rate between numbers of realized overnights at functional touristy capacity from a certain period (www.insse.ro).

$$I_n = (N/C_f) \times 100$$

where:  $I_n$  – utilization index of functional touristy capacity;

N – number of overnights recorded into a certain period of a time;

$C_f$  – functional touristy capacity.

Absolute indicators represent a basic form of dynamic series, based on which could be obtained general indicators [3].

Level indicators are the terms of a series formed by absolute indicators ( $y_1, \dots, y_t, \dots, y_{t-1}$ ).

Total level of terms

$(\sum_{t=1}^n y_t)$ , only for time interval series with absolute measures.

The absolute modifications

-with fixed base ( $\Delta_{t/1}$ )

$$\Delta_{t/1} = y_t - y_1 \quad \text{where, } t=2, n$$

-with in chain base (mobile or variable base)

$$(\Delta_{t/t-1} = y_t - y_{t-1})$$

$$\Delta_{t/t-1} = y_t - y_{t-1} \quad \text{where, } t=2, n$$

Relative indicators

It is a presentation way, mainly percentage. In this situation is mandatory that in title or outside the table to be mentioned the rating based so the data interpretation to be correctly done.

Dynamic index:

-with fixed base ( $I_{t/1}$ ):

$$I_{t/1}(\%) = \frac{y_t}{y_1} \times 100$$

-with in chain base ( $I_{t/t-1}$ ):

$$I_{t/t-1}(\%) = \frac{y_t}{y_{t-1}} \times 100$$

Dynamic rhythm:

-with fixed base ( $R_{t/1}$ ):

$$R_{t/1} = I_{t/1}(\%) - 100\%$$

-with in chain base ( $R_{t/t-1}$ ):

$$R_{t/t-1}(\%) = I_{t/t-1}(\%) - 100\%, \quad t = 2, n$$

## RESULTS AND DISCUSSIONS

### Analysis of tourist offer

The number of the tourist accommodation establishments by type of structure (hotels, hostels, motels, tourist villas, tourist cottages, bungalows, campings, tourist stops, preschools camps, tourist boarding houses and agro-tourism hostels) in Iași County in those 5 years analysed (2012-2016) (Table 1) fluctuated from year to year, the fewest were recorded in 2013, with a total of 72 structures and the most numerous were registered in 2015 with a total of 99 tourist accommodation structures. The most numerous tourist accommodation establishments were hotels, agro-tourist boarding houses and tourist boarding houses.

Table 1. Tourist accommodation structures with functions of tourist accommodation by type of structures in Iași County in the period 2012-2016

Types of structures tourist reception	2012	2013	2014	2015	2016
	UM: Number				
<b>Total</b>	<b>78</b>	<b>72</b>	<b>81</b>	<b>99</b>	<b>96</b>
Hotels	25	28	29	30	30
Motels	2	1	1	2	2
Hostels	5	5	5	4	2
Tourist cottages	1	1	1	1	1
Tourist villas	2	1	6	7	7
Bungalows	-	-	-	12	12
Tourist stops	2	1	2	1	1
Campinggrounds	-	-	1	1	1
Tourist guesthouses	28	24	24	28	24
Camps for pupils and preschools	1	1	1	1	1
Agrotourist hostels	12	10	11	12	15

Source: insse.ro

The touristic accommodation capacity in the Iași County in the period 2012-2016 (Table 2) varied in those 5 years analyzed between 3,530-4,284 places, the most significant accommodation capacity was in the hotels followed by tourist guesthouse and agrotourist hostels. The existent accommodation capacity based on types of tourist accommodation establishments from Iași County in the same period of 2012-2016 (Table 3) recorded year-on-year increases, which shows a good and growing economic situation for tourism in Iași County during the analyzed period.

In 2016, the total tourist accommodation capacity in the Iași County was about 1,531,262- 29.64% more compared to year of 2012 and a net use index of the accommodation capacity in operation about 35.49%.

Table 2. The existing tourist accommodation capacity by types of tourist accommodation structured in Iași County between 2012-2016

Types of structures tourist reception	2012	2013	2014	2015	2016
	UM: Capacity number				
<b>Total</b>	<b>3,530</b>	<b>3,547</b>	<b>4,014</b>	<b>4,276</b>	<b>4,284</b>
Hotels	2,290	2,493	2,790	2,946	2,964
Hostels	124	124	112	90	46
Motels	155	29	138	138	138
Tourist villas	72	76	108	114	118
Tourist cottages	21	21	27	27	27
Bungalows	:	:	:	24	24
Campinggrounds	:	:	18	18	18
Tourist stops	26	14	28	16	16
Camps for pupils and preschools	140	140	116	116	116
Tourist guesthouses	484	454	470	572	562
Agrotourist hostels	218	196	207	215	255

Source: insse.ro

Table 3. The existing tourist accommodation capacity based on types of tourist accommodation structures in Iași between 2012-2016

Types of structures tourist reception	2012	2013	2014	2015	2016
	UM: Capacity number per days				
<b>Total</b>	<b>1,180,231</b>	<b>1,214,466</b>	<b>1,374,729</b>	<b>1,445,261</b>	<b>1,531,273</b>
Hotels	781,065	820,487	970,503	1,039,668	1,092,858
Hostels	47,180	40,779	39,634	21,609	12,380
Motels	54,364	56,449	50,642	50,370	51,579
Tourist villas	27,792	24,064	38,572	40,508	41,536
Tourist cottages	7,686	7,675	8,769	9,855	9,882
Bungalows	:	:	:	4,416	6,576
Campinggrounds	1,064	1,708	854	1,472	496
Camps for pupils and preschools	37,864	34,300	28,412	21,312	38,428
Tourist guesthouses	159,953	160,092	168,625	184,301	185,038
Agrotourist hostels	63,263	68,912	68,718	71,750	92,500

Source: insse.ro



Regarding the comparative analysis of the accommodation units and the number of the existing places in the tourist accommodation establishments, in the interval 2012 - 2016 in Iași County (tab.4), we can observe that in 2016 the number of accommodation units increased with 23.07% compared to year 2012 and the number of the accommodation units increased in 2016, by 21.36% compared to 2012.

The qualitative analysis of the structure of the accommodation units based on types of structures for the two analyzed years, 2012 and 2016, shows that only the share of tourist villas in the total units increased from 2.56% in 2012 to 7.29% in 2016. The most significant increases into accommodation places were recorded in the hotels where the share of accommodation increased from 64.87% in 2012 to 69.18% in 2016.

Table 4. The comparative analysis of the number of accommodation units and the capacity number in the tourist accommodation establishments with tourist accommodation functions between 2012-2016 in Iași County

Type of unit	2016				2012			
	Nr. of units	%	Nr. of units	%	Nr. of units	%	Nr. of units	%
<b>Total</b>	96	100	4,284	100	78	100	3,530	100
Hotels	30	31.25	2964	69.18	25	32.05	2290	64.87
Hostels	2	2.08	46	1.07	5	6.41	124	3.51
Motels	2	2.08	138	3.22	2	2.56	155	4.39
Tourist villas	7	7.29	118	2.75	2	2.56	72	2.04
Tourist cottages	1	1.04	27	0.63	1	1.28	21	0.59
Bungalows	12	12.50	24	0.56	:	-	:	-
Campinggrounds	1	1.04	18	0.42	:	-	:	-
Tourist stops	1	1.04	16	0.37	2	2.56	26	0.74
Camps for pupils and preschools	1	1.04	116	2.70	1	1.28	140	3.96
Tourist guesthouses	25	26.04	562	13.12	27	34.61	484	13.71
Agrotourist hostels	14	14.58	255	5.25	13	16.66	218	6.17

Note: computing operation based of insse.ro info.

### The analysis of tourist traffic

Regarding the structure of the tourist traffic in Iași County between 2012-2016 (Table 5), we can observed that the number of foreign tourists has a value of only 15.38% of the total arrivals in the country, the number of days per tourist for foreign tourists has also an average share of 18.37% of the total number of the overnight stays in the county, and the number of foreign and Romanian tourists increased during this period.

The average duration of the stay as an indicator showing the average time (days) of tourists' stay in the accommodation units, reflects the possibility to restrain the tourist in a specific area or region [10], decreased between 2012 and 2016 for Romanian tourists with 4.86% in 2016 compared to 2012, and for foreign tourists by 21.48% in 2016 compared to 2012.

Table 5. The structure of tourist traffic by type of tourists in Iași County

Years	Number of arrivals (number of tourists)			Number of overnight stays (nr. of days / tourist)			The average duration of stay (days)		
	T	RT	FT	T	RT	FT	T	RT	FT
2012	185,946	161,816	24,130	365,736	300,417	65,319	1.97	1.85	2.70
2013	183,305	158,699	24,606	356,667	294,837	61,830	1.94	1.86	2.51
2014	197,024	167,454	29,570	391,404	323,061	68,343	1.99	1.93	2.31
2015	246,470	204,565	41,905	454,161	369,124	85,037	1.84	1.80	2.03
2016	298,657	247,857	50,800	545,063	437,323	107,740	1.82	1.76	2.12

Note: T-tourists; RT-romanian tourists; FT-Foreign tourists

Note: computing operation based of insse.ro info

The net use index of tourist accommodation capacity in operation (Table 6) in Iași County between 2012-2016 that shows us the relation between the accommodation capacity in operation and its actual use by the tourists (overnight stays),

(in a determined period) recorded fluctuating values in Iași County in the analyzed years (2012-2016), in 2016 being recorded the highest value of 35.58%.

Table 6. The capacity and the activity of tourist accommodation in Iași County

Years	Accommodation capacity		Arrivals (thousands)	Overnight stays (thousands)	The net use index of tourist accommodation capacity in operation (%)
	Capacity number	In operation (thousands/days)			
2012	3,530	1,180,231	185,946	365,736	30.99
2013	3,547	1,214,466	183,305	356,667	29.37
2014	4,014	1,374,729	197,024	391,404	28.47
2015	4,276	1,445,261	246,470	454,161	31.42
2016	4,284	153,273	298,657	545,063	35.59

Note: computing operation based of insse.ro info

Based on the analysis of the tourist traffic in Iași County between 2012-2016 (Table 7) we can observe an increase in the dynamic index of the number of tourists, the total average dynamics index shows an increase of 1,126 times. This increase may be due to the economic strength of the area which implicitly determines an increasing interest of tourists for this area.

The average number of tourists ( $\bar{y}$ ) was 222,280 thousand people.

The absolute average change in the number of tourists ( $\bar{D}$ ) recorded a value of 28.18 thousand people.

The average dynamic index for the number of tourists ( $\bar{I}$ ) was about 1.126 or 112.6%.

The average dynamic rhythm for the number of tourists ( $\bar{R}$ ) was about 12.6%.

Table 7. The analysis of the tourist traffic in the period 2012-2016 in the Iași County

Years	Nr. of tourists (thousand people)	The absolute changes		Indice de dinamică %		The average dynamic rhythm %	
		$\Delta_{t/1}$	$\Delta_{t/t-1}$	$I_{t/1}$	$I_{t/t-1}$	$R_{t/1}$	$R_{t/t-1}$
2012	185,946	-	-	-	-	-	-
2013	183,305	-2,641	-2,641	98.58	98.58	-1.42	-1.42
2014	197,024	11,078	13,078	105.96	107.48	5.96	7.48
2015	246,470	60,524	49,446	132.55	125.10	32.55	25.10
2016	298,657	112,711	52,187	160.61	121.17	60.61	21.17

Note: computing operation based of insse.ro info

## CONCLUSIONS

Regarding the analysis of the tourist offer, the number of tourist accommodation establishments with touristic accommodation functions by type of structures in Iași County during the analyzed 5 years (2012-2016) is ranging from 72 to 99 tourist accommodation structures, the most numerous such as hotels, touristic and agrotouristic hostels.

The existing tourist accommodation capacity by types of tourist accommodation structures in Iași County (2012-2016) increased during those 5 analyzed years and varied between 3,530 and 4,284 places, the most significant accommodation capacity being also found in hotels, touristic and agrotouristic hostels.

The existing accommodation capacity in function based on different types of tourist accommodation establishments in Iași County in the same period (2012-2016) shows year-on year increases, recording an increase of 29.74% in 2016 compared to the year 2012

which shows us a good economic situation for tourism in Iași County during the analysed period.

The analysis of the tourist traffic in the Iași County between years 2012-2016 indicates that the value of foreign tourists and the number that indicates the days per tourists for foreign tourists have a very small share in the number of arrivals and overnight stays in the country, and the evolution of the number for foreign and Romanian tourists increased during the period. The average length of stay decreased during 2012 - 2016 for Romanian tourists, with a decrease in the average length of stay of 4.86% in 2016 as compared to 2012 and for foreign tourists by 21.48% in 2016 compared to 2012.

The net use index of tourist accommodation capacity in operation recorded fluctuating values in those 5 years analyzed (2012-2016), in 2016 recording the highest value of 35.59%.

Based on the analysis of the tourist traffic we can observe an increase of the dynamic index for the number of tourists, the total average dynamics index shows an increase of about 1.126 times. The average number of tourists in Iași County between 2012-2016 was 222,280, with an average increase of 28.18 thousand persons. The average dynamic index indicates a relative increase of 112.6% and an average rate of 12.6%

## REFERENCES

- [1]Bălăcescu Aniela, Zaharia M., 2012, Statistical analysis of the touristic traffic and touristic accommodation in the period 2000-2009 in Brașov county, *Analele Universității "Constantin Brâncuși" din Târgu Jiu, Seria Litere și Științe Sociale*, Nr. 3/2012: 19-26.
- [2]Ghereș Marinela, 2006, Agro-tourism (Agroturism, in Romanian), Editura Risoprint, Cluj-Napoca, 115-120
- [3]Merce, E., Merce, C.C., 2009, Statistics – consecrated paradigms and completing paradigms (Statistică – paradigme consacrate și paradigme întregitoare, in Romanian), Editura Academic Pres, Cluj-Napoca, 120-130.
- [4]Neacșu, N., Bălărețu Andreea, Neacșu Monica, 2012, Tourism economy (Economia Turismului, in Romanian), Editura ProUniversitaria, București, 15-16.
- [5]Neacșu, N., Bălărețu Andreea, Neacșu Monica, Drăghilă Marcela, 2016, Resources and tourist destinations in Romania (Resurse și destinații turistice în România), Editura Universitară, București, 93-103.
- [6]Cosmescu, I., 1999, Service economy (Economia serviciilor in Romanian), Editura Universității Lucian Blaga, Sibiu, 34-42.
- [7]Postelnicu, G., 2006, Introduction in tourism theory and practice (Introducere în teoria și practica turismului, in Romanian), Editura Dacia, Cluj-Napoca, 175-180.
- [8]Snak, O., Baron, P., Neacșu, N., 2001, Tourism economy (Economia turismului, in Romanian), Editura Expert, București, 420-430.
- [9]Minciu Rodica, 2004, Tourism economy (Economia turismului, in Romanian), Editura Uranus, București, 73-98.
- [10]Turcu Daniela, Weisz Janeta, 2008, Tourism economy (Economia turismului, in Romanian); Editura Eurostampa, Timișoara, 9-11.

## EDUCATION IN RURAL AREAS IN THE SELECTED EU COUNTRIES ON THE EXAMPLE OF EDUCATIONAL FARMS

Alexandru SIN<sup>1</sup>, Czesław NOWAK<sup>2</sup>, Małgorzata BOGUSZ<sup>2</sup>, Elżbieta KMITA-DZIASEK<sup>3</sup>,  
Magdalena KOWALSKA<sup>2</sup>

<sup>1</sup>National Institute for Economic Research “Costin C. Kirițescu”, Romanian Academy,  
Bucharest, Romania

<sup>2</sup>University of Agriculture in Krakow, Krakow, Poland

<sup>3</sup>Agricultural Advisory Center in Brwinów – Krakow Unit, Krakow, Poland

**Corresponding author:** alxsin@gmail.com

### **Abstract**

*Education in rural areas, more and more frequently, takes place in agricultural holdings which address their educational offer, in particular, to specific groups of children and youth. The aim of the paper was to characterize such holdings in the selected EU countries. The characterization was based on the results of research obtained from two sources, firstly, the international FARMLAND project, secondly, the original study conducted by the authors in Poland and Romania. The research results clearly point to the development of educational activities in agricultural holdings, with the use of natural and cultural resources of the given areas.*

**Key words:** rural areas, education, educational farms, rural development

### **INTRODUCTION**

In accordance with the definition in force in the European Union member states, an educational farm is a farm which regularly hosts children and youth within the framework of school trips, as well as other groups and private individuals, “with the aim of teaching them about farming and the role of farmers” [1, 7], in turn, argues that “farms as sites of learning award the opportunity to impart knowledge related to the field of agriculture. These farms are sites where people can gather experiences with plants and animals and which illustrate the meaning of sustainable and product-oriented production of food”.

In Poland, educational farms, as approved by the Ministry of Agriculture and Rural Development, are defined as the activity conducted by rural inhabitants and located in rural areas, involved in the implementation of at least two of the following objectives: education in terms of plant and/or animal production and the processing of agricultural products; education in terms of environmental and consumer awareness; education in terms of the material heritage of rural areas,

handicraft, folk art and traditional occupations [8].

One can argue that the most important function of educational farms is the pedagogical one. Depending on the adopted concept of educational services, two types of such farms can be distinguished:

– farms whose activity is focused on school children education, the aim of which is to “familiarize pupils with the life in an farm and knowledge on the origin of food, and allow contact with natural, rural environment”. It seems of particular importance given that children, especially those living in large cities, have less and less contact with the traditional countryside, and, often, have a distorted idea about the origin of food;

– farms offering dedicated programs (often in the form of workshops) which complement or support therapies or psychophysical development of children with a range of dysfunctions [6].

### **MATERIALS AND METHODS**

The characterization of educational farms in the selected EU countries was based on the results of research obtained from two sources.

The first one is the material obtained as a result of the international FARMLAND project. The project was implemented by the consortium of six partners from five EU member states: Romania, Italy, Belgium, Spain and Poland, and led by the *Agricultural Advisory Center in Brwinow, Krakow Unit*.

As part of the project, in 2014, surveys were conducted on a group of 267 rural residents and experts from the five countries involved in the project. The objective was to analyze trends in terms of innovation in rural areas, diagnose training needs and expectations of people engaged in educational activities in their farms, and determine perspectives of development of educational farms as an innovative model of multifunctional agriculture.

The second source used in the present paper is the results of the original study conducted by the authors in 2015 on a group of fifty educational farm owners associated in the National Network of Educational Farms in Poland. The sample represents almost one fourth of all educational farms in Poland associated in the Network.

At the time of the article's submission, 210 farms were associated in the National Network of Educational Farms.

The research tool used during the questionnaire surveys allowed characterizing the functioning of educational farms in all the Polish voivodeships.

In Poland, the research was conducted during the National Meeting of Educational Farms thanks to the courtesy and commitment of the Agricultural Advisory Center in Brwinów, Krakow Unit, and many years of fruitful cooperation between the Center and the University of Agriculture in Krakow.

## RESULTS AND DISCUSSIONS

The results of research conducted within the framework of the FARMLAND project on the owners of educational farms and people interested in such activity in the future clearly show that the demographic structure of the respondents from all the partner countries is quite homogeneous. The breakdown by

gender indicates that in Italy and Poland women-farmers are more often than men interested in providing educational services, while the opposite situation can be observed in Spain and Romania. For comparison, it is important to take note that the results of the survey conducted by the authors on a national sample of educational farm owners revealed a predominance of women, whose number almost doubled the number of men.

Another interesting point was the age structure of the respondents surveyed as part of the FARMLAND project. Interest in the issue of education in agricultural holdings was clearly higher among young people in Belgium (mostly people in their thirties) and the older generation in Poland (the respondents being 51 years old on average). In the remaining countries, that is, Spain, Romania and Italy, the average age was comprised between 37 and 40. For comparison, it is worth mentioning that over 50% of the owners of educational farms taking part in the authors' national research were aged 46 to 60, approx. 20% were aged 31 to 45, while the least represented were the youngest and the oldest age groups.

The respondents' education structure, both in case of the FARMLAND project and the authors' research, seems favorable. In Spain and Romania, the majority of respondents were people with higher education (similar is the case of the national research where over 50% of the surveyed participants graduated from a higher education institution), while in Italy and Poland the respondents were mostly people with secondary education. In general, one can argue that in all the partner countries the respondents were mostly people with good education and entrepreneurial attitude [5].

The size structure of farms studied within the framework of the FARMLAND project is clearly diversified. In the entire sample, that is, in all the partner countries, the majority of farms are sized from 16 ha in Poland to 50 ha in Belgium (in Italy, the average acreage is 27 ha, while in Spain, 22 ha). Only Romania is an exception – an average size of a farm providing educational services is 164 ha, which results from the fact that innovative solutions are introduced mainly in large

holdings, among others, due to easier access to financial resources when compared with small farms [5].

Pantelimon Dairy Farm, for example, a rather large dairy farm located near Bucharest, started its education services by establishing an educational farm in 2010. The number of visitor has steadily increased since then, reaching around 3,000-4,000 visitors per weekend and between 10 and 600 persons per day during weekdays, depending on season. Around 20% of the visitors are school organized groups of children. Now, putting agricultural subsidies aside, the income generated by the educational activities count for as much as 25%-30% of the total farm's income.

It is also important to take note that the authors' national research showed that educational services are most often provided in small farms (from 1 to 5 ha of arable land), while in other acreage groups (6-10 ha, 11-20 ha, 21-50 ha and over 50 ha) their share was 12% or more.

The educational programs offered by Polish agricultural holdings are focused, mostly, on sustainable farming, with emphasis on the promotion of healthy, organic food. Frequently, the offered programs enable participants to track the origin of food from field to fork. Also, many programs are devoted to the natural, cultural and historic heritage of a specific region. It appears that the topics raised by educational farm owners in Poland are similar to those demonstrated in the 2014 research conducted in Belgium, Spain, Italy and Romania as part of the FARMLAND project. According to the farmers participating in the study the most interesting innovative themes for educational farms were: ecology, biological biodiversity, farm inventory, and herbal and medicinal plants [5].

The offer of the educational farms involved in the authors' research is targeted at both individual clients and organized groups (Tables 1A and 1B). In the first case, these are most commonly families with children in preschool and school age – as much as 46% of the respondents agreed that such clients are their most common guests. Similar is the

percentage of farms which do not address their offer at seniors and people traveling without children (42% in both cases).

Table 1. Clients benefiting of educational services in the respondents' farms, broken down by individual clients and organized groups, in a 1 to 5 scale, where "0" = "none" and "5" = "very often" (%)

**1A. Individual clients**

Type of clients	Scale						Total
	0	1	2	3	4	5	
families with children in school and preschool age	20	6	10	20	18	26	100
people traveling without children	42	8	12	22	8	8	100
seniors	42	4	16	16	6	160	100
others	88	2	4	4	-	2	100

Source: own research.

**1B. Organized clients**

Type of clients	Scale						Total
	0	1	2	3	4	5	
children in preschool age	12	2	8	20	24	34	100
children in school age (primary school)	8	2	-	10	32	48	100
youth in school age (secondary school, high school)	22	16	14	24	12	12	100
students	60	16	8	14	2	-	100
adults	16	8	30	22	10	14	100

Source: own research.

Organized groups benefiting of educational services offered by the studied farms are mostly children in school age (almost 80% of the respondents claim to often or very often host such groups) and preschool age. The least frequently, such services are offered to students and secondary school or high school youth.

The analysis of the programs chosen by tourists, as demonstrated in Table 2, shows that the most popular are short visits (42%), then, all day visits without accommodation, and the least popular are few day programs with accommodation. The situation probably stems from the fact that the main target of short or all day visits are, mostly, organized

groups, particularly children and youth in school age. Few day programs are usually combined with a stay in an agritourism farm or a guest house.

Table 2. Types of educational programs offered at the respondents' farms, in a 1 to 5 scale, where "0" = "none" and "5" = "very often" (%)

Type of program	Scale						Total
	0	1	2	3	4	5	
short visit of 1-3 h	10	2	2	24	20	42	100
all day visit (without accommod.)	18	16	12	20	26	8	100
few days program (with accommod.)	48	10	12	16	4	10	100

Source: own research.

The fact that educational farms operate mostly based on activities targeted at children in school age is also true in other European countries, e.g. Norway [4], Spain, Belgium or Romania [6]. Also in Italy a vast majority of farms offer, mostly, programs for the youngest visitors [2]. In the Netherlands, too, educational programs are, first and foremost, addressed to children in school age, and, what is important, studies conducted there correspond with the authors' research results, showing that the most popular are one day farm visits [3].

Educational farms associated in the National Network of Educational Farms, usually, offer more than one educational program. In the studied farms, the number of programs offered ranges from 2 to 10. A predominant majority of the farms offer 3 programs (56%), and over 18% – 2 programs. It is important to take note that as much as 12% of the farms offer 6 programs, and individual farms – 7, 8 or 10 programs. Usually, the more different programs offered, the higher the number of people engaged in teaching. In such cases, apart from the farmers themselves, also family members and employees are involved.

Educational activity is always provided with the use of own resources and, usually, constitutes (as was already mentioned in the paper) one of the courses of business activity.

According to the trends identified as a result of the FARMLAND project the topics of the innovative activities implemented seem correlated with the conditions and development stage of domestic farming. It turned out that what is important in Spain is the diversification of revenue combined with sustainable agriculture; in Italy – organic farming combined with biological protection, and social and environmental functions of agricultural activity; in Belgium – the involvement of agriculture in services provided to persons with disabilities and dysfunctions. In the developing Romanian agriculture, in turn, the key to innovation is the technology of food production or ways of saving energy [5].

Taken into account that education in farms is a relatively new concept of employing their potential, it is worth to diagnose changes that have occurred in Polish farms as a result of such activity (Table 3).

Table 3. Changes in Polish farms since the beginning of educational activity\*

Changes in terms of:	increase	no change	
number of guests choosing accommodation	11.9	7.6	
number of foreign tourists	7.2	11.2	
number of tourists outside of the season	12.9	6.9	
number of weekend tourists	7.7	11.2	
number of school trips/organized groups	19.6	3.1	
length of stay	4.1	11.2	
clients'/tourists' expectations	6.2	10.0	
operation costs	7.7	9.4	
investment expenditure	9.8	6.9	
price of accommodation/services	3.6	16.9	
volume of sales of the farm's produce	9.3	5.6	
Total answers	L	194	160
	%	100.0	100.0

\*More than one answer was permitted

Source: own research.

The results of the research show that the most important increase has been observed in the number of school trips and other organized groups (almost 20% of answers), as well as the number of guests outside of the season (almost 13%) and the number of guests

choosing accommodation (almost 12%). Educational services, in turn, had no influence on, first and foremost, the prices of accommodation and other services provided (17%), as well as the number of foreign and weekend tourists, and the length of their stay (in all the three cases – approx. 11%).

What is important, only in individual cases educational farm owners indicated a decrease in particular areas of operation (11 such answers), mostly: the number of guests choosing accommodation, number of foreign tourists and number of visitors outside of the season. Therefore, it can be assumed that a decrease in the sector is almost unnoticeable, while the largest number of answers for growth shows that the educational activity in farms has a positive impact, especially on tourism.

The results of the research, both within the framework of the FARMLAND project and the authors' original study, allow identifying the form of trainings and courses as the one preferred by educational farm owners and others interested in this type of activity. It appears that, in Italy, the respondents would prefer to employ e-learning courses, as well as stationary courses of up to one week. They have also shown interest in video-conferences. In Spain, in turn, the preferred forms of training are mixed courses (stationary and online modules), as well as stationary courses (shorter than the online ones). What is more, educational farm owners pointed to the importance of learning by doing, i.e. participating in meetings, workshops and study visits. According to the respondents in Romania, as in Spain, the best form of training are mixed stationary and online courses, as well as active participation in classes, for instance, in the form of workshops. The choice of such form of training is certainly linked with the fact that educational farms in Romania are poorly developed, thus, every form of training is welcome. In Belgium, in turn, the most popular form was learning by doing, study visits in other farms in particular; stationary and online courses turned out to be the least popular [6].

For comparison, it is worth to take note that the authors' original study has unequivocally shown that, in Poland, the owners of educational farms most appreciate active trainings, especially study visits in other farms, as well as workshops and lectures whose main objective is the exchange of experiences. In case of stationary courses, as in other countries, the most popular are those of up to one week. It appears that the least popular among Polish educational farm owners is the mixed method, combining stationary and online courses.

Certainly, a positive fact is that in all of the discussed countries farm owners do notice the need for trainings, which, with no doubt, has a positive impact on the quality of the services offered.

## CONCLUSIONS

Rural areas are characterized by rich natural and cultural heritage. Since a dozen or so years, Europe aims at the popularization of traditions and culture of specific regions, while ensuring their sustainable development. Within the framework of such actions, in the selected EU countries, education in rural areas is promoted. Both literature and empirical studies conducted by the authors prove the development of educational activities in agricultural holdings. The conducted research shows the emergence of professional educational farms, offering specially designed, specialist education programs. Such programs are, in particular, targeted at children and youth in school age. A positive fact is that the topics of programs are usually focused on issues valid in a specific country or region. It should be emphasized that, very often, these include: the promotion of ecological principles, sustainable development, traditions and culture of given area. The analysis of Polish educational farms, as well as farms interested in this type of activity (within the framework of the FARMLAND project), shows that the farms in question are of different size; some of them very large, willing to broaden the scope of activities. Furthermore, according to the research results, farm owners demonstrate the



need to participate in trainings, workshops and courses, which will, certainly, translate into improving the quality of educational services provided.

## REFERENCES

- [1]Delling, H., 2010, How is the farm as site of learning related to social services? in: Academic foundation of learning on farms. Series of the Competence Centre for Regional Learning. Volume 2. Competence Centre of Regional Learning, University of Vechta, p.34.
- [2]Fattorie didattiche, <http://www.alimos.it/it/fattorie-didattiche.html> (12.02.2016).
- [3]Haubenhofer, D., Hassink, J. *et al.*, 2010, Results of a Dutch effect study on different farm education programs. in: Academic foundation of learning on farms. Series of the Competence Centre for Regional Learning. Volume 2. Competence Centre of Regional Learning, University of Vechta, p.21, 21-29.
- [4]Jolly, L., Krogh, E., 2010, School-farm Cooperation in Norway: Background and recent Research. in: Academic foundation of learning on farms. Series of the Competence Centre for Regional Learning. Volume 2. Competence Centre of Regional Learning, University of Vechta, p.19.
- [5]Kmita-Dziasek, E., 2015, Koncepcja i funkcjonowanie Ogólnopolskiej Sieci Zagrod Edukacyjnych. Europejski Fundusz Rolny na Rozwoju Obszarow Wiejskich: Europa inwestująca w obszary wiejskie, Krakow, (The concept and functioning of the National Educational Farms' Network. European Agricultural Fund for Rural Development: Europe investing in rural areas), p.6-15.
- [6]Kmita-Dziasek, E., 2015, Wprowadzenie do zagadnień edukacji w gospodarstwie rolnym, Europejski Fundusz Rolny na Rozwoju Obszarow Wiejskich: Europa inwestująca w obszary wiejskie, Krakow, (Introduction to the issues of education on the farm, European Agricultural Fund for Rural Development: Europe investing in rural areas), p.15.
- [7]Open farms, Bridging the gap between town and country, [http://ec.europa.eu/agriculture/cap-communication-network/open-farms/pdf/open-farms\\_en.pdf](http://ec.europa.eu/agriculture/cap-communication-network/open-farms/pdf/open-farms_en.pdf) (02.04.2016).
- [8]Rules and Regulations of the National Network of Educational Farms, Agricultural Advisory Center, Kraków, 2015.

## RESULTS OF FARMS SPECIALIZING IN PRODUCTION OF CATTLE FOR FATTENING IN SELECTED EUROPEAN UNION COUNTRIES

Aldona SKARŻYŃSKA, Łukasz ABRAMCZUK

Institute of Agricultural and Food Economics – National Research Institute, ul. Świętokrzyska 20, Warsaw, Poland, Phone: +48225054570, Fax:+48228269322, Email: [ierigz@ierigz.waw.pl](mailto:ierigz@ierigz.waw.pl)

**Corresponding author:** [lukasz.abramczuk@ierigz.waw.pl](mailto:lukasz.abramczuk@ierigz.waw.pl)

### Abstract

*The study presents differences in economic results of farms specializing in production of cattle for fattening in six EU countries. France, Germany, Italy and Great Britain are the largest producers of beef in the EU-15, and Poland and Romania – in the EU-N13. The FADN EU average data for 2010-2015 were used for the analysis. The level of farm income was examined in order to assess their condition. The production efficiency assessment was carried out using the productivity indicator of current inputs, fixed capital and the ratio of costs to the production value. In France, Germany and Great Britain, the farm income without subsidies was negative. The loss was covered by the subsidies, their relation to farm income with subsidies amounted to 1.83, 1.67 and 1.55, respectively. The highest costs of producing EUR 100 of production were registered in French farms (EUR 117), and the lowest in Romanian farms (EUR 69). The productivity of current inputs indicates the advantage of Romanian (189.9%), Italian (184.5%) and Polish farms (148.9%). In other countries, this indicator was lower.*

**Key words:** cattle for fattening, beef production, farm income, production efficiency

### INTRODUCTION

Among the EU-15 countries, the largest beef producers (including veal) are France, Germany, Italy and Great Britain. On average, in 2010-2015, their total production expressed in weight of meat (the so-called hot carcass weight – HCW) accounted for 63.9% of total production in the EU-15. In turn, Poland and Romania are the largest producers of beef (including veal) among the EU-N13, their total production accounted for 63.5%. The share of these countries in total beef production in the EU-15 and EU-N13 was similar. However, there are differences in terms of participation in beef production in the EU-28. Beef produced in France, Germany, Italy and Great Britain accounted for 57.5%, and in Poland and Romania – only 6.4%. The “old” EU Member States clearly dominate in the production of this meat. On average, in 2010-2015, beef from the EU-15 accounted for 89.9% (6972 thousand tonnes) of the total EU-28 production (7,758 thousand tonnes). This means that the countries which joined the EU after 2004 (EU-N13) accounted for only 10.1% (786 thousand tonnes). [8]

In some countries (e.g. in Poland), there is no tradition of rearing beef cattle breeds, which is why beef production is mostly related to the dairy use of cattle. The direction of cattle use depends on the percentage of dairy cows or suckler cows in the total number of cows. Dairy cows and suckler cows differ in their physiological features and the resulting predisposition to a specific production. Genetic (breed) and non-genetic (nutrition) factors have a crucial influence on the yield of both dairy and beef cows. Literature specifies that 25% of dairy cows and 75% of suckler cows indicate bidirectional use. More than 75% of beef suckler cows, and less than 25% of suckler cows proves the use of cattle for dairy. [17]

A similar phenomenon as in Poland can be observed throughout the EU. It is estimated that around two-thirds of beef in the EU comes from dairy herds. For this reason, the milk sector and changes in the cattle stock resulting, among others, from the abolition of milk quotas and fluctuations in milk prices, have large impact on beef production. [7]

The long-term tendency of beef production development is determined by demand for this kind of meat. In some countries, this is only

internal demand, and in others also external demand. EU analysts predict a drop in beef production by 2026 compared to 2015 on average by 4.5% in the EU (in the EU-15 by 2.1%, and in the EU-N13 by 21.1%). The consumption of beef per capita will also decrease, on average in the EU by 4.7% (in the EU-15 by 5.6%, and in the EU-N13 by 5.1%). The average EU price of beef will be higher – in 2026 compared to 2015 it may increase by 5.6% (from 3772 EUR/tonne to 3,985 EUR/tonne). [9]

The link between the dairy and beef sectors in the EU provides farmers with additional flexibility in adapting to market needs and addressing the challenges of price volatility. It is estimated that cattle-breeding farms in the EU-N13 may be at greater risk of survival than EU-15 farms, due to their, on average, smaller production scale and smaller share of total EU production. The analysis of the direct payment system and incomes of agricultural holdings shows that, on average, EU beef producers are dependent on CAP payments in over 100%, which intensifies concerns about the future of farms in this sector. [5]

## MATERIALS AND METHODS

The purpose of the study was to assess economic results and production efficiency in farms specializing in production of cattle for fattening in selected countries of the European Union. The assessment also covered the level of payment for work of a farmer and farmer's family by the farm income without subsidies.

The subject of the study were specialist farms breeding cattle for fattening (type of farming 49) in four countries which are the largest producers of beef among countries included in the EU-15 (in France, Germany, Italy and Great Britain) and in two countries included in the EU-N13 (in Poland and Romania). The criterion for the selection of these countries was their combined share in beef production in the EU-15 and EU-N13. On average, this share exceeded 60% in 2010-2015. The analysis used the most up-to-date data available during that time, i.e. for the period 2010-2015, collected and processed under the FADN EU system. [10]

The results of farms in a tabular format are presented on average in the adopted research period (2010-2015). The study used horizontal analysis comparing the parameters which characterise farms in individual countries. The analysis covered productive potential of farms, i.e. the utilised agricultural area (UAA), labour resources expressed in the annual work units (AWU) and total assets. The structure of fixed assets and the organisation of production in farms were also examined.

The basic assessment measure of the economic condition of farms was the farm income, but the study also included production value and costs. The dependence of farms on subsidies to operating activity was assessed. Thus, the impact of the CAP on the economic effects of farms was determined. The analysis included the income value per family work unit (FWU) and the estimation of the level of payment – by the farm income – for farmer's work inputs. The pay rate of employed persons in individual countries was taken as the measure of the cost of 1 hour of farmer's work. It was calculated as the quotient of remuneration for employment and the number of hours worked.

The production efficiency assessment was carried out using the following indicators:

- total costs of producing EUR 100 of production (total costs include direct and indirect costs of the farm),
- the productivity indicator of current inputs – the ratio of production value to intermediate consumption (the sum of direct costs and farming overheads, which are related to operations but not recognised as direct operational costs, is referred to as the intermediate consumption),
- the productivity indicator of fixed capital inputs – the ratio of production value to depreciation of fixed assets.

The productivity indicators express the effectiveness of farms in transforming inputs of production factors into effects. They reflect the technical as well as economic aspect of economic activity [4]. In agricultural holdings, the assessment and analysis of productivity is a tool for effective management, and in particular, it allows

assessment of the results achieved by the holding in comparison with other units, especially with the same line of production. Based on the literature, it can be concluded that there is no one universal measure of productivity. The sets of productivity indicators proposed by different authors differ from each other [4, 12, 14, 15, 18]. Partial productivity indicators, characterising the use

of particular types of resources, are analysed the most frequently. This study – using variables available in the FADN EU database – uses indicators which depict the productivity of current inputs and fixed capital.

The farm indebtedness and its structure were also examined. The study used the following indicators:

$$\text{Level of farms debt [\%]} = \frac{\text{Total liabilities}}{\text{Total assets}} \times 100 \quad (1)$$

$$\text{Indebtedness structure indicator [\%]} = \frac{\text{Long-term liabilities}}{\text{Total liabilities}} \times 100 \quad (2)$$

The level of debt of farms shows what part of the value of assets of agricultural holdings are liabilities, hence it indicates the financial risk associated with running a production activity. The higher the ratio, the higher the financial risk. In individual farms, the value of this indicator should not exceed 50% [11]. The indebtedness structure indicator expresses the percentage share of the value of long-term liabilities in total liabilities. Higher result of this indicator means greater financial stability of farms [16].

## RESULTS AND DISCUSSIONS

**Productive potential of farms.** The determinant of the productive potential of a farm are its resources. In order to assess the differences of the studied farms in terms of the size of existing resources, data describing agricultural land, labour resources and farm assets were used. According to Woś [19], farm resources involved intentionally in the production process and actively contributing to it are called production factors.

Data presented in Table 1 shows that the economic size of farms specializing in production of cattle for fattening in the countries included in the analysis differed quite significantly. On average, in 2010-2015, German farms had the greatest economic strength (EUR 122.4 thousand), and farms from Romania the smallest (EUR 7.8

thousand). Comparing these extreme values, the diversity was 15.7-fold.

The production factors were also different among farms. Workforce expressed by the number of annual work units (AWU) was the least diverse – only 1.2 times. Farms from France were characterised by the largest workforce (1.50 AWU), and the smallest – from Romania (1.30 AWU). In terms of labour intensity of production, the differences were greater, per 100 ha of UAA, Romania had the largest share of this production factor – 21.43 AWU, and France the smallest – 1.37 AWU. This means that in Romania the labour intensity of production was 15.6 times greater. Farms supported their activity with employed workforce to a different extent. The share of own labour input expressed in family work units (FWU), in annual work units (AWU), was the highest in Poland – it amounted to 96.6%, and the lowest in Germany – 83.4%.

The results indicate that the land resources in Romanian farms were the smallest, the average utilised agricultural area (UAA) was 6.07 ha and was 18.1 times smaller compared to French farms (109.76 ha), which were the largest in terms of the area. Utilised agricultural areas of Polish and Romanian farms consisted of own resources of agricultural families to the greatest extent (the share of leased UAA amounted to 23.0 and 26.5%, respectively). The smallest share of own land was recorded in French, German

and Italian farms (the share of leased UAA was 80.8, 64.8 and 63.9%, respectively).

Another element of the assessment of productive potential of farms are assets (total property). Research shows that total assets were dominated by fixed assets, their share ranged from 62.3% in Italian farms to 90.2% in farms in Great Britain. According to the literature, domination of the farms' property by fixed assets reduces the possibility of adjusting the size and structure of this

property to market changes [2]. The consequence is small flexibility of farms, due to the fact that fixed assets are characterised by lower liquidity than current assets. However, it should be borne in mind that in agriculture there is a higher demand for fixed assets than in non-agricultural sector production enterprises and that the property structure of the analysed farms was the result of investment decisions taken much earlier.

Table 1. Productive potential of farms specializing in production of cattle for fattening in selected EU countries on average in 2010-2015

Specification		France	Germany	Italy	Great Britain	Poland	Romania
Economic size of farms	[thous. EUR]	98.2	122.4	71.0	88.2	17.9	7.8
Utilised agricultural area (UAA)	[ha]	109.76	67.38	35.31	104.49	17.24	6.07
The share of leased UAA	[%]	80.8	64.8	63.9	36.6	23.0	26.5
Number of annual work units	[AWU]	1.50	1.45	1.31	1.46	1.48	1.30
in this: the share of family work units (FWU)	[%]	92.7	83.4	90.0	84.2	96.6	93.1
Number of AWU per 100 ha of the UAA	[AWU]	1.37	2.15	3.72	1.40	8.60	21.43
Total assets	[EUR/farm]	423,508	660,270	524,989	1,263,050	142,384	30,661
Fixed assets	[EUR/farm]	286,101	565,491	327,026	1,139,383	126,340	24,866
The share of land [Z] in fixed assets	[%]	16.9	71.2	70.1	85.9	59.3	34.2
Fixed assets without land [Z]	[EUR/farm]	237,611	162,693	97,821	160,373	51,398	16,361
	[EUR/ha UAA]	2,165	2,415	2,771	1,535	2,982	2,694
Structure of fixed assets without land [Z]	[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which: buildings [B]		28.6	43.6	50.3	20.2	58.0	71.0
machinery [M]		27.6	41.5	28.9	41.8	33.0	14.7
basic herd [S]		43.8	14.9	20.8	38.0	9.0	14.3
Current assets	[EUR/farm]	137,407	94,779	197,963	123,667	16,044	5,796

Explanations: [Z] – land, permanent crops and production quotas, [B] – buildings and their permanent equipment, [M] – machinery, equipment and means of transport, [S] – basic herd females.

Source: own study based on the FADN EU.

The value of fixed assets was highly diverse, comparing the extreme values – 45.8 times. The main reason was more than 115-fold variation of the land value (in Romanian farms, the land value amounted to EUR 8.5 thousand, while in Great Britain – EUR 979.0 thousand). A high share of land in the value of fixed assets was observed in the farms of almost all countries, ranging from 59.3% in Poland to 85.9% in Great Britain. The only exception were Romanian farms, where the share of land was 34.2%, and French farms – with only 16.9%. The relatively small share of land in French farms results from the land ownership structure – only 19.2% of the land used was owned by the farmer. The variation

the value of fixed assets, omitting the value of land, was 14.5-fold. Buildings and machines had a large share in their structure, ranging from 56.2% in French farms to 91.0% in Poland. The share of the basic herd's values was quite high in France and Great Britain, where it amounted to 43.8% and 38.0%, respectively, while in other countries it was lower – from 9.0% in Poland to 20.8% in Italy. The land and basic herd are the productive part of the farmers' property, so the higher their share in the structure of assets, the greater the chances of obtaining high value of production.

The specificity of agricultural production in farms of individual countries also affects the

variation of current assets. A larger number of production lines is generally associated with the need to have, for example, larger stocks, while farm's specialisation allows optimising their size. In the studied farms, the share of current assets in total assets ranged from 9.8% in Great Britain to 37.7% in Italy.

Organisation of production on farms. Data presented in Table 2 indicates that in the studied farms – specializing in beef production, plant production was ancillary to animal production. This is evidenced by the share of area for fodder crops (i.e. forage area) in the utilised agricultural area, which ranged from 68.3% in Poland to 93.3% in Great Britain. Taking into account the share of

cereals in the utilised agricultural area, significant differences between countries were found. In Romania and Poland, the share of cereals in the utilised agricultural area was relatively large, amounting to 20.4 and 28.3%, respectively. In contrast, in other countries, this share was much smaller, ranging from 5.9% in Great Britain to 17.8% in Germany. The larger share of cereals in the structure of the UAA indicates greater possibilities of securing concentrated feed from own production for cattle, which has an effect on the reduction of costs and increase in the profitability of production. On the other hand, due to larger share of cereals in the UAA, the share of fodder crops was smaller.

Table 2. Organisation of production in farms specializing in production of cattle for fattening in selected EU countries on average in 2010-2015

Specification		France	Germany	Italy	Great Britain	Poland	Romania
The share of cereal area in the utilised agricultural area (UAA)	[%]	10.0	17.8	11.0	5.9	28.3	20.4
The share of fodder crops in the UAA	[%]	89.2	79.5	86.1	93.3	68.3	73.8
Total animals	[LU/farm]	123.3	79.3	46.5	122.8	14.9	7.2
Total cattle	[LU/farm]	121.6	77.4	45.9	102.9	14.3	6.0
in this: other cattle		112.0	66.7	41.9	100.1	12.3	3.2
dairy cows		9.6	10.7	4.0	2.8	2.1	2.8
The other cattle per 100 ha of the UAA	[LU]	102.0	99.0	118.6	95.8	71.1	52.7
The share of livestock production in farm's total production value	[%]	86.3	69.5	69.8	71.2	68.2	61.6

Source: own study based on the FADN EU.

Due to the method of selecting sample farms, the group of animals classified as “total cattle” (expressed in livestock units – LU) was dominated by other cattle; their share ranged from 53.3% in Romania to 97.3% in Great Britain. The share of dairy cows was very diverse, the smallest share was recorded in Great Britain – 2.7%, slightly larger in France and Italy (7.9-8.7%), as well as in Germany and Poland (13.8-14.5%), and the largest in Romania – 46.7%. This may indicate that in some countries – especially in Romania, but also in Germany and Poland – produced beef came largely from animals from dairy herds.

The number of animals from the group “other cattle” per 100 ha of the UAA indicates the intensity of organisation of livestock production. Calculations show that in Romania and Poland the number of animals was the smallest, amounting to 52.7 and 71.1

LU, respectively. In Great Britain, Germany and France it was in the range of 95.8-102.0 LU, and in Italy it was 118.6 LU. The structure of the production value of farms was dominated by livestock production in all countries covered by the analysis. In France, its share was the largest – it amounted to 86.3%, and in other countries it was smaller but similar, ranging from 61.6 to 71.2% (Table 2).

Bearing in mind the differences in the productive potential of farms and the differences in the intensity of organisation of livestock production, it is interesting to know the economic results of farms in individual countries and the effectiveness of their production.

**Economic results of farms.** Research shows that the ownership structure of production factors in farms from the study sample was highly diverse. Polish and Romanian farms

bore the least burden of the cost of using external factors of production, taking into account its share in total costs and in terms of the value, and the most heavily burdened farms were those from France and Germany.

The share of the cost of external factors in total costs of farms in Poland and Romania was 6.1 and 9.0%, respectively, while in France and Germany 12.5 and 14.0%, respectively (Table 3).

Table 3. Production and economic results of farms specializing in production of cattle for fattening in selected EU countries on average in 2010-2015

Specification		France	Germany	Italy	Great Britain	Poland	Romania
Total production value	[EUR/farm]	109,167	116,897	70,755	114,067	13,692	7,935
Total costs	[EUR/farm]	128,236	127,204	51,678	126,914	13,255	5,510
Farm income without subsidies	[EUR/farm]	-19,685	-12,621	17,613	-12,480	43	2,335
	[EUR/FWU]	-14,162	-10,430	14,905	-10,146	30	1,927
Subsidies to operating activity of the farm	[EUR/farm]	43,543	31,447	13,688	35,367	5,877	1,632
	[EUR/ha UAA]	397	467	388	338	341	269
Farm income with subsidies	[EUR/farm]	23,858	18,827	31,301	22,887	5,920	3,967
	[EUR/FWU]	17,164	15,559	26,488	18,608	4,135	3,274
The ratio of subsidies to operating activity to farm income with subsidies		1.83	1.67	0.44	1.55	0.99	0.41
Total costs of producing EUR 100 of production	[EUR]	117	109	73	111	97	69
The share of the cost of external factors in total costs of the farm	[%]	12.5	14.0	9.9	10.2	6.1	9.0

Source: own study based on the FADN EU (Farm Accountancy..., 2017).

Income of farms specializing in production of cattle for fattening in countries with the largest beef production in the EU was very diverse. Income without subsidies was obtained only in Italy (EUR 17.6 thousand), Romania (EUR 2.3 thousand) and Poland (EUR 43). Farms in remaining countries suffered a loss, and their income was a negative value. The largest loss was recorded by French farms (EUR -19.7 thousand), the loss of German (EUR -12.6 thousand) and British farms (EUR -12.5 thousand) was also large but smaller than in France.

Subsidies recorded at the farm level have a significant impact on the final amount of income. The strength of their impact is conditioned by the value of economic surplus obtained from production and the amounts of subsidies received. The results indicate that the ratio of subsidies to farm income with subsidies in two countries, i.e. Romania (0.41) and Italy (0.44), was the lowest. In Polish farms, this ratio was more than twice as high (0.99), which means that the impact of subsidies on the results was stronger. On the other hand, in farms from Great Britain, Germany and France, subsidies to operating activity of the farm covered the loss from

production and farm income with subsidies exceeded 55, 67 and 83%, respectively. Production of farms in these countries was not profitable. In agriculture, income is generally lower than in other sectors of the economy, which is why it is supported by direct payments. Their goal is to compensate farmers for lower incomes compared to other sectors of the economy. Subsidies contribute to the increase in income on the farm, but this increase is not the result of the improvement in the efficiency of agricultural production [1].

The farm income is the economic effect of conducted economic activity, the level of meeting the consumer needs of the farmer's family and developmental capacities of the farm depend on its level. The aim of agricultural producers is striving for an increase in income, because its level determines the amount of payment for unpaid work of the farmer and its family members and the amount of payment for other production factors involved owned by the agricultural family, i.e. land and capital.

The research results indicate that the differences in income per one family work unit (FWU) between farms from individual



countries were very large. This was determined by the share of own work (FWU) in total inputs, but above all the pay rate of employed persons, which was taken as the measure of cost of 1 hour of farmer's work in individual countries. The calculations show that the remuneration of employed persons

was the lowest in Romania (1.66 EUR/hour), followed by Poland (3.67 EUR/hour). In turn, the highest remuneration of employed persons was recorded in French farms (11.35 EUR/hour); compared to the Romanian farms, the difference was 6.8-fold (Table 4).

Table 4. Payment for farmer's own work in farms specializing in production of cattle for fattening in selected EU countries on average in 2010-2015 (estimate)

Specification		France	Germany	Italy	Great Britain	Poland	Romania
Remuneration of employed persons	[EUR/hour]	11.35	10.90	10.05	10.86	3.67	1.66
The level of payment for farmer's work by:							
farm income without subsidies	[%]	0.0	0.0	63.8	0.0	0.4	46.6
farm income with subsidies	[%]	94.3	63.0	113.3	70.4	49.7	79.3

Source: own study based on the FADN EU (Farm Accountancy..., 2017).

The results indicate that the farm income without subsidies provided a partial payment for farmer's work only in Italian (in 63.8%) and Romanian farms (in 46.6%). After taking into account the subsidies, payment for farmer's work exceeded the pay rate of employed persons only in Italian farms (by 13.3%). On farms in other countries, farmer's work was partially paid, at the highest level in French farms (in 94.3%), and at the lowest in Polish farms (in 49.7%) (Table 4).

**Production efficiency.** The ratio of costs to the production value was used to assess the economic efficiency of management. Total costs of producing EUR 100 of production differed quite significantly. The highest costs (EUR 117) were recorded in farms specializing in production of cattle for fattening in France, i.e. on farms where the loss of production was the greatest. Production of EUR 100 of production cost the least in Romanian (EUR 69), Italian (EUR 73) and Polish farms (EUR 97). The results of the calculations show that the level of costs exerted a strong influence on the efficiency of the studied farms (Table 3).

While analysing the production efficiency in farms from the study sample, the productivity of inputs was also assessed. The analysis of the productivity of current inputs, measured by the value of intermediate consumption, allows learning how their management translates into manufactured products.

The results included in Table 5 indicate a clear advantage of Romanian farms, where the productivity of current inputs was 189.9% (which means that the production value obtained exceeded the value of inputs by 89.9%). Italian farms also achieved a similar level of productivity – 184.5%. The next position was occupied by Polish farms, whose productivity of current inputs was 148.9%. The higher the value of this indicator, the better as it shows, among other things, better management of the production process. In the sample of French, German and British farms, the productivity of current inputs was smaller, ranging from 120.0 to 130.0%. These results are puzzling, especially as the subsidies had a significant impact on improvement of income of these farms (Table 5).

Literature discusses the impact of subsidies on technical efficiency and productivity. In research conducted in selected EU-15 countries (Germany, the Netherlands and Sweden), Zhu and Lansink [20] and Zhu et al. [21] demonstrated a negative impact of subsidies on technical efficiency of farms. Cechura et al. [3] came to similar conclusions in research covering dairy farms from 24 European Union countries. On the other hand, Kumbhakar and Lien [13] noticed a positive impact of subsidies on technical efficiency of Norwegian farms between 1991 and 2006. At the same time, the authors noticed a negative effect of subsidies on productivity. The recent research shows that higher payments from



Pillar II for physical capital investments, human capital development or agro-environmental measures cause increase of productivity. On the contrary payments related to rural development do not have significant impact on productivity. Results are similar in

all EU Member States and do not change depending on the date of access to the European Union, spatial characteristics (i.e. being in the south, north or east) or size of the countries [6].

Table 5. Selected indicators characterising the production and economic situation of farms specializing in production of cattle for fattening in selected EU countries on average in 2010-2015

Specification		France	Germany	Italy	Great Britain	Poland	Romania
Productivity of current inputs	[%]	127.3	130.0	184.5	120.0	148.9	189.9
Productivity of fixed capital inputs	[times]	4.1	6.0	8.6	6.0	4.2	9.5
The share of depreciation charge in total costs	[%]	20.6	15.3	15.9	14.9	24.6	15.1
The level of debt of farms	[%]	32.4	16.9	0.6	7.0	3.8	0.5
Indebtedness structure indicator	[%]	70.3	68.8	89.9	55.2	73.3	64.4

Source: own study based on the FADN EU (Farm Accountancy, 2017).

Productivity of fixed capital inputs expresses the production value per PLN 1 of depreciation of fixed assets on the farm. This type of productivity reflects the degree of intensity of using fixed assets in the production process, thus characterises its activity. The results obtained indicate a clear advantage of farms from Romania and Italy, while French and Polish farms were characterised by a relatively low productivity of fixed capital. It should be added that the productivity of fixed capital shows a relation with the share of depreciation charge of fixed assets in total costs of the farm. In farms specializing in production of cattle for fattening in France and Poland, this share was the largest (amounted to 20.6 and 24.6%, respectively), while the productivity of fixed capital inputs was the lowest.

In order to assess the level of debt of farms, the indicator calculated as the ratio of liabilities to the value of total assets was used. The value of the indicator varied for farms in individual countries, however, it did not exceed 50% in either of them. This is important because it is assumed that the value of the indicator exceeding 50% is associated with a significant increase in the risk in financing the enterprise [22]. The results indicate that French farms were the most indebted, the indicator determining the indebtedness was 32.4%. Lower but also quite large indebtedness characterised German farms – 16.9%. This means that farmers in

these countries were quite willing to use credits. Romanian and Italian farms were the least indebted, the indicator which determines the share of liabilities in financing farm assets amounted to 0.5 and 0.6%, respectively. Considering the structure of liabilities, it should be noted that long-term loans were dominating, their share ranged from 55.2% in farms from Great Britain to 89.9% in Italian farms – Table 5.

## CONCLUSIONS

France, Germany, Italy and Great Britain are the largest beef producers in the European Union. On average, in 2010-2015, their total production accounted for 63.9% of beef produced in the EU-15. In turn, Poland and Romania are the largest beef producers among the EU-N13, the share of their total production was similar – amounted to 63.5%. However, there are differences in terms of participation in beef production in the EU-28. Beef produced in France, Germany, Italy and Great Britain accounted for 57.5%, and in Poland and Romania – only 6.4%. The economic situation of farms specializing in production of cattle for fattening in these countries was also different. Above all, there were large differences in the productive potential.

- Workforce was the least diverse, farms from France were characterised by the largest (1.50 AWU), and farms from Romania by the

smallest (1.30 AWU); the diversity was 1.2-fold. In terms of labour intensity of production, the differences were greater, per 100 ha of the UAA, Romania had the largest share of this production factor (21.43 AWU), and France the smallest (1.37 AWU).

- The largest land resources (109.76 ha) were owned by farms from France, and the smallest – from Romania (6.07 ha), the diversity was 18.1-fold. Farms used leased land to a varying degree. The smallest share in total utilised agricultural area was recorded by Polish farms (23.0%) and the largest by French farms (80.8%).

- The highest value of total assets was recorded on farms from Great Britain, and the smallest from Romania and Poland. The share of fixed assets in total assets was the smallest in Italian farms (62.3%), and the largest in farms in Great Britain (90.2%).

The intensity of organisation of the livestock production, determined by the number of animals from the group “other cattle” per 100 ha of the UAA, was the highest in Italy and France (118.6-102.0 LU), slightly lower in Germany and Great Britain (99.0-95.8 LU), and the smallest in Poland and Romania (71.7-52.7 LU).

Economic results and production efficiency in farms specializing in production of cattle for fattening in the countries with the largest beef production in the EU were very diverse.

- Farm income without subsidies was obtained only in Italy (EUR 17.6 thousand), Romania (EUR 2.3 thousand) and Poland (EUR 43). French, German and British farms suffered a loss, and their income without subsidies was negative.

- The subsidies were of the least importance to Romanian, Italian and Polish farms; this is proven by the amount of subsidies per EUR 1 of income without subsidies: EUR 0.41, 0.44 and 0.99, respectively. In farms from Great Britain, Germany and France, subsidies covered the loss from production, and the farm income with subsidies exceeded 55, 67 and 83%, respectively.

- Thanks to subsidies, payment for farmer's work was achieved: in Italian farms in 113.3%, in French farms in 94.3%, in Romanian farms in 79.3%, in British farms in

70.4%, in German farms in 63.0%, and in Polish farms in 49.7%.

- The measure of the production efficiency was the cost of producing EUR 100 of production value. The best results were obtained by Romanian (EUR 69) and Italian farms (EUR 73), followed by Polish farms (EUR 97). On the other hand, worst results were recorded by French (EUR 117), British (EUR 111) and German farms (EUR 109). Higher production efficiency of farms from Romania, Italy and Poland was affected by a lower burden of the cost of using external factors of production. This is evidenced, among others, by smaller indebtedness of these farms (from 0.5 to 3.8%) and, therefore, lower cost burden, while the level of debt of farms from other countries was much larger (from 7.0 to 32.4%).

## REFERENCES

- [1] Babuchowska, K., Marks-Bielska, R., 2011, Płatności bezpośrednie w kontekście dochodów polskich rolników [Direct payments in the context of income of Polish farmers]. Scientific Journal of Warsaw University of Life Sciences – SGGW. Problems of World Agriculture, Vol. 11, No. 1, 7-15.
- [2] Bieniasz, A., Gołaś, Z., 2008, Płynność finansowa gospodarstw rolnych w Unii Europejskiej [Financial liquidity of agricultural holdings in the European Union]. J. Agribus. Rural Dev. 3(9), 41-52.
- [3] Cechura, L., Grau, A., Hockmann, H., Levkovich, I., Kroupova, Z., 2017, Catching up or falling behind in European Agriculture – the case of milk production. Journal of Agricultural Economics. Vol. 68, No. 1, 206-227.
- [4] Coelli, T.J., Prasada Rao, D.S., O'Donnell, Ch. J., Battese, G.E., 2005, An introduction to efficiency and productivity analysis. Springer, 88-90.
- [5] Directorate-General for Internal Policies, European Parliament, 2017. Research for Agri-Committee – the EU cattle sector: challenges and opportunities – milk and meat. Brussels.
- [6] Dudu, H., Smeets Kristkova, Z., 2017, Impact of CAP Pillar II payments on Agricultural Productivity. JCR Technical Reports, European Commission.
- [7] European Commission, 2016. EU Agricultural Outlook. Prospect for the EU agricultural markets and income 2016-2026. Brussels.
- [8] European Commission, 2017a. EU Meat Market Observatory. [https://ec.europa.eu/agriculture/market-observatory/meat\\_en](https://ec.europa.eu/agriculture/market-observatory/meat_en) [access: 29.11.2017].
- [9] European Commission 2017b, Medium-term prospects for EU agricultural markets and income 2016-2026. <https://ec.europa.eu/agriculture/sites/>

- agriculture/files/markets-and-prices/medium-term-outlook/2016/2016-tables.pdf [Accessed: 29.11.2017].
- [10] Farm Accountancy Data Network, 2017. <http://ec.europa.eu/agriculture/rica> [Accessed: 10.11.2017].
- [11] Goraj, L., Kulawik, J., 1995, Analiza finansowa gospodarstw prowadzących rachunkowość rolną [Financial analysis of farms conducting agricultural accounting]. IERiGŻ, Warsaw.
- [12] Kosieradzka, A., 2012, Zarządzanie produktywnością w przedsiębiorstwie [Productivity management in an enterprise]. Publ. comp. C.H. Beck, Warsaw.
- [13] Kumbhakar, S. C., Lien, G., 2010, Impact of Subsidies on Farm Productivity and Efficiency. In: The Economic Impact of Public Support to Agriculture, Studies in Productivity and Efficiency, edited by Ball, V. E., R. Fanfani, and L. Gutierrez, New York, NY: Springer, 109-124.
- [14] Lis, St., 1999, Vademecum produktywności [Vademecum of productivity] (sci. ed.). Publ. comp. PLACET, Warsaw.
- [15] Morse, P.W., 1994, Productivity Measurement in Canada. Europe Productivity Ideas Publ. comp. Spec. Productivity Measurement Today, No 1, 16-19.
- [16] Nowak, E., 2008, Analiza sprawozdań finansowych [Analysis of financial statements]. PWE, Warsaw.
- [17] Peters, K.J., 2008, Developments in cattle product markets and market prices, Humboldt Universität zu Berlin, Institute of Animal Sciences, International Workshop, Vilnius, 22 August.
- [18] Poczta, W., Średzińska, J., Pawlak, K., 2008, Sytuacja finansowa gospodarstw rolnych krajów UE sklasyfikowanych według ich wyników produkcyjno-ekonomicznych [Financial situation of EU agricultural holdings classified according to their production and economic results]. Scientific Journal of Warsaw University of Life Sciences – SGGW, Problems of World Agriculture, Vol. 4 (XIX), Warsaw, Publ. comp. SGGW, 379-387.
- [19] Woś, A., 1996, Agrobiznes [Agri-business]. Vol. 2. Mikroekonomika [Microeconomics] (ed.). Publ. comp. Key Text, Warsaw.
- [20] Zhu, X., Lansink, A.O., 2012, Impact of CAP subsidies on technical efficiency of crop farms in Germany, the Netherlands and Sweden. Journal of Agricultural Economics No. 61(3), 545-564.
- [21] Zhu, X., Demeter, R.M., Lansink, A.O., 2012, Technical efficiency and productivity differentials of dairy farms in three EU countries: the role of CAP subsidies. Agricultural Economics Review, No. 13(1), 66.
- [22] Ziętara, W., 1998, Ekonomika i organizacja przedsiębiorstwa rolniczego [Economy and organisation of an agricultural undertaking]. FAPA, Warszawa.

## RESEARCH ON CHERRIES SECTOR IN ROMANIA

Elena SOARE<sup>1</sup>, Iuliana DOBRE<sup>2</sup>

<sup>1</sup>University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 011464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40744 6474 10, Emails: soare.elenausamv@gmail.com;

<sup>2</sup>Academy of Economic Studies, Bucharest, 5-7 Mihail Moxa Street, District 1, 010961, Bucharest, Romania, Phone:+40213119790/112, Email:iulya\_dobre@yahoo.com

**Corresponding author:** soare.elenausamv@gmail.com

### Abstract

*This paper is a quantitative research which highlights aspects about production and marketing of cherries and sour cherries in Romania. In order to achieve the objective, the relevant indicators were analyzed during the period 2012-2016. The indicators analyzed in the paper refer to the number of cherries and sour cherries at national level as well as at macro-regional level; cherry and sour cherry production in Romania and on macro-regions; average production of cherry and sour cherry tree at national and macro-regional level; prices for cherries and sour cherries in Romania; average consumption per year of cherries and sour cherry at national level, also imports and exports. In Romania the cherry is a very productive culture, which has contributed to the achievement of notable performances from production point of view. The placing on the third place in the world ranking in terms of yield per hectare is conclusive. In 2016, the Romanian cherry production accounted 8.2% of the production achieved at the level of the European Union. The National Institute of Statistics is the main source of data used in this study.*

**Key words:** cherry, sour cherry, cherry and sour cherry varieties, average production, consumption

### INTRODUCTION

Worldwide there are numerous cherry species, but two categories have been noted such as cherries belonging to the species *Prunus Avium* and sour cherries of the species *Prunus Cerasus*. Cherry tree is included in the Rosaceae. Along with cherry tree, in Rosaceae are plum tree, apricot tree; apple tree [21].

Cherries and sour cherries are important fruits for the population because they contain a number of mineral salts, vitamins and sugars that are easy to assimilate. The chemical composition of cherry and sour cherries is presented in table 1.

Cherries and sour cherries have a double use: 1) they are intended for the fresh consumption of the population; 2) are intended for industrial processing [4].

According to statistical data, at worldwide the cherry demand is covered at 26% [5].

This situation is an opportunity for farmers who want to produce quality cherries so as to secure substantial profits from their selling abroad.

Table 1. The chemical composition of cherry and sour cherry fruits

Specification	Cherry	Sour cherry
Dry substance	10.79-24.70	11.45-22.17
Sugar	7.70-16.82	6.34-13.80
Acidity	0.49-1.36	1.02-2.41
Tanoid substance	0.06-1.30	0.18-0.21
Pectic substance	0.06-0.39	0.05-0.29
Proteic substance	0.54-1.36	0.70-1.90
Mineral substance	0.19-0.62	0.37-0.59
Vitamin C (mg,%)	0.40-14.00	1.00-13.00
Energetic value (Kcal)	43.16-98.40	46.72-88.68

Source: [4]

This situation is an opportunity for farmers who want to produce quality cherries so as to secure substantial profits from their selling abroad. In Romania, cherry grows and develops well in those areas where the annual average temperature is 9.0-10.50°C [2].

Also, in Romania, the best areas are found: the hills of the Iasi, Botosani, Cluj, Mures, Bacau, Vaslui, Vrancea, Arges, Dolj and Valcea counties [8].



The best areas for sour cherries statistics data the cherries are substantial; Romania being on the first rank about cherries production are Iasi, Botosani, Cluj, Mures, Bacau, Vaslui, Vrancea, Arges, Dolj si Valcea [8].

According to European ranking Romania is on the first place. In Romania over 70% of cherries are in Bacau; Vaslui; Galati; Botosani; Iasi. Generally, much of cherry production is made in Moldova [3].

At present, the Romanian market shows an increase in demand for domestic cherry production. According to published statistics, the investment per hectare of cherries can reach 20,000 euros with drip irrigation and intensive system. At national level several varieties of cherries are grown. In Romania, these cherry varieties are both native, but also foreign. Foreign varieties have been adapted to pedological and climatic conditions in Romania [2].



Photo 1. Early Lorry  
Source: [24]

Among the varieties of the most important cherries found in Romania are Early Lorry, Bistrita cherry, Rubin, Regina, Germersdorf, Oblacinska, Mocanesti, Crisane. The Early Lorry variety breeds in May and has high yields per hectare.

**Bistrita cherry**- matures in the first half of July.



Photo 2. Bistrita cherry  
Source: [7]

**Rubin**—matures in the end of June [7].



Photo 3. Rubin  
Source: [7]

Regina variety matures in the period of 15 June-July. This variety records a good yield four years after planting, although it enters the fruit two years after planting.



Photo 4. Regina  
Source: [19]

**Germersdorf** – matures in the end of June



Photo 5. Germersdorf  
Source: [11]

In Romania cherry varieties differ, depending on the characteristics of the area and the objectives of the farmers. If the varieties grow early, the profits will be more substantial, due to the high prices both internally and externally. It is necessary to specify that most cherry varieties, both indigenous and foreign, are resistant to cold [1, 2, 3, 21].

In Romania, the sour cherry is reduced compared to cherry although there are, on the one hand, favorable conditions for this culture; and on the other hand are required in large quantities for export. Increased demand for sour cherry on the external surface is primarily due to the increased contingency of nutrients, vitamins and mineral salts [13].

The main varieties cultivated in Romania are: Vrancean; Morella; Ilva; Oblacinska; Tarina; Early in Cluj; Great early; Mocanesti 16, Crisana 2 [8].



Photo 6. Oblacinska  
Source: [10]

The Oblacinska variety is characterized by medium-sized trees, which predominate early and flowering in the third year. This variety is productive. An essential feature for this variety is that it adapts to any type of soil and

can be planted in all regions of the country [10].

The Mocanesti variety is highlighted by the fact that it is very productive; resistant to frost and drought; is semi-ripe. The harvest is at the end of July [17].



Photo 7. Mocanesti  
Source [17]

The Crisane 2 varieties grow after half of June [23].



Photo 8. Crisane 2  
Source: [23]

## MATERIALS AND METHODS

The paper presents the main trends in the production and marketing of cherries and sour cherry in Romania. Most statistical data analyzed in the paper were taken from the National Institute of Statistics. In order to achieve the objective of this paper a number of specialized books were consulted. The paper, aimed to analyze the main specific indicators to outline the manifestations related to the production and marketing of cherries and sour cherries in Romania. The indicators refer to number of cherry and sour cherry, production



of cherry and sour cherry, productivity at national level, average price, average consumption, imports and exports. The indicators were analyzed in dynamics.

## RESULTS AND DISCUSSIONS

An important key of this paper is number of cherries and sour cherries existing in orchards. Various varieties of cherries and sour cherries are cultivated in Romania.

The varieties cultivated in Romania are both native, but also foreign. Foreign varieties are adapted to different areas. All varieties mature from May 10 to July 20.



Photo 9. Cherry flower

Source: [22]



Photo 10. Sour cherry flower

Source: [9]

Table 2 shows the evolution of the number of cherries and sour cherries in Romania in the period 2012-2016, both at national level and at macroregional level. In the analyzed period the number of cherries and sour cherries showed a decreasing trend. At the national level, the largest number of cherries and sour cherry was recorded in 2012 (5,858,290 cherries and sour cherries), and the smallest number was 5,438,277 (2016). In 2016, in Romania, there was a decrease of 7.17% in the number of cherries and sour cherries compared to 2012. From the data presented in table 2, it can easily be noticed that in Macroregion 2 are recorded the most cherries and sour cherry.

Table 2. Cherry and sour cherry trend at national and macroregional level, 2012-2016 (number)

Specification	2012	2013	2014	2015	2016	2016/ 2012 (%)
Romania	5,858,290	5,654,257	5,586,479	5,461,968	5,438,277	92.83
Macroregion 1	1,253,757	1,300,598	1,283,611	1,160,842	1,184,446	94.47
Macroregion 2	2,416,649	2,311,580	2,347,496	2,351,291	2,306,999	95.46
Macroregion 3	846,498	866,265	797,567	786,690	787,154	92.98
Macroregion 4	1,341,386	1,175,814	1,157,805	1,163,145	1,159,678	86.45

Source: Own calculation based on National Institute of Statistics, Tempo On-line Database, 2018 [15]

In 2016, this Macroregion held 42.42% of the number of cherries and sour cherry existing at national level. The largest number of cherries and sour cherries was 2,416,649 (2012). In 2016, the number of cherries and sour cherries decreased by 4.54% compared to 2012. In 2016, at macroregional level, the number of cherry and sour cherry was: Macroregion 1 (21.77%); Macroregion 4 (21.32%) and Macroregion 3 (14.47%). It has been noticed that at macroregions level, in 2016, the number of cherries has decreased compared to 2012 [3].



Photo 11. Cherries

Source: [6]



Photo 12. Sour cherries in plantation

Source: [18]

The production of cherries and sour cherries at national level represents an important segment for the domestic market. The evolution of cherry and sour cherry production at national and macro-regional level in the period 2012-2016 is presented in the table 3. Also, production of cherries and sour cherries varies in the period. At national level the higher production registered in 2014 (82,808 tones), and the smallest was 70,542

tones (2012). The high production of cherries and sour cherries, registered at the national level in 2014, was due to high production on the high tree. In Romania, in 2016, there was an increase of cherry and sour cherry production by 4.66% compared to 2012. As expected, the high production is recorded in Macroregion 2, as here is the largest number of cherries and sour cherries. In this macro-region, from the data presented, it is observed that in 2016 the production of cherries and sour cherries increased by 5.88% compared to 2012. This increase of production registered in Macroregion 2 is higher, compared with the increase registered at national level, during the same period. The production of cherries and sour cherries made in Macroregion 2 obtain in 2016 accounted for 44.68% of the national production. The smallest production of cherries and sour cherries was obtained in Macroregion3

Table 3. Cherry and sour cherry production at national and macroregional level, 2012-2016 (tons)

Specification	2012	2013	2014	2015	2016	2016/2012 (%)
Romania	70,542	80,477	82,808	75,503	73,834	104.66
Macroregion 1	14,724	16,785	16,262	14,208	13,902	94.41
Macroregion 2	31,161	35,029	36,538	33,947	32,994	105.88
Macroregion 3	10,191	12,304	12,466	11,324	11,068	108.60
Macroregion4	14,466	16,359	17,542	16,024	15,870	109.70

Source: Own calculation based on National Institute of Statistics, Tempo On-line Database, 2018 [15]

This production varied between 10,191-12,466 tons. Macroregion 3 has production which increased with 8.60% in the period 2012-2016. Also, Macroregion 4 registred an increase with 9.70% in 2016 compared to

2012. There has been an increase in the production of cherries and sour cherries, as well Macroregion 4. In Macroregion 1, in 2016, there was a decrease of cherry and sour cherry production by 5.59%, compared to 2012.

â



Photo 13. Cherries and sour cherries from sale

Source: [16]





Photo 14. Production of cherries at farm gate  
 Source:[12]

In 2016, Romania ranks fifth among the top cherry producers in the European Union. The cherry production made in Romania in 2016 accounts for 8.2% of total cherry production in the European Union. At European level has 29,3% of production, Spain 11,9%, Italy 11,2%, Hungary 9,9% [20].

Table 4 presents the evolution of average production in the period 2012-2016. About the dynamic of cherry the average production of cherries and sour cherries on the tree, different evolutions are observed at certain time intervals. In the period 2012-2014, the average cherry and sour cherry production recorded a positive trend, in the period 2014-2015 the average production decreased and in the period 2015-2016, the production remained constant at 14 kg per tree. In Romania, in 2016, the average production of

cherries and sour cherries on the tree increased by 12 kg / tree (2012) to 14 kg / tree (2016). The highest average production of cherries and sour cherries on the tree was 15 kg (2014).

At macroregional level, the largest production of cherries and sour cherries on the tree were recorded in 2014 (16 kg/tree). These high average yields were recorded in Macroregion 2 and in Macroregion 3.

In macroregion 1 the average cherry and sour the cherry and sour cherry production remained constant in 2016 compared to 2012 (12kg /tree). The higher productions were in 2014 (16 kg/tree).

These productions were registered in microregions 2 and 3. In the period 2012-2016 the average production of cherry and sour cherry registered 12 kg/tree.

Table 4. Cherry and sour cherry production, period 2012-2016 (kg/tree)

Specification	2012	2013	2014	2015	2016	2016/2012 (%)
Romania	12	14	15	14	14	116.66
Macroregion 1	12	13	13	12	12	100.00
Macroregion 2	13	15	16	14	14	107.69
Macroregion 3	12	14	16	14	14	116.66
Macroregion 4	11	14	15	14	14	127.27

Source: Own calculation based on National Institute of Statistics, Tempo On-line Database, 2018 [15]

Also, in macroregion 4 average production increased in 2016 compared to 2012. In Romania, the average prices for cherry and sour cherries were affected by a number of representative factors, of which: domestic production; effective demand; import; the income of the population; food consumption

model. It is important to note that at the beginning of the season the prices are higher, both for cherries and for sour cherries. Out of season, cherries and sour cherries come from outside Romania and at high prices. The evolution of average prices for cherries and sour cherries at national level in the period

2012-2016 is presented in table no.5. From the statistical data presented, it can be noticed that during the analyzed period the average price for cherries is higher compared to the average price for sour cherries. This shows

that in Romania cherries are more popular with consumers. The average cherry price has changed from one year to the next. The highest price for cherries was recorded in 2012(7.47lei/kg).

Table 5. Romanian average price of cherry and sour cherry, period 2012-2016 (Lei/kg)

Specification	2012	2013	2014	2015	2016	2016/2012 (%)
Cherry	7.47	6.51	7.06	6.26	7.26	97.18
Sour cherry	6.63	5.55	5.34	4.99	5.38	81.14

Source:Own calculation based on National Institute of Statistics, Tempo On-line Database, 2018 [15]

The high average price for cherries in 2012 was also determined by the small domestic offer due to a reduced cherry production. For cherries, in 2016, the price dropped by 2.82%, compared to 2012. For sour cherries, the following prices were recorded: during 2012-2015, the average price registered a decreasing trend; and for the 2015-2016 period there was an increasing trend. In 2016, the average price for sour cherries decreased by 18.86% compared to 2012.

In Romania, the annual average per capita cherry-sour cherry varied between 3.3 kg and 3.8 kg (Fig. 1). The highest average annual per capita cherry-tree consumption per capita was recorded between 2013 and 2014 (4.0 kg / inhabitant). This high consumption was due, on the one hand, to lower prices and, on the other hand, to higher domestic production.

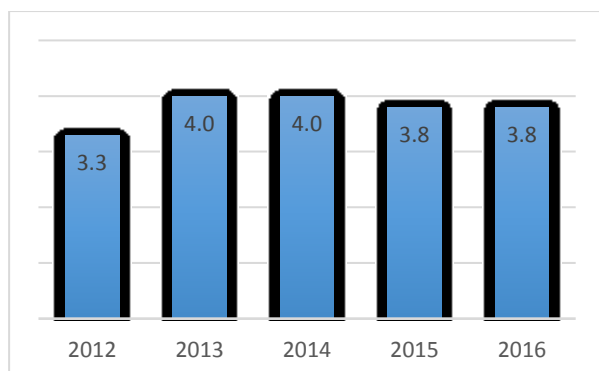


Fig. 1. Annual average consumption per capita of cherry and sour cherry, in Romania, period 2012-2016 (kg / inhabitant)

Source: Own design based on NIS Tempo-online database 2018 [15]

The lowest annual average per capita cherry-tree consumption was 3.3 kg (2012). In 2016,

the annual average per capita of cherry and sour cherry increased. The cherry price decreased in 2016 with 2.82%, Also, average sour cherry price decreased in 2012-2015, but in 2015-2016 the price increased.

In 2015, according to data provided by the National Institute of Statistics, exports of cherries and sour cherries were of 4,914 tonnes (in fresh fruit equivalent). Exports of cherries and sour cherries in 2015 increased by 36.61% compared to 2014. This increase in exports shows that this fruit category is demanded and appreciated externally. In terms of quantitative imports of cherries and sour cherries in 2015, they were of 4,840 tons. It can be noticed that, in 2015, quantitative imports of cherries and sour cherries were smaller compared to exports of cherries and sour cherries. In 2015, quantitative imports of cherries and sour cherries increased by 15.70% compared to 2014. The increase in imports of cherries and sour cherries is due in large measure to the increase in demand for this fruit category, outside the period in which they are found in abundance. In order to reduce the quantitative imports of cherries and sour cherries, it is necessary to plant early varieties of both cherry and sour cherry [14].

## CONCLUSIONS

Cherries and sour cherries are important both for the consumption of the population and for the industrial processing. Regarding the production and marketing of cherries and cherries in Romania, during 2012-2016, the following trends were found:

-The largest number of cherries and sour cherries at national level was 5,858,290 (2012);

-At macroregional level, macroregion 2 has been highlighted with the large number of cherries and sour cherries 2,416,649 (2012);

-The highest quantity of cherries and sour cherries at national level was 82,808 tons (2014). At the opposite pole, the smallest amount of cherries and sour cherries achieved was in 2012 (70,542 tonnes);

-In 2016, more than 40% of the cherry and sour cherry production at national level was made in macroregion 2;

-At the level of the European Union in 2016, Romania ranked fifth in terms of cherry production;

-In 2014, at national level, the highest average production was achieved per cherry and sour cherry tree (15 kg / tree);

-During the analyzed period, at the macroregional level, average yields were recorded on the cherry trees and sour cherry trees higher than the average production achieved at national level. The highest average production per cherry and sour cherry tree was 16 kg / tree (2014). These average productions were made in macroregions 2 and 3;

-At national level, during the analyzed period, the average price for cherries was higher compared to the average price recorded for sour cherries;

-In the period 2013-2014, the highest consumption of cherries and sour cherries (4.0 kg / inhabitant) was recorded at national level;

-In 2015, exports and imports of cherries and sour cherries increased compared to 2014;

-Due to the growing demand for cherries and sour cherries, both on the domestic market and on the foreign market, for Romanian farmers, the production and marketing of these fruit categories is an opportunity.

## REFERENCES

[1] Bălan, A., Soare, E., Cofas, E., Nicolae, I., 2012, Study on the fruit sector in Romania, *Lucrări Științifice, Seria I, Management Agricol*, Vol. XIV (2) Timișoara, pp: 133-140

[2] Business ideas: 10 Romanian cherry varieties good for founding an orchard, 2016. *Agrointeligenta-438*

Adevarul Financiar (Idei de afaceri: 10 soiuri românești de cireși bune pentru înființarea unei livezi, 2016, *Agrointeligenta- Adevarul Financiar*)

<http://adevarulfinanciar.ro/articol/idei-de-afaceri-10-soiuri-romanesti-de-ciresi-bune-pentru-infiintarea-unei-livezi/>, Accessed on February 20, 2018.

[3] Cherry varieties grown in Romania, 2013, *Gazeta de Agricultura (Soiuri de cirese cultivate in Romania, 2013, Gazeta de Agricultura)*

<https://www.gazetadeagricultura.info/pomicultura/598-pomi-fructiferi/14212-soiuri-de-cirese-cultivate-in-romania.html>, Accessed on February 5, 2018.

[4] Cultivation of the cherry tree (Cultivarea ciresului) (<https://www.pom-fructifer.ro/cultivarea-ciresului-www-pom-fructifer-ro-vand-pomi-fructiferi-cires/>), Accessed on February 25, 2018.

[5] Dobre, R., 2015, Intensive cherry orchard-a profitable business. How much does the investment per hectare cost and what are the varieties that fruit growers can give to export (Livada intensivă de cireș – o afacere profitabilă. Cât costă investiția la hectar și care sunt soiurile cu care pomicultorii pot da lovitura la export, 2015)

<http://agrointel.ro/34697/livada-de-cirese-printre-cele-mai-profitabile-afaceri-agricole-cat-costa-investitia-la-hectar-si-care-sunt-soiurile-cu-care-pomicultorii-pot-la-lovitura-la-export/>, Accessed on February 25, 2018.

[6] Dumitru, D.M., The best cherry varieties. 10 foreign and Romanian varieties. 2015 (Cele mai bune soiuri cires. 10 soiuri straine si romanesti, 2015)

[http://adevarul.ro/life-style/stil-de-viata/cele-mai-bune-soiuri-cires-10-soiuri-straine-romanesti-1\\_5530f39dcf376e353b2dc4/index.html](http://adevarul.ro/life-style/stil-de-viata/cele-mai-bune-soiuri-cires-10-soiuri-straine-romanesti-1_5530f39dcf376e353b2dc4/index.html), Accessed on February 15, 2018.

[7] European funds for pomiculture: the most profitable varieties OF Cherries from the Romanian pomiculture, 2015, *Stiri Agricole (Fonduri europene pentru pomicultură: cele mai profitabile soiuri de cireș din pomicultura românească, 2015, Stiri Agricole* <https://www.stiriagricole.ro/fonduri-europene-pentru-pomicultura-care-sunt-cele-mai-profitabile-soiuri-de-cires-21025.html>, Accessed on February 21, 2018.

[8] Favorable regions for sour cherry and cherry crops 2012, *Gazeta de Agricultura (Regiunile favorabile culturilor de visin si cires, 2012, Gazeta de Agricultura)* <https://www.gazetadeagricultura.info/pomicultura/598-pomi-fructiferi/12610-regiunile-favorabile-culturilor-de-visin-si-cires.html>, Accessed on February 15, 2018

[9] Flowers and colored eggs, 2012 (Floricele si oute colorate, 2012)

<https://retouch8more.files.wordpress.com/2012/04/spring-059.jpg>, Accessed on February 20, 2018

[10] Fruit trees and vines (Pomi fructiferi și viță de vie) [http://pepinieragajic.com/vocne\\_sadnice\\_visnje.html](http://pepinieragajic.com/vocne_sadnice_visnje.html), Accessed on February 28, 2018.

[11] Germersdorf, LevyPlant <http://www.levyplant.ro/soiuri-cires/germersdorf>, Accessed on February 25, 2018.

[12] How much money are earned from cherries at ciresoia. 140 trees give 7 tons of fruits which go to Turkey, Italy or Russia, 2015, *Stirile PRO TV (Cati*

- bani se castiga din cirese la ciresoaia. 140 de pomi dau 7 tone de fructe care ajung in Turcia, Italia sau Rusia, 2015, Stirile PRO TV  
<https://stirileprotv.ro/stiri/social/cati-bani-se-castiga-din-cirese-la-ciresoaia-140-de-pomi-dau-7-tone-de-fructe-care-ajung-in-turcia-italia-sau-rusia.html>, Accessed on February 5, 2018
- [13]Nana - an intensive and productive variety of sour-cherry, 2015, Gazeta de Agricultura (Nana - un soi intensiv si productiv de visin, 2015, Gazeta de Agricultura)  
<https://www.gazetadeagricultura.info/pomicultura/598-pomi-fructiferi/17105-nana-un-soi-intensiv-si-productiv-de-visin.html>, Accessed on February 20, 2018.
- [14]National Institute of Statistics, Food Balance in 2015, 2016 (Bilanturi alimentare in anul 2015, 2016)  
[http://www.insse.ro/cms/sites/default/files/field/publicatii/bilanturi\\_alimentare\\_in\\_anul\\_2015.pdf](http://www.insse.ro/cms/sites/default/files/field/publicatii/bilanturi_alimentare_in_anul_2015.pdf), Accessed on February 10, 2018.
- [15]National Institute of Statistics, Tempo On-line Database, 2018  
<http://statistici.insse.ro/shop/>, Accessed on February 10, 2018.
- [16]Natural juices of sour cherries and cherries - benefits. Physical and psychic energy, Flowers of lime (Sucuri naturale de visine si de cirese – beneficii. Energizant fizic si psihic, Floare de tei)  
<http://www.floaredetei.ro/sucuri-naturale-de-visine-si-de-cirese-beneficii-energizant-fizic-si-psihic/>, Accessed on February 25, 2018.
- [17]Nursery fruit trees , Breasta-Dolj (Pepiniera pomi fructiferi, Breasta-Dolj)  
<https://florafruct.com/soiuri-pomicole/visin/>, Accessed on February 25, 2018
- [18]Pop, A., Business ideas / The sour-cherry orchard, 2015 (Idei de afaceri / Livada de vișini, 2015, Accessed on February 28, 2018  
<http://www.gorjeanul.ro/economie-2/idei-de-afaceri-livada-de-visini#.WpxJgHzRbtQ>
- [19]Regina, LevyPlant  
<http://www.levyplant.ro/soiuri-cires/regina>  
Accessed on February 25, 2018
- [20]Rotaru, R., 2017, Romania, on the fifth place concerning the cherry production in the EU. Poland, the largest supplier of cherries, apples and carrots from the EU, Finance newspaper (România, pe locul cinci la producția de cireșe în UE. Polonia, cel mai mare furnizor de cireșe, mere și morcovi din UE, 2017, Ziarul Financiar)  
<http://www.zf.ro/companii/retail-agrobusiness/romania-pe-locul-cinci-la-productia-de-cirese-in-ue-polonia-cel-mai-mare-furnizor-de-cirese-mere-si-morcovi-din-ue-16649067>, Accessed on February 25, 2018
- [21]Râșnoveanu, M., Cherries, 2015, (Cireșe, 2015) (<http://dieta.romedic.ro/aliment/cirese>), Accessed on February 10, 2018.
- [22]The cherry tree (Ciresul)  
<http://gradina.acasa.ro/fructe-115/ciresul-12861.html>, Accessed on February 28, 2018.
- [23]The sour-cherry tree Crisane 2 (Visin Crisane 2)  
[http://fructifer.ro/Producator\\_pepiniera\\_Dumbrava/Visin\\_Crisane?page=3](http://fructifer.ro/Producator_pepiniera_Dumbrava/Visin_Crisane?page=3), Accessed on February 28, 2018.
- [24] The super-Cherry variety: Bears in May and has an excellent production per hectar! , 2017, Agointeligenta (Super- Soiul de cireșe: rodește în luna mai și are o producție excelentă la hectar! 2017, Agointeligenta)  
<http://agointel.ro/79648/super-soiul-de-cirese-rodeste-in-luna-mai-si-are-o-productie-excelenta-la-hectar/>, Accessed on February 26, 2018.



## MEASURES TO SUPPORT AGRICULTURE IN THE PERIOD 2014-2020

Maria SPONTE (PIȘTALU)

Bucharest Academy of Economics Studies, 6 Romana Square District 1, Bucharest, Romania,  
Email: maria.sponte@yahoo.com

*Corresponding author:* maria.sponte@yahoo.com

### *Abstract*

*In this paper are presented the priorities for the Romanian agricultural sector for the period 2014 – 2020. European Union has allocated important funds for the Romanian rural that account more than 8 billion Euro. The most important priorities are increasing competitiveness of the agro-food sector through investments, diversification of economy in the rural area as well as sustainable rural development.*

*Key words:* direct payments, efficiency, rural development

### INTRODUCTION

In the period 2014 – 2020, the Romanian sector benefits for funds for rural development. Rural development represents one of the major priorities for European Union in this period and for Romania the strategy is represented by the National Rural Development Programme (NRDP).

In the NRDP 2014-2020 there are some measures that highlight the directions for the development of the Romanian agriculture. The focus of the interventions is to maximize the impact of the proposed measures, together with the ways of accessing them and solving the structural problems in the case of agricultural holdings.

Regarding competitiveness, we can still notice major gaps in comparison with other EU countries, especially in the field of labour productivity. [1]

As mentioned in the NRDP, increasing competitiveness of Romanian agriculture involves a set of measures, such as: [2]

- investment in new assets and farm modernization as well as the creation of secondary or alternative irrigation systems;
- orientation of investments in infrastructure in the fields of agriculture and forestry (roads, installations for energy obtained from renewable resources, facilities for water collection and treatment);

- aid for young farmers in setting up agricultural holdings;

- supporting the transfer of knowledge in agriculture, forestry, as well as in rural areas;

- establishing and strengthening relations between the agri-food and forestry sectors and research and innovation;

- the pursuit and determination of risks in the agricultural sector;

- implementation of agri-environmental and climate measures aimed at promoting the agricultural practices necessary for the preservation of the environment;

- supporting the value losses caused by the practice of methods and techniques appropriate to ecological crops;

- support for areas with natural hardship or other specific constraints;

- promotion of afforestation actions and the realization of forested areas;

- actions related to the construction of communal roads, water supply, sewerage networks;

- supporting non-agricultural activities in rural areas;

- support for the realization of investments in assets, aimed at processing, marketing of agricultural products.

Sustainable management of natural resources, as well as climate change, is another objective of intervention, actions to be directed towards the restoration and conservation of ecosystems that are closely related to agriculture and forestry. In 2014-2020, the

NRDP provides for measures to protect biodiversity, prevent soil erosion by erosion and improve water management. [3]

Finally, another major objective of balanced development is the fight against the poverty line, which has reached 40%, through the economic development of poor areas and the expansion of social inclusion. To achieve these goals, the 2014-2020 NRDP has more than 8 billion euro of EU funding, through the EAFRD.

## MATERIALS AND METHODS

A series of data have been used in this paper from various of sources like ministry of resort, using data regarding direct payments as well as 2014 – 2020 European funds for rural development.

## RESULTS AND DISCUSSIONS

In the actual period, 2014 – 2020, the Romanian agricultural sector benefits of European funds for rural development and for the direct payments. Regarding direct payments, the situation, according to the Multiannual Financial Framework, is presented according to the data in Table 1.

Table 1. Direct payments for Romania (Euro Mil.)

Indicator	2015	2016	2017	2018	2019	2020
SAPS (mil. Euro)	1,600.0	1,772.5	1,801.3	1,872	1,903.2	1,903.2
Total 2015-2020	10,853.0					

Source: MARD, Multiannual Financial Framework

In addition to the amounts presented, there are also those relating to the financing of market measures on export as well as those relating to the promotion of agricultural products on the markets of other third countries.

The 2014-2020 NRDP for Romania was accepted by the European Commission in 2015 and supported with financial resources from the European Agricultural Fund for Rural Development (€ 8.1 billion earmarked from the EAFRD budget and € 1.4 billion for national co-financing) as is presented in Table 2.

Table 2. Financial allocations through NRDP 2014 – 2020 (Euro Mil.)

2014	2015	2016	2017	2018	2019	2020	TOTAL
0,0	1,723	1,751	1,186	1,184	1,141	1,139	8,128

Source: Ministry of Agriculture and Rural Development

The total public allocation is broken down into 6 priority actions for rural development, as mentioned in the 2014-2020 NRDP: [2]

- Supporting the transfer of knowledge in rural area with 169.28 million Euro;
- Increasing the competitiveness in rural area, the promotion of new agricultural technologies, the sustainable management of forests, amounting to 1,864.16 million Euros;
- Supporting the food chain (production, processing, marketing), animal welfare, risk management, amounting to 995.37 million Euros;
- Restoration, protection and development of agro-forest ecosystems, amounting to 2,813.74 million Euros;
- Promoting efficient resource use as well as supporting an economy based on low-carbon use and agriculture, food and forestry sector to withstand climate change in the amount of 1,025.84 million Euros;
- Supporting social inclusion, reducing poverty and expanding economic activities in the countryside, amounting to 2,563.69 million euros.

For these above-mentioned allocations, by priority, the amount of 209.84 million Euro is added, representing support for the Technical Assistance which is meant to ensure a good implementation of NRDP 2014-2020. These allocations fall within the total funding sources for sustainable and balanced development of Romania. If we refer to rural areas of our country, the EAFRD financial allocations will promote innovation and increasing competitiveness. Persons working in the field of agriculture will benefit from financial assistance for the development or restructuring of businesses and on the other hand diversification of activities will create a favourable environment for reducing dependence on agriculture and will improve the use of the human resource by creating new ones jobs. All these transformations will be



related to the efficient use of the Romanian rural resources.

Regarding the co-financing of agricultural programs, financially supported by the EU, the State Budget contribution amounts to 1,704.6 million Euro.

Over the 2014-2020 period, Romania received 22.4 billion Euro of funds through Cohesion Policy, which adds up to 106 million Euro in youth employment.

The amounts earmarked for the European Fisheries and Maritime Affairs Fund amount to about 168 million Euro. Taking into account the challenges that Romania faces, the thematic objectives in their entirety will be supported. However, Romania allocates 51.2% of the ERDF funds to priority sectors such as: research and development, competitiveness, and carbon reduction, with a higher 5.5 billion euro than the minimum required. Similarly, major funds are geared towards the carbon economy, amounting to 3.25 billion euros, which means 30% of ERDF support.

The share of structural funds reaches 30.8%, which is about 4.8 billion euros, a 23% share for social inclusion and poverty alleviation, higher than the 20% threshold. EAFRD resources (39% of total allocations) are largely geared towards biodiversity, land use and climate change support in agro-forestry.

The area of Romania, with the exception of Bucharest-Ilfov region, belongs to the category of less developed regions. The policy for rural development is funded with the support of the EAFRD, which has a budget of 100 billion Euro for the 2014-2020 period. Each member state has allocated a part from the financial package for the 2014-2020 period. These financial packages will mobilize in the Member States another 61 billion Euros of public funds.

Within the EU's 28 countries, 118 rural development programs are being carried out during this period: 20 countries have a single national program and 8 have chosen to apply two or more programs.

**Rural development and the European investment strategy**

Starting in 2014, Member States establish a partnership that requires the coordination of all European Funds in that country.

The European Commission's budget for rural development amounts to 386.9 billion Euro, broken down as follows:

- Pillar I - Direct payments to farmers (EAGF), amounting to 281.8 billion Euro;
- Pillar II - Rural Development (EAFRD), amounting to 89.9 billion Euro;
- Food Safety, amounting to 2.2 billion Euro;
- Needless people, 2.5 billion Euro;
- Crisis reserves in the agricultural sector, amounting to 3.5 billion Euro;
- The European Globalization Fund, amounting to about 2.5 billion Euro;
- Research and innovation, amounting to 4.5 billion Euro.

For the period 2014-2020, Romania will be allocated by the EU with European non-reimbursable European funds totalling EUR 39.88 billion.

The National Rural Development Program 2014-2020 is a program covering the territory of our country, consisting of 61.3% agricultural land (about 14.6 million hectares, of which 64.2% represents arable land, 32.9% are pastures and natural hay and 2.7% busy with plantations of trees and vines); 28.3% of the land occupied by forests and forest vegetation; 10.4% is the area of the localities, the one occupied by water, roads, railways and non-productive land.

By surface size, Romania falls within the category of average countries within the EU. Romania's territory has 5 bio-geographic regions from the 11 of Europe. About 87.1% of the country's surface is the rural area, made up of communes (with component villages), where 45% of our country's population lives. The distribution is balanced on geographical areas as follows: 33% is the plain area, 37% is considered the hilly area and 30% is the mountain area.

## CONCLUSIONS

At European Union level, the financial allocation of European funds for rural development for the period 2014-2020 covers 43% for ecosystems in agriculture and



forestry; 20% for increasing competitiveness; 15% for promotion of social inclusion; 10% for organization of the agro-food chain; 9% for promoting resource efficiency and 3% for technical assistance to the program.

In Romania, the largest financial allocations are for environmental measures, about 29.78% of the total funds are for afforestation and forestry curtains, agri-environment and climate measures, measures for organic farming, and for the delimitation of areas facing natural constraints.

Regarding the measures for increasing the competitiveness of the agri-food sector, we find that they account for about 35%, representing investments in fixed assets, financial support for young farmers, for processing, marketing of agricultural products and investment for agricultural infrastructure.

A newly introduced measure is the one on agricultural risk management, for which about 2.3% of the total funding is allocated.

The LEADER measure benefits from significant increases in the funds allocated over the period 2007 - 2013. The measure benefits from 624 million Euro, representing about 7.7% of the total funds.

In essence, we can state that Romania has set its priorities through the financial allocation of the NRDP 2014-2020, following the efficient allocation of national and European budget funds. In the next period, it is very important to use all of them efficiently.

## REFERENCES

- [1]Istudor, N., 2006, Dezvoltarea rurală și regională a României în condițiile integrării în Uniunea Europeană, ASE Publishing, Bucharest, pp.84
- [2]National Rural Development Programme 2014 – 2020.
- [3]Sponte, M., 2017, Evaluarea efectelor măsurilor de susținere a agriculturii din România finanțate din fondurile bugetare, PhD thesis, pp.173

## ASSESSING THE IMPACT OF THE ALLOCATION OF BUDGET FUNDS ON THE MAIN MACROECONOMIC INDICATORS IN ROMANIA

Maria SPONTE (PIȘTALU)

Bucharest Academy of Economics Studies, 6 Romana Square, District 1, Bucharest, Romania,  
Email: maria.sponte@yahoo.com

**Corresponding author:** maria.sponte@yahoo.com

### *Abstract*

*This paper represents an analysis of the impact of the budget funds for agriculture have influenced the main macroeconomic indicators like: gross added value, gross domestic product. From the paper we can conclude that since 2007, the indicators reveal an increasing of efficiency in the agricultural sector: value of the agricultural production, share of the GDP from agriculture in total GDP and others. Agricultural sector has received different funds from European Union, as well from the national budget for investments in technology as well as for the direct payments.*

**Key words:** European funds, GDP, agricultural production

### INTRODUCTION

The NRDP is the instrument by which the European Union allocates non-reimbursable investment funds for rural development for all member states.[2]

Under the National Rural Development Programme for the period 2014 - 2020, a series of measures are under way to pursue rural development in our country, taking into account the socio-economic realities and the Common Agricultural Policy (CAP 2020). Such a program is very important as it contributes to development of medium and long-term agricultural sector as well as to the rural environment.

At the EU level, the CAP for the period 2014-2020 will further contribute to sustainable growth. In this respect, Romania has also developed for this period a program that allows the development of rural development capable of meeting the European demands through comprehensive and sustainable measures. Moreover, rural development policy had to be linked to other policies at EU level such as rural development, the environment, human resources, etc. [1]

Improving agro-food performance, in line with modernization of rural infrastructure and living standards, are fundamental for Romania [3]. To this end, the NRPP 2014-2020

promotes a set of measures to increase the competitiveness of the agricultural sector. However, rural areas also mean other areas and activities than the agricultural sector, all but related to environmental protection.

The NRPP 2014-2020 promotes objectives aimed at increasing competitiveness; managing natural resources under climate change; a balanced development of the rural environment, diminishing the gaps between the country's regions.

### MATERIALS AND METHODS

In this paper, have been used data from National Institute of Statistics regarding revenues and expenditures from the state budget, as well as those from agricultural activities. Also, data on GDP, VAB was collected both at the national economy level and at the level of agricultural activities. The EUROSTAT database was used for data on the value of agricultural production.

### RESULTS AND DISCUSSIONS

The value of agricultural production decreased by 11% in 2015 compared to 2014. The main cause is the dependence of agriculture on the climate factor, the year 2014 being considered a very good

agricultural year. This is also evident from the structure of agricultural production, thus the vegetal production is decreasing by 17%, as compared to the animal production of only 1%.

Table 1. Structure of agricultural production according to the main markets (Euro mil.)

Indicator	2015	2014
<b>Value of crop production</b>	14,815	16,770
<b>Gross added value</b>	6,097	7,098
<b>Vegetal production</b>	9,104	11,039
Cereals	2,965	3,852
Wheat	1,275	1,252
Barley	325	341
Maize	1,248	2,124
Others	115	133
<i>Industrial plants</i>	990	1,143
Oil plants	903	1,011
Others	87	131
<i>Fodder plants</i>	1,157	1,465
<i>Vegetable</i>	2,223	2,020
<i>Potato</i>	591	1,161
<i>Frut</i>	938	1,137
Wine	213	240
Others	13	18
<b>Animal production</b>	3,902	3,967
<i>Animal</i>	1,762	1,890
<i>Animal products</i>	2,140	2,076
<b>Services</b>	248	221
<b>Others</b>	1,560	1,542

Source: EUROSTAT, 2017

However, the share of livestock production in agricultural production in Romania is increasing from 23% in 2014 to 26% in 2015. There is also an increase in the share of services in total agricultural production, from 1.3% in 2014 to 1.6% in 2015.

If we compare with other countries, the situation is somewhat different. Thus, for example, local financial productivity is lower

by over 30% compared to the level of the same indicator in Poland or Hungary. If we compare to France and Germany, Romania also achieves less than three times in the agri-food sector.

Depending on grain, sunflower or rape yields, our country is ranked 1st in the EU, in line with the declining agricultural output in 2015, alongside Luxembourg or Slovakia, which are marginal producers in the EU. Similar decreases were registered in Germany and Bulgaria, with - 11% and 9.3%, respectively. Starting with the pre-accession period, the agri-food sector benefited from European funds and from the state budget to make investments to increase competitiveness. Analysing the degree of access to SAPARD, we find that it was 88.6%, and the most attractive measures were for product processing, infrastructure development, as well as investments in agricultural holdings. At the opposite, there were measures to set up producer groups and methods to protect the environment. Through this program, the EU has allocated 1.1 billion Euro, and the state budget is about 361 mil. Euro.

Between 2007 and 2013, through the NRDP program, the EU allocated 8,022 billion Euro and the state budget 1,1 billion Euro. The measures that have been of the highest interest to Romanian farmers are those that encourage young people to set up farms, modernize agricultural holdings by purchasing agricultural machinery, developing village infrastructure, or related to the development of agriculture, encouraging other rural activities to diversify the rural economy etc.

Both in the pre and post accession period, rural area has benefited from the largest funds and their efficient use led to a slight diminishing of the competitiveness gap with the EU. In order to make the most efficient use of funds for the period 2014-2020, an impact assessment on the main macroeconomic indicators is required.

From the analysis of the data presented in Fig. 1, it is noted that in the period 2008 - 2014, the total agricultural revenues registered an increase of 54% compared to the total expenditures that registered a 42% increase, which is a positive aspect for our country.

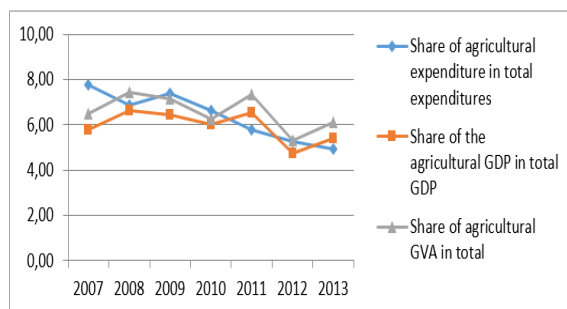


Fig. 1. Share of agricultural in GDP, GVA and expenditures

Source: processed data from National Institute of Statistics

Analyzing the national expenditures allocated for agriculture over the same period, we find that they have decreased by 10%, except for those provided by the local budgets, which have registered significant increases, namely from 18.3 billion lei (as it was in 2008) to 141.1 billion lei (as it reached in 2014), which means an increase of 6.7 times.

Compared to year 2007, the date of Romania's accession to the European Union, there is an increase of all macroeconomic indicators. GDP has grown by 53%, and GDP in agriculture is growing by 43% due to investments made from European non-reimbursable funds and those from the state budget, which have contributed to the performance of the sector.

Also, gross value added, representing the new value created in the production process, recorded 43.5% in agriculture growth in agriculture and 52.4% growth for total economy. Production has grown to 38% in the national economy and gross fixed capital formation, representing the value of purchased goods less fixed asset disposals in economic units, is up 20%.

Thus, starting with 2007, we see positive effects on the main macroeconomic indicators in Romania, with all significant increases. This is due to the European funds for the period 2007 - 2013, amounting to about 20 billion Euros, out of which about 8 billion were destined exclusively for investments in rural areas. [4]

According to the data presented in Fig. 1, we see a decrease in the expenditure in the agricultural sector, as well as the share of

these expenditures in the total expenditures at national level. We also see an oscillating evolution in the share of the agricultural sector in the GDP and VAB of our country.

## CONCLUSIONS

In the first semester of 2013, Romania had a positive evolution of the sustained economy, both in agriculture and industry production, as well as by increased demand for exports. It is worth highlighting some of the features that refer to the economic evolution of our country, namely:

- external demand for products has been the main driver of economic growth;
- expenditure on private consumption increased in the second quarter of 2013, following the reduction in the first quarter of the same year compared to the corresponding period of 2012;
- the fixed capital formation mode recorded negative evolutions, but in similar conditions, with the second quarter higher than in the first quarter of 2013, which highlights the recovery trend;
- government consumption, (individual and collective government), declined almost constantly each quarter;
- industrial production, agricultural production and services have contributed positively to GDP growth in the first half of 2013;
- a negative dynamics (-1.5%). was also recorded in the evolution of net taxes on the product.

The growth trend of the world's population will increase the consumption of agri-food products and the long-term increase in food prices. It is worth mentioning that Romania has the fifth arable land in the EU but has an average yield per hectare for cereals of only 50% of the European average and does not use the entire agricultural area. The EU allocated 39% of its budget for the 2014-2020 budget to agriculture, and Romania received a consistent financial allocation.

## REFERENCES

- [1]Hera, C., (editor), Istudor, N., 2013, Agricultura domeniul strategic pentru securitatea și siguranța

alimentară, Chapter, Politica Agricolă Comună din perspectiva interesului național. Romanian Academy Publishing, Bucharest, pp.115

[2] Hera, C., Istudor, N., Petrescu, I., 2016, Capitolul 19 "Agricultura românească în contextul integrării în Uniunea Europeană", seria Cunoaște România. Retrospective 2007 – 2013, coord. Gen. Iulian Văcărel, Romanian Academy Publishing, Bucharest, pp.363

[3] Istudor, N., 2006, Dezvoltarea rurală și regională a României în condițiile integrării în Uniunea Europeană, ASE Publishing, Bucharest, pp.236

[4] Sponte, M., 2017, Evaluarea efectelor măsurilor de susținere a agriculturii din România finanțate din fondurile bugetare, PhD thesis, pp.173

## STUDY ON TAXES AND CHARGES APPLIED IN THE EUROPEAN UNION COUNTRIES AND IN ROMANIA IN THE FIELD OF AGRICULTURE

Nicoleta STANCIU

University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania, Mobile: +40749 980 455, Emails: nico\_leta\_tecuci@yahoo.com

**Corresponding author:** nico\_leta\_tecuci@yahoo.com

### *Abstract*

*The purpose of this study is to make a methodological and technical synthesis on taxation in the countries of the European Union, as well as to highlight the methodology and tax rates for corporate tax and value added tax in 14 European countries. This study highlights that taxes and charges in Europe are not much different from those in Romania. More substantial differences are recorded in the tax rates applied by 26 countries of the European Union but also those outside the EU. In some EU Member States, a number of tax reform measures have been taken, such as: reducing social contributions, lowering VAT in labour intensive sectors, introducing and increasing environmental taxes. Establishing the legal framework for taxation, depending on the fiscal policy objectives of the state, the impact of fiscal discipline in combating the underground economy and tax evasion, improving the methods and procedures used by the tax office in tax settlement, levying and control are problems of utmost importance for ensuring that the public budget system is supplied with the necessary minimum resources.*

**Key words:** incomes, taxes, value added tax.

### INTRODUCTION

The corporate tax is a personal tax and within the fiscal reform in Romania, the profit tax plays an important role, both in terms of its contribution to the formation of budgetary revenues and by influencing the profit generating activities [9].

Profit is the result obtained as a result of the investment of capital, determined as the difference between the total incomes received from the basic activity and other activities and the total expenses corresponding to the performed activity [13].

Value Added Tax is an indirect tax that, unlike freight tax, applies to the entire economic circuit, to the end user of the products or services but only to the value added in the phase of that circuit [10]. The taxable object is the value of goods, works and services at billing prices. The supporter is the final consumer [17].

VAT is highly elastic to economic processes in the sense that if businesses develop and VAT collected, VAT will be higher.

If sales are stagnating and the amount of VAT will be lower, therefore the state's revenues will be lower. VAT is a tax with a high tax return, but any indirect tax is unfair [11]. This translates into regressing revenue growth and not to a low taxable minimum.

### MATERIALS AND METHODS

The research methodology used in this paper has the following main aspects:

- bibliographic study of the internal and international literature;
- collecting the concrete information within the researched area;
- ordering, processing and presentation of results in synthetic form;
- making a tax questionnaire;
- analysis and interpretation of results, formulation of conclusions and recommendations.

## RESULTS AND DISCUSSIONS

The actuality of the theme lies in the importance of taxation and reforms in this domain for the economic development of any state.[16]

It is well-known that tax systems are a key factor in influencing the overall mechanism of the economy [14].

They determine the extent to which people save, invest, work, influencing production growth and employment, which are key elements of the economic strategy, making tax reform an important component of economic reform. [3]

Lithuania (only 17.4%) has the smallest share of direct taxes from total taxes in 2010, followed by Bulgaria (18.8%) and Slovakia (19.1%). (Countries that together with Romania emphasis on indirect taxation). All of these countries have adopted fixed-rate taxation systems that lead to a sharp reduction of direct taxes compared to indirect taxes. [15].

In 2010, Romania holds the third place in terms of indirect taxes (45.2%) from total taxes, with the first positions occupied by Hungary (45.5%) and Bulgaria (55.4%).

Tax systems in Germany and France that focus on social security contributions are on the opposite side to those in Denmark, Sweden and the UK, where the share of social contributions in total incomes is low (The focus in these states is on direct taxes). [4] (Table 1).

Table 1. Employee-Employer Contributions in Romania. 2011-2014

Specification	Employee	Employer
Pension	10.5%	20.8%, 25.8%, 30.8%
Health	5.5%	5.2%
Unemployment	0.5%	0.85% leave and allowances 0.5%, 0.25% Guarantee Fund for the payment of its receivables
<b>Total</b>	<b>11.5%</b>	<b>27.6%-37.6%</b>

Source: Own processing after ec.europa.eu/eurostat

### Austria

**Tax on profit.** Taxable persons:

- some companies owe incomes tax both for incomes earned in Austria but also for profits made abroad: capital companies,

cooperatives, mutual insurance funds, associations, foundations, other private legal entities; associations with no legal personality, institutions, foundations or other special funds governed by private law, whose central or head office is in Austria, legal persons governed by public law for the benefits of industrial and commercial public services;[16].

- legal persons, associations of individuals and funds not having central government or headquarters in Austria owe tax only to the profits made in that State.

The following institutions are exempted from paying incomes tax: railway companies, religious or charitable associations, non-profit associations, credit union and pension funds [5].

The taxable base is the realized profit. In order to determine the expenses, the following deductions are being made: pensions paid, permanent expenses, fees paid to tax advisors, donations admitted by law, research and development expenses (up to 0.25%), professional training expenses for employees (up to 20% ).

Tax losses incurred in a fiscal year may be deducted from the incomes earned in the following year, under the heading of "special expenses". Until 1988, the carry forward of tax losses was limited to 7 years, and now there is no such limit. Since 2001, the deduction of losses is capped at 75% of the taxable profit realized in the following fiscal year.

The tax rate is 25%, being reduced from 34% as it was in 2014. The tax is paid annually.

Whatever profit they make joint stock companies subject to incomes tax must pay a minimum tax determined according to the form under which the company is formed and accounting for approximately 5% of the minimum share capital for the formation of that company. For limited liability companies, the minimum tax is 1,090 Euros for the first fiscal year and 1,750 Euros for the next fiscal years. For joint-stock companies, the minimum tax is 1,090 Euro for the first fiscal year and 3,500 Euro for the next fiscal years. For banks and insurance companies, the minimum tax is € 5,452.[19].

The amounts collected from the profit tax are divided as follows:

- 71.89% for the Federal Government;
- 14.94% for the Länder Government;
- 13.17% for local authorities.

**Value Added Tax.** Companies whose turnover does not exceed € 22,000 are not required to pay value added tax. Value of VAT, applied in Austria:

- overall rate 20%;
- 10% reduced rate for: some food, books, newspapers, other periodicals; certain art objects; land and buildings lease agreements (hotels, hostels, etc.); energy distribution; the activity of theatres, museums, cinemas, television, etc;
- 0% quota for: export of goods to countries other than those in the Community; work performed under a contract with a foreign agent if goods are to be transported to countries outside the US; distribution of goods in the United States, if the customer is registered as a VAT payer in another Member State; the cross-border transport of persons by airplane or ship.

Excluded from VAT are the bulk of banking and insurance services, small businesses whose turnover exceeds EUR 7,500, as well as medical services in the field of public health and social assistance [8].

Taxpayers are required to submit monthly statements by the 15th of the second month following the reporting period [7]. Companies that had a turnover in the previous year under the ceiling of 22,000 Euro submit the quarterly forecast [6].

Table 2. Structure of revenues between 2000 and 2014 in Austria

Structure of revenues	2000	2001	2013	2014	% 2014/2000
Indirect taxes	15.2	15.2	15	14.8	15.2
VAT	8.1	8.1	7.9	7.9	8.1
Excise duties and consumption taxes	2.7	2.7	2.8	2.7	2.7
Other taxes on products	1.2	1.2	1.1	1.1	1.2
Other taxes on production	3.2	3.3	3.1	3.1	3.2
Direct taxes	13.2	15	13.5	12.8	13.2
Personal	10	10.7	10.1	9.5	10
Corporate	2.2	3.2	2.4	2.3	2.2
Other	0.9	1	1	1	0.9
Social	14.7	14.8	14.6	14.5	14.7
Employers	7.1	7	6.8	6.8	7.1
Employees	6	6.1	5.9	5.9	6
Self- and non-employed	1.6	1.7	1.9	1.8	1.6
Less: amounts assessed but unlikely to be collected	0	0	0.1	0.1	0

Source: Own processing after ec.europa.eu/eurostat

At the end of the year, the final declaration is filed for the entire fiscal year.(Table 2).

### **Belgium**

**Tax on profit.** The Belgian tax system favours "coordination centres", "distribution centers" and "service centers". Coordination centers involve the reunification of several companies within a group whose reserve capital is at least EUR 24,789,352.48 and its turnover is at least EUR 247,893,324.78. The goal of the center is to develop and centralize one or more joint activities for the benefit of some or all companies that form the group.

The determination of the tax base is the result of a succession of six operations each with distinct rules.

In the first operation, the components of the taxable profit that are grouped into three categories are determined and summed up:

- Reserves (risk and cost provisions are exempt from tax); non-deductible expenses (fines, penalties, confiscations, interests, excessive benefits, gifts, certain specific professional expenses, 25% for private car expenses, clothing costs, 50% of protocol expenses);
- distributed benefits (dividends, amounts used by the company to acquire its own shares)[19].

The second operation consists in dividing the taxable profit into three parts, according to their origin as follows:

- profits made in Belgium are taxed in full;
- profits made abroad in a country with which Belgium has not entered into an agreement to avoid double taxation benefit from a reduction when determining the tax on profits;
- profits made abroad in a country with which

The profit tax collected is due to the state budget. (Table 3).

Table 3. Belgian income tax-2016

Taxable income on bracket	Total tax on income below bracket	Tax rate on income in bracket
0	11,070	0
11,070	12,720	25
12,720	21,190	30
21,190	38,830	40
38,830	Over	45
		1,4588.50
		50

Source: Own processing after Belgium Taxation and Investment 2016. Reach, relevance and reliability. A publication of Deloitte Touche Tohmatsu Limited



Belgium has not entered into a double taxation convention are tax-exempt and are no longer taken into account.[2].

In the third operation deduction of non-taxable items takes place. Thus, an amount of 11,510 or 23,030 Euro, as the case may be, can be deducted for each employee involved in a scientific research activity or recruited to take a leading position in the export department.

The value of certain gifts can be deducted but cannot exceed 5% from the tax base determined in the first stage or 500,000 Euros. The standard rate of taxation is 33%. Reduced rates apply if taxable profit does not exceed € 322,500. For a taxable profit of less than € 25,000, a rate of 24.25% applies, for a taxable profit between € 90,000 and € 322,500 a 34.5% tax rate is applied.

To qualify for reduced rates, the company must accomplish certain conditions:

- not be a member of a group belonging to a coordination center registered in Belgium;
- 50% of the shares are not controlled by another company; starting with 1994, the standard quota and reduced rates are increased by a "complementary crisis contribution" of 3%, for example the standard rate is 33.99%.

If the taxable incomes derive from a state with which Belgium has not signed a double taxation convention, the tax rate is reduced to a quarter.

The coordination centers, if they have employees, pay a tax of 10,000 euros for each employee of the centre, but cannot exceed 100,000 Euros. Tax is paid in advance before 1 January [18].

Taxes are also paid by certain legal entities, such as the state, the provinces, the Brussels region, municipalities and authorities administering religious goods, inter-municipal associations, public transport companies, non-profit societies and associations [19]. The taxable base is the incomes from real estate, capital incomes and the acquisition of movable property. The tax rates are variable, namely:

- 20% for real estate incomes;[1].
- between 16.5 and 33% for capital incomes;
- 300% for expenses that cannot be justified.

Insurance companies and credit companies pay a tax of 0.06%.

**Value Added Tax.** Natural or legal persons existing in Belgium who are engaged in an economic activity consisting in the supply of goods or the provision of services, with the principal title or occasionally wherever the place of employment is, are liable to value added tax.

Belgian income tax is paid on the taxable base, which is determined from salary less compulsory social security contributions (paid either in Belgium or abroad). Social security tax in Belgium is paid on top of earned income. If you're employed your employer pays part and you pay another, smaller part (which worked out to be 35 percent and 13.07 percent of salary respectively in 2016). Self-employed workers pay the amount themselves but it is capped at EUR 15,905 per year.

#### **The United Kingdom of Great Britain And Northern Ireland**

**Tax on profit.** Taxable persons, companies and associations, clubs and trade associations, non-resident companies making profits from business activities in the United Kingdom are considered to be taxable persons. The profit tax is applied to the global profit of British companies, corporations and unicorporative associations.[12].

For profits between £ 300,000 and £ 1,500,000, a marginal deduction rate is applied so that the tax rate will gradually increase in proportion to the profit. (Table 1).

Table 4. Taxes on profit tax 2011-2014 in UK

Profit (£ per year)	The marginal rate of deduction	Taxation rate (%)
0-300,000	20	20
300,001-1,500,000	27.5	20-26
Above 1,500,000	26	26

Source: Own processing after <http://www.ifs.org.uk/bns/bn09.pdf>

The following institution is not taxable persons: institutions providing health services, local authorities, charitable associations, etc.

The tax rate is set on a progressive profit scale: the 0% share for profits lower than £ 10,000;

- 23.75% share for profits between £ 10,001-50,000;

- 19%, for profits ranging from 50,001 to 300,000 pounds; share of 32.75%, for profits ranging from £ 300,001 to £ 1,500,000; a 30% share for profits higher than £ 1,500,000.

**Value Added Tax.** Any company whose turnover exceeds £ 58,000 becomes a value added tax payer for all its products.

The following are exempt from VAT: land, education, health, insurance, postal services, lottery, funeral pumps, etc.

Tax rates: the normal share of 17.5%;

- The reduced share of 5% for gas and electricity for housekeeping and restoration of religious edifices;[1].

- 0% quota for food, medicines, children's clothing, books, gold, transport.

The payment of value added tax is based on the estimated annual value as follows:

- annually for a VAT cap of less than £ 600,000;

- quarterly for a VAT cap of £ 600,001-2 million;

- Monthly for a VAT cap of over 2,000,000 pounds.

### Spain

**Tax on profit.** Profit tax payers are resident companies as well as non-resident companies for profits made in Spain. Spain allocates some percentage deductions for: research and development activity, for investments in tangible and intangible assets, excluding land and buildings, for foreign investment, for investment in culture, film production, publishing of books, to improve the professional training of the employees of a company.[1].

In Spain, several tax rates are applied for profit as follows: the standard rate of 35%;

- a reduced 30% share for small and medium-sized enterprises whose profit does not exceed 90,152 Euros;

- 25% reduced rate for mutual insurance companies, for social security organizations, for credit cooperatives and for non-profit-making associations;

- the reduced rate of 20%, for the profits from the activity specific to the cooperatives;

- 0% share for pension funds;

- The 40% quota for hydrocarbon companies or similar businesses.

As of January 1, 2015, the income tax has been reformed and simplified. It's important to note that these rates vary between each region.

The rates shown below apply to the Community of Madrid. The communities of Andalusia and Catalonia apply a higher regional income tax than Madrid. The top rate of income tax in Andalusia and Catalonia is 49%.(Table 5).

Table 5. Income tax rate applied in the Community of Madrid

From (euros)	Up to (euros)	Tax Rate
€0	€12,450	19%
€12,450	€20,200	24%
€20,200	€35,200	30%
€35,200	€60,000	37%
€60,000 & Above	0.0%	45%

Source: Own processing after Taxation in Spain. Moving to Valencia. Retrieved 13 July2016.

[https://en.wikipedia.org/wiki/Taxation\\_in\\_Spain](https://en.wikipedia.org/wiki/Taxation_in_Spain)

**Value Added Tax.** Value added tax is applied for deliveries of goods and services. They are exempt from value added tax: medical services, social services, courier services, financial services, insurance, cultural, educational activity.

Tax rates applied in Spain: the normal rate of 16%;

- The reduced share of 7% for food, sanitation, radio and television services, sanitary materials and tools, funeral services, refreshments;

- The reduced share of 4% for bread, milk, cheese, eggs, vegetables and fruits, pharmaceuticals, prostheses and vehicles for the handicapped, books and periodicals, etc. The VAT return is filed monthly, quarterly, or annually based on turnover, and payment is made within three weeks of the expiration of the reporting period.

### Hungary

**Tax on profit.** The Hungarian tax system stimulates the establishment of companies on the Hungarian territory but also the

development of foreign investments. Are areas such as environmental protection, Internet service development, food quality, film production, creating new jobs, benefiting from some tax incentives.

Hungary uses a single tax rate of 16%.

Tax losses can be carried forward to the results of subsequent years for a period of 5 years.

**Value Added Tax.** For value added tax, Hungary uses three allowances: the standard rate of 25%; reduced share of 15% of natural gas, water supply, restaurant services, hotel services, passenger transport, fuel used for public transport, sewage services as well as household waste treatment; reduced share of 5% for medicines, nutritional products.

## CONCLUSIONS

For the development of a community, both public and private financial resources are needed. Public resources consist mainly taxes that governments use in all countries. Through taxes and taxes governments pursue the following goals:

- Procurement of revenue necessary to cover public expenditures;
- Stimulation of branches or sub-branches;
- reducing the production and consumption of some products;
- achieving social goals, etc.

In order for taxes and contributions to be made available to the state in financial resources it is necessary to issue tax regulations that create the technical - organizational and operational framework for their establishment, settlement and collection. These regulations must be known by both tax authorities and taxpayers, both natural and legal.

Taxation after 1990 granted some facilities to all economic agents, including those who carried out agricultural activities. These facilities were:

Even if the European Union has different views on granting tax incentives, they are used in many countries within the Union. Thus, taxation can contribute more to the development of agriculture by adopting the following measures:

Promoting the formation and consolidation of agricultural companies by:

- non-taxation the profits of agricultural companies for a period of 5 years since the establishment, if the profit is used for the development of the business. Among the countries of the United States which apply such exemptions are: France, Germany, Greece, Italy, Luxembourg, Poland, Portugal;
- non-taxation of the incomes from the lease for a period of 5 years from the date of the lease, for the encouragement of the lease and the increase of the leased lands, provided that the lease is maintained for at least 5 years;
- non-alignment of petroleum products, energy and natural gas for agriculture;
- applying a maximum VAT rate of 5% on inputs in agricultural production for all supplies as well as agricultural services. Reduced rates apply to the following countries in the European Union: Belgium, France, Germany, the Netherlands;
- reducing tax rates to the following tax categories:
  - tax on profit = from currently 16% to 15%;
  - VAT = from currently 19% to 16%;
  - employers' contribution to pensions = from 19.5% to 16%;
  - employee's contribution to health = from 5.5% to 3%.

### **A few proposals are needed based on this analysis**

Even if the European Union has different views on granting tax incentives, they are used in many countries within the Union. Thus, taxation can contribute more to the development of agriculture by adopting the following measures:

- Promoting the formation and consolidation of agricultural companies by: the non-taxation the profits of the agricultural companies for a period of 5 years from the establishment, if the profit is used for the development of the business. Among the countries of the United States which apply such exemptions are: France, Germany, Greece, Italy, Luxembourg, Poland, Portugal.

- Non-taxation of leased incomes for a period of 5 years from the date of the lease, for the encouragement of the lease and the increase

of the leased lands, provided that the lease is maintained for at least 5 years.

- Applying higher import duties on non-U.E. to encourage and protect domestic production such as wheat, meat sugar, etc.

-Non-alignment of petroleum products, energy and natural gas for agriculture.

-Applying a maximum VAT rate of 5% on inputs in agricultural production for all supplies as well as agricultural services. Reduced rates apply to the following countries in the European Union: Belgium, France, Germany, the Netherlands.

- Non-taxation of administrative buildings and zootechnical buildings for a period of 5 years from the date of putting into service provided that they are not alienated or destroyed 10 years after the exemption period.

- Non-taxation of salary incomes of persons working in the agricultural sector for a period of 5 years from the date of employment.

This research work was carried out with the support of Ministry of Agriculture and Rural Development, Department of Statistics and also was financed from Project PN II Partnership No2365/2007.

## REFERENCES

- [1] A Survey of the UK Tax system -Institute for Fiscal Studies, <http://www.ifs.org.uk/bns/bn09.pdf>, Accessed February 5, 2018.
- [2]Belgium Taxation and Investment 2016. Reach, relevance and reliability. A publication of Deloitte Touche Tohmatsu Limited
- [3] Beltranu, P., 1998, La fiscalité en France, Nchette Publishing House, Paris, pp.54-75.
- [4] Benafoux, Ph. *et al.*, 1990, VAT et tones imolints, Larmy SA Publishing House, Paris, pp.25-55.
- [5]EFAC, Taxation of Agriculture in Europe. [a guide to agriculture income tax], Kluwer, Deventer, 2000, <http://newisbn.ru/Taxation-of-agriculture-in-Europe-a-guide-to-agriculture-income-tax-cEFAC/9/daeeecj>, Accessed February 5, 2018.
- [6] Europa, Eurostat, <http://ec.europa.eu/eurostat>, Accessed February 5, 2018.
- [7]Europa - Overview of the European Union Activities: agriculture [http://europa.eu/pol/agr/overview\\_en.htm](http://europa.eu/pol/agr/overview_en.htm), Accessed February 5, 2018.
- [8]European Commission, Taxation trends in the European Union, Focus on the crisis: The main impacts on EU tax systems, 2011 edition, Luxembourg, 2011c, <http://ec.europa.eu/eurostat/documents/3217494/5730669/KS-EU-11-001->

EN.PDF/fec0c5ff-e858-481c-904c-c291cf9804b8?version=1.0, Accessed February 5, 2018.

[9] Filip, G., *et al*, 2001, Finance, Publishing House Sedcom Libris, Iași, pp. 124-135.

[10] Goșa, V., 2000, Agricultural Financing Systems, Mirton Publishing House, Timișoara, pp.85-100.

[11] Hennie van der Veen, Harold van der Meulen, Karel van Bommel, Bart Doorneweert. Exploring agricultural taxation in Europe. April 2007. Report 2.07.06.

[12]HM Revenue and Customs, Online resource available at: <https://www.gov.uk/government/organisations/hm-revenue-customs>, Accessed February 5, 2018.

[13]Marza Bogdan, Marcuta Liviu, Marcuta Alina, 2016, The Importance Of The Information Supplied By The Farm Accountancy Data Network In Preparing The Agricultural Policies-Case Study For Romania, Revista Economică, pp 64-72

[14]Marcuta Alina, Marcuta Liviu, Niculae Ioana, Angelescu Carmen, 2011, The importance of integrating the environmental indicators into financial and accounting processes, Agricultural Management, Seria I, Management Agricol, pp.105-108.

[15] Nouville, V., 2000, La taque fiscale, Pub. Albine Michel, Paris, pp. 10-25

[16] Pope, T., Waters, T., 2016, A survey of the UK tax system, <http://www.ifs.org.uk/bns/bn09.pdf>, Accessed February 5, 2018.

[17]Ștefura, G., 2005, Public Budgets and Taxes, University Publishing House "Al. I. Cuza" Iasi, [http://www.academia.edu/7217757/Cuprins\\_Capitolul\\_I\\_Bugetul\\_public](http://www.academia.edu/7217757/Cuprins_Capitolul_I_Bugetul_public), Accessed February 5, 2018.

[18]Taxation in Spain. Moving to Valencia. Retrieved 13July2016.[https://en.wikipedia.org/wiki/Taxation\\_in\\_Spain](https://en.wikipedia.org/wiki/Taxation_in_Spain), Accessed February 5, 2018.

[19]Taxation trends in the European Union. Data for the EU Member States, Iceland and Norway.2017 edition, [https://ec.europa.eu/taxation\\_customs/sites/taxation/files/taxation\\_trends\\_report\\_2017.pdf](https://ec.europa.eu/taxation_customs/sites/taxation/files/taxation_trends_report_2017.pdf), Accessed February 5, 2018.

[20]The Europe 2020 Competitiveness Report: Building a More Competitive Europe 2014 Edition is published by the World Economic Forum within the framework of the Global Competitiveness and Benchmarking Network and in cooperation with the Europe Team, <http://polity.org.za/article/europe-2020-competitiveness-report-building-a-more-competitive-europe-2014-edition-june-2014-2014-06-12>, Accessed February 5, 2018.



## THE EFFECTS OF V.A.T. SPLIT PAYMENTS MEASURE ON INSOLVENT AGRICULTURAL COMPANIES

Paula STOICEA, Adina Magdalena IORGA

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Mobile:+40721209921, Emails:stoicea.paula@gmail.com, iorga\_adinam@yahoo.com

**Corresponding author:** stoicea.paula@gmail.com

### Abstract

*In Romania, the value of added tax (VAT) is the most important source of revenue for the general consolidated budget (24.4% in 2015 and 23.1% in 2016), but the degree of compliance is around 80% VAT paid on time in relation to the VAT declared in VAT returns submitted by taxable persons registered for VAT purposes. The paper presents the impact of the measure split VAT payment on insolvent agricultural companies, as it has the role of increasing the voluntary compliance rate of companies in insolvency, reducing VAT evasion, ensuring a fair competitive environment by eliminating the advantages of some economic operators with incorrect fiscal behaviour that does not pay VAT to the state budget. The conclusions drawn from the study revealed that the split VAT measure would reduce the chances of recovery for insolvent agricultural companies, contradicts the payment schedule and the prioritization for the distribution to creditors and contravenes the objective for which insolvency proceedings were regulated.*

**Key words:** VAT split payments, agriculture, insolvent companies

### INTRODUCTION

The Government Ordinance no. 23/2017 on VAT split payments, published in the Official Gazette, 1<sup>st</sup> part from 31<sup>st</sup> august 2017, is the legislation that presents the implementation ways of the new VAT collecting mechanism. [1]

The VAT is the state's budget most important source of income (it is an indirect tax, collected by the companies which are VAT payers on behalf of the State), even if the collection rate is about 80% between the VAT paid at the due date and the VAT declared in VAT return by Romanian companies. [6]

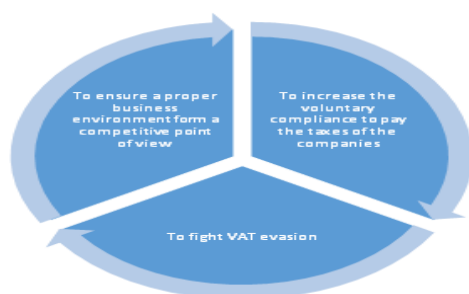


Fig.1. The main reasons of application of the VAT split measure

Source: Own representation.

This method of paying the VAT became optional at 1<sup>st</sup> of October 2017, becoming mandatory for all the companies at 1<sup>st</sup> of January 2018. Law no, 275/2017 on the application of VAT split payment, came into force at 31<sup>st</sup> of December 2017, applicable from 1<sup>st</sup> of January 2018 through which the application of this mechanism became significant. [2] Thus, the VAT split payment is mandatory only for State companies and private companies in insolvency or companies that have debts in VAT payments, for all the other types, this mechanism is optional. The companies in insolvency at 431<sup>st</sup> of December 2017, will apply the mechanism by 1<sup>st</sup> of March 2018. The societies that are not VAT payers, will not make two payments when buying from companies that apply the split VAT system. Thus, the companies that are not VAT payers and the authorized persons, will not make two payments when having relationships with companies that apply the split VAT system. So, the obligation of paying the VAT in a VAT special account of the provider which applies the split VAT



mechanism, will come only to the companies that are VAT payers. [4]

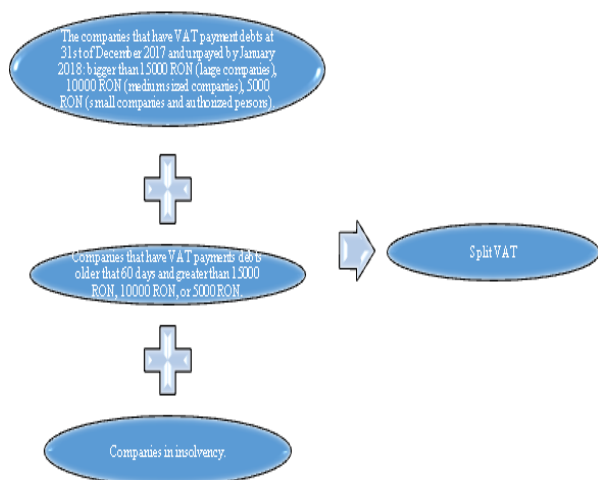


Fig.2. The application of VAT split payments  
Source: Our representation.

## MATERIALS AND METHODS

Based on The national office of the Register of Commerce’s statistics, it was analysed in comparison, the dynamics and the evolution of the registered, active, dissolved in insolvency, radiated and with suspended activity companies, existing in January 2018 and January 2017. It was analysed, also, the impact of the VAT split payments on the agricultural societies in insolvency.

## RESULTS AND DISCUSSIONS

The split VAT concept is based on the paying the VAT in/from a special VAT account, which will have the sequence “VAT” in the IBAN. [7]

It will not affect any other rule in the VAT system (the chargeability rules, the way of recording the transactions in the VAT return, time period of issuing the invoices, paying the VAT, without any other additional reporting obligations).

The mechanism works the following way: each VAT payer will have a special VAT bank account, different from the current bank account, and for every invoice received from the providers that are VAT payers, the beneficiary will make two payments: one in the current bank account (the value of the

products/services that they bought – the VAT tax base) and the other payment will be made from the VAT bank account and it will represent the VAT value of the beneficiary. Exceptions will be made for the cash payments.

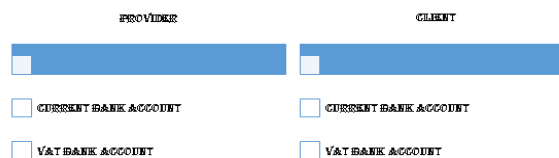


Fig 3. Payments by bank transfer: both the provider and the client are VAT payers  
Source: Our representation.

The authorized persons, individual companies, family businesses and the legal persons (societies, national companies, autonomous companies, economic interest groups, cooperative societies, cooperative organizations, European societies, European cooperative societies and European interest groups headquartered in Romania), but also any other natural or legal person are obliged by law to be recorded at the national office of the Register of Commerce, obtaining an registration certificate in which are mentioned the serial number and an unique registration code assigned by the Ministry of Public Finance. It will be presented the registered companies after 1989. [8]

Table 1. The number and the structure of the companies registered at the Register of Commerce, in December 1990 – January 2018

Period (year, month)	Number of registrations	(%)
Total at 31st January 2018, from which:	2,937,258	100.0
1990-2003	1,119,100	38.10
2004	144,284	4.91
2005	159,464	5.43
2006	135,371	4.61
2007	144,728	4.93
2008	144,177	4.91
2009	116,024	3.95
2010	123,148	4.19
2011	133,190	4.53
2012	125,603	4.28
2013	124,816	4.25
2014	101,627	3.46
2015	113,167	3.85
2016	105,982	3.61
2017	136,699	4.65
2018, January	9,878	0.34

Source: www. onrc.ro Operations in the Central Register of Commerce - Statistical summary of data from the Central Trade Register - on January 31, 2018, no. 315 [8]

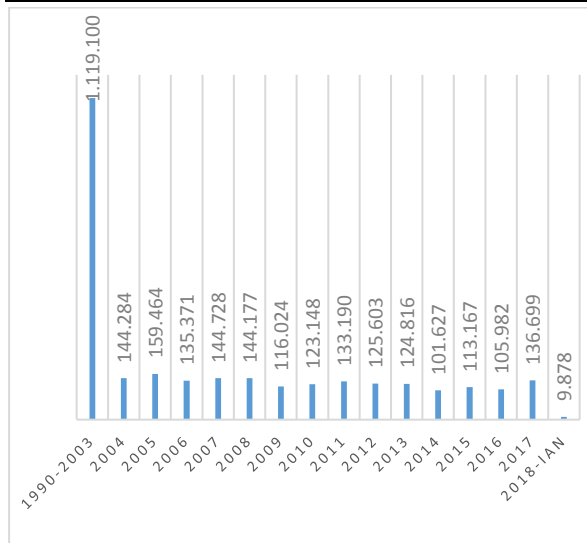


Fig. 4. The situation of registration in Romania in December 1990 – January 2018  
Source: Own design.

So, it can be observed, that from a total of 2,937,258 registered companies, 38.10% of the registrations took place in 1990-2003, but in 2004-2018, the annual percentage of registrations was between 3.6% - 5.5%, with a top of registrations in 2005, when it was registered a number of 159,464 new companies.

Talking about January 2018, it can be seen that there were 9878 registered companies, compared to 5,475 of the same period of 2017, with a grow of 44.57%.

Table 2. Comparison of registrations by company type in January 2018 versus January 2017

	Total	CA	IF	II	PFA	SA	SRL
2018	9,878	6	115	1,191	2,209	8	6,349
2017	5,475	2	27	482	1,038	11	1

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

The most companies set up in 2018 were the limited liability ones, with a grow of 38.35%, compared to the same period of 2017, the authorized persons which almost doubled their number, the individual companies had grown their number with 72.52%.

From these registrations, in January 2018, 1,342 chose a CAEN code from agriculture, forestry and fishing, which represents a number 3.85 times bigger compared to January 2017. [5]

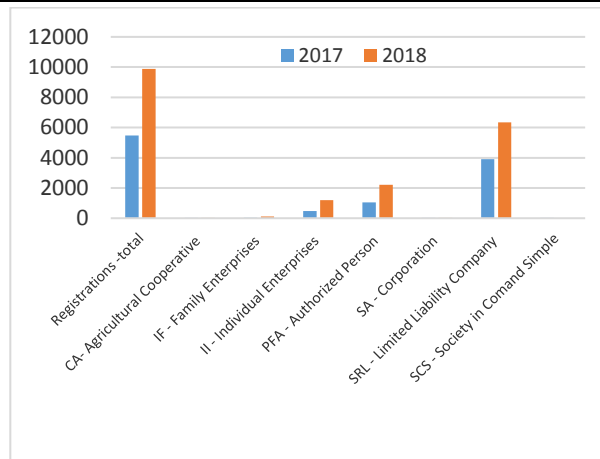


Fig 5. The types and the number of registered companies at the Register of Commerce: January 2018 – January 2017

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

Table 3. Number of registered companies at the Register of Commerce in agriculture, forestry and fishing: January 2018 – January 2017

Registrations	Number of registrations - January -		2018/2017 %
	2018	2017	
Total, from which:	9,878	5,475	80.42%
Agriculture, forestry and fishing	1,342	348	385.63%

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

The number of active professionals, legally speaking, registered in January 2018 was 1,259,186, with a grow of 5.61% compared to January 2017. The number of active legal persons has grown with 1.13%.

Table 4. The number of active professionals: January 2018 – January 2017

Number active professionals – January -						2018/2017 %
2018			2017			
Total, from which:	Authorized persons	Legal persons	Total, from which:	Authorized persons	Legal persons	
1,259,186	386,110	873,076	1,192,329	381,776	810,553	5.61

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

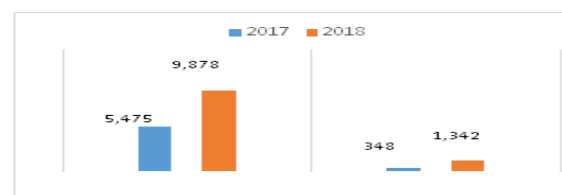


Fig 6. Registrations and active professionals: January 2018 – January 2017

Source: www. onrc.ro – statistics, Accessed January 10, 2018.



The method of liquidation and winding-up of a company, is established by the article of association, doesn't matter the type of the company. According to the law, the liquidation must be made no later than the date the company was registered at the Register of Commerce with the mention of the winding-up.

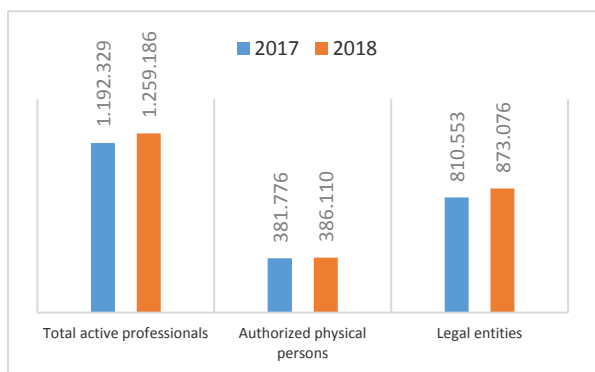


Fig. 7. Active Professionals: January 2018 – January 2017

Source: www. onrc.ro – statistics, Accessed January 10, 2018.

The liquidator must submit to the office of the Register of Commerce, for the indication in the Register of Commerce, a report on the economic situation of the company. Depending on this report, whether the debtor fulfils the terms for opening the simplified insolvency proceedings, the liquidator has the obligation to request the opening of this procedure within 15 days form the report's submission date. [3]

Table 5. Liquidation.Comparison January 2018 – January 2017

Liquidation	Number of liquidations – January -		2018/2017 %
	2018	2017	
<b>Total, of which:</b>	3,089	1,276	142.08%
<b>Agriculture, forestry and fishing</b>	110	40	175%

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

After the liquidation is done, the liquidators shall be submitted to the Register of Commerce Application for cancellation of the registration of the company from the Register of Commerce, on the basis of the final report of winding-up proceedings and the preparation of the financial statements of

winding-up proceedings which shows the heritage situation of claims and the allocation of remaining assets.

Table 6. Insolvency. Comparison January 2018 – January 2017

Insolvency	Number of liquidations – January -		2018/2017 %
	2018	2017	
<b>Total, from which</b>	753	512	47.07%
<b>Agriculture, forestry and fishing</b>	25	25	0%

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

The resolution by which the company has cancellation from the Register of Commerce, shall be published on the web site of the National Office of the Register of Commerce.

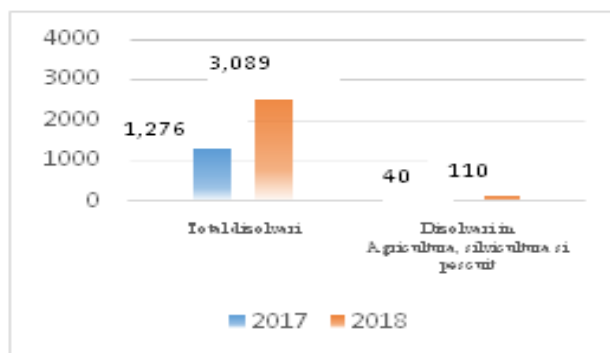


Fig. 8. Liquidations companies: January 2018-January 2017

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

Thus, according to ONRC, in January 2018, there were dissolved 3,089 companies, from which, 110 with a CAEN code from agriculture, forestry and fishing.

Comparing to 2017, the number of this type of companies, had grown with 142.08% overall, and with 175% in agriculture, forestry and fishing.

753 companies have declared their insolvency, with an increase of 47.07%, compared to the same period of the previous year. These companies will apply the split VAT system. [5]

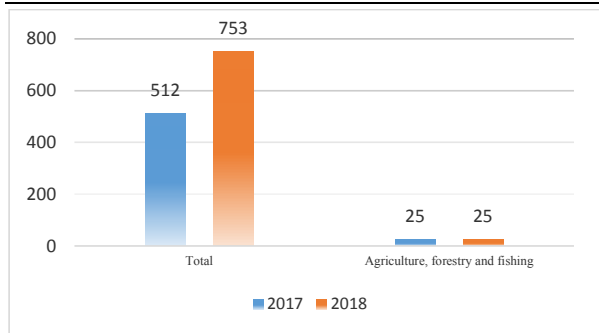


Fig. 9. Insolvent companies: January 2018-January 2017, source: www. onrc.ro – Statistics, Accessed January 10, 2018.

Table 7. Cancelled companies January 2018 – January 2017

Cancelled	No. of cancelled companies -January-		2018/2017 %
	2018	2017	
<b>Total cancelled from which</b>	8,072	5,640	43.12%
<b>Agriculture, forestry and fishing</b>	914	521	75.43%

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

In January 2018, compared with the same period of the previous year, the total of cancelled companies was with 43.12% bigger and in the agricultural companies, it was a raise of 75.43%. [5]

Table 8. Suspended companies January 2018 – January 2017

Suspended	No. of cancelled companies -January-		2018/2017 %
	2018	2017	
<b>Total Suspended, of which</b>	2,472	1,061	132.99%
<b>Agriculture, forestry and fishing</b>	113	52	117.31%

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

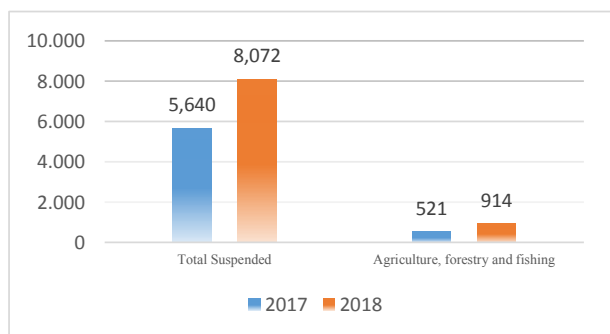


Fig. 10. Cancelled companies companies in January 2018 – January 2017, Source: www. onrc.ro – Statistici, Accessed January 10, 2018.

Speaking about suspended activity, in January 2018, compared with January 2017, there was a growth of 132.99%. The ascending trend, was registered in the area of the companies from agriculture, forestry and fishing, where there was a percentage of 117.31%.

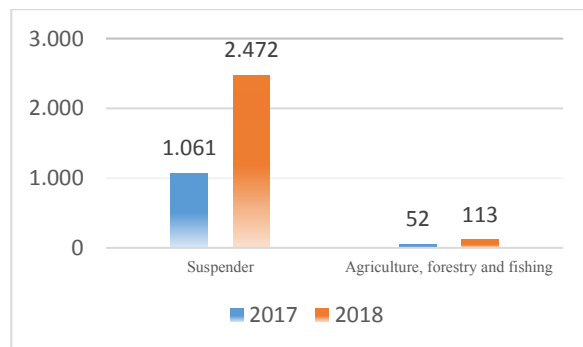


Fig 11. Suspended companies in January 2018 – January 2017

Source: www. onrc.ro – Statistics, Accessed January 10, 2018.

## CONCLUSIONS

Following the analysis, there was found that: The arguments of the introduction of the VAT split payments: the increase of the degree of the compliance on a voluntary basis to the payment of the companies in insolvency proceedings, the reduction of tax evasion, ensuring a fair competitive environment by eliminating the advantages of the companies that are not paying the VAT to tee state’s budget.

-The companies registered in January 2018, had a grow of 44.57% compared to the same period of the previous year. The registrations in Agriculture, forestry and fishing, had grown 3.85 times, compared to January 2017, but also the number of cancelled and suspended companies had an important rise.

-The number of juridical active professionals registered in January 2018, has increased with 5.61% compared to January 2017.

-The number of cancelled companies had increased with 43.12% in January 2018 compared to 2017, and in agricultural companies, there were with 75.43 % more.

-The number of the companies with suspended activity, had increased in January 2018 compared to January 2017 with 132.99%, and in the companies from the field

of agriculture, forestry and fishing, the percentage was of 117.31%.

-The number of cancelled companies increased with 142.08% in January 2018, and in the agricultural ones, with 175%, compared with 2017.

-The number of societies that declared their insolvency, in January 2018, compared to 2017, had grown with 47.07%.

-The split VAT mechanism will lead to a decrease of the recovery chances of the companies in insolvency proceedings, including ones with a CAEN code form agriculture, forestry and fishing.

-The implementation of the split VAT payments, contradicts the program of payments and prioritize distributions of the cash money to creditors.

-Even if the implementation of split VAT would determinate the insolvency companies or the ones that are in debts, to transfer the earned money from all the transactions to treasury accounts, however, this regulation is contradictory with the purpose of what the procedure of insolvency was made for.

## REFERENCES

- [1]Government Ordinance No. 23/2017 on the payment of VAT
- [2]Law No. 215/2017 on the application of the measure on the disbursement of VAT
- [3]Law No. 85/2014 on insolvency and insolvency prevention procedures
- [4] Law No. 227/2015 regarding the Fiscal Code
- [5]ONRC, Statistics, 2018, [www.onrc.ro](http://www.onrc.ro), Accessed January 10, 2018.
- [6]Teodorescu M. et al., 2017, Taxation in Roumania, Publishing House Universitaria, Craiova, pp: 56
- [7]Vintilă, N. *et al*, 2013, Taxation applied and fiscal management elements, 2013, Publishing House C.H. Beck, Bucharest, pp: 125
- [8]Zai, P.V., 2010, European budgetary policies, Publishing House Accent, Cluj Napoca, pp: 150

## NEW APPROACHES ON THE DEVELOPMENT OF THE METHODOLOGY OF THE INTEGRAL INDICATOR FOR ESTIMATION OF THE RESOURCES POTENTIAL AND THEIR RANGE IN AGRICULTURAL ENTITIES

Elena TIMOFTI, Petru TOMIȚA, Daniela POPA

State Agrarian University of Moldova, 44, Mircesti St., MD-2049, Chisinau, Republic of Moldova, Phone: +373 697 88 745, Emails: e.timofti@uasm.md, p.tomita@uasm.md, d.popa@uasm.md

*Corresponding author:* e.timofti@uasm.md

### *Abstract*

*Through organization scientific production and work aims the growth the use of resources. The degree of mobilization of the resource potential, what characterized intensity use their is expressed by two indicators: intensity consuming (spending) the resource potential and efficiency (result) using resource potential. Addressing theoretical and methodological issues evaluation potential units agriculture, which is being discussed in the literature economic agrarian, allows shooting conclusion that the production potential of the units agriculture is a category economic through which it expresses itself characteristic production systematic forces as sets of different combinations of productive resources: land, capital (in form fixed and assets) and labor resources. Evaluation resource potential is performed complicated in the goal determination opportunities potential of the entities in the production agricultural, information obtained. It is used in the development business plans and the development of the enterprise. The authors investigated composition potential resources, which have a share essential in the production potential and are of great importance in the indicators- the result, which is determined through the report from results obtained (output, income, profit ) and efforts (or resources used ). The authors have developed methodology determination the full potential of resources and return it expressed value, and estimate with their help indices statistics .*

*Key words:* resource potential, resources yield potential, agricultural land, statistical indices

### INTRODUCTION

The change in the dynamics of the provision of resources: land, labor, fixed assets and current assets under market economy conditions are different in each agricultural entity, have different production directions and different branches of development [4]. In the current period, the size of production potential in agricultural units in the Republic of Moldova depends to a great extent on the influence of different trends in the change of production resources: first, the reduction of labor resources and agricultural land, secondly, the quantitative and qualitative changes of fixed assets, current assets, and so on.

The notion of resource potential means all the volumes of all resources (natural resource, labor resource, material resource, intellectual resource, informational resource etc.) by

separate entities, by groups, territories, branches. In this context, there is a wide range of opinions.

Thus, in the opinion of [2, 3, 7, 8, ], "the production resources are represented by the natural, material, financial and human potential of an agricultural unit which, in the context created by the social environment, are attracted and used in the production of agricultural products". [2, 3, 8, 7].

Zahiu Letitia believes that the resource potential of an agricultural enterprise is usually higher than the resources utilized. [11].

The economic resources attracted to the economic circuit, moving as streams, are factors of production. JB Say, a representative of the Classical School, underlined in his paper "The Treaty of Political Economy," that three factors are involved in the production of goods: labor, nature (land) and capital. The

first two factors - labor and nature - are primary or originating factors, as they are the starting point for economic activity. The other factor, capital is the derived factor, resulting from the interaction of premiums.

In the opinion of the authors [1, 3, 10]: "the factors of production are the total of the material and human resources attracted and used in the economic activity, ie the" , the potential of economic resources attracted in the economic circuit ". [1, 10]. Or "production factors represent an active potential of resources attracted in the economic circuit" . [1].

The basis for the estimation and analysis of the factors of production "is the economic resources, the total of the means available and likely to be capitalized for the production of economic goods and services" . In the process of using economic resources (material, financial and labor) it is necessary to consider such features of resources as the property of replacing one another and complementing one another. However, they are resources that are interrelated between them that a resource cannot be used without another (for example, the technique and the fuel).

For resources that are replacing one another there are some ways to use them. For example, one resource can be replaced by another to get it the same purpose (labor and technical resources), or there are different variants and consecutives of their use (in this case it is found in the optimal choice).

Between different resources there is a link of dependence, of mutual conditioning. Knowing these dependencies is of great importance for the economic activity as they are resources that have a particular influence on growth and economic development and the use of other resources. [8].

## **MATERIALS AND METHODS**

Researches in the field of the methodology of the full indicator for estimating the resource potential and its efficiency are carried out with the following methods: the monographic method, the statistical index

method, the comparison method, and so on. Practical investigations were conducted on the basis of the data of the agricultural entities. New methodologies are proposed to estimate the full potential of resources and their efficiency.

## **RESULTS AND DISCUSSIONS**

The issue of increasing the yield of using agricultural production resources is very important. To solve it successfully depends directly the economic security of the country and its constant supply with agricultural products.

The increase in the volume of crop and livestock production due to the introduction of new production resources is limited. Thus, agricultural land, which is the main means of production in agriculture, as we know, is limited in space. Due to the improvement measures and other landscaping, the real possibilities of enlarging the agricultural land surfaces due to the inclusion in the intensive circulation of the new land are decreasing each year.

Regarding labor resources in agriculture, their staff gradually decreases. Although national measures for village rehabilitation have taken place in recent years, the migration of the rural population to the city and beyond the country continues and there are no conditions for stopping it in the near future. The real possibilities for increasing the resources of the branches are limited, first, due to the insufficiency of the means that can be allocated for the extended reproduction of fixed and current assets.

Besides the tasks that stand up in front of you society about the need to make agriculture more efficient, there are also other economic, social and political problems, the realization of which requires large expenditures and means. First of all, the manufacturing forces of the industrial branch, which produce means and objects of work for agriculture, have their restrictions. The pace of widening the reproduction of fixed assets and current assets for agricultural purposes is limited by the biological laws governing the process of plant and animal propagation. The latter circumstance entails considerable

limitations, especially with regard to the growth rate of animals.

Secondly, increasing agricultural production due to increased production volume is not the best way to make production more efficient. Thus, the increase in livestock production based on the increase in the number of cattle and poultry necessitates an increase in the number of rooms and the consumption of more fodder.

All the circumstances outlined above make it necessary to recover the already existing agricultural production potential, as well as the increase of the one aimed at attracting capital investments and material resources. This task can only be successfully resolved by using a whole set of factors and mobilizing all existing reserves.

Making a totalizing of the opinions of scientific treatment and practical problem of assessing the full potential of resources, we believe that the value method, one based on the calculation of statistical indicators and methods of economic-mathematical, which allow to determine the exact weight of each resource in the production of production are original, but we would like to we present our own vision, taking into account that partial resources are estimated in different units of measure (agricultural land - in hectares, fixed assets and current assets - in monetary units and labor resources in natural indicators (persons)), for comparability (the surface of the agricultural land and labor) is necessary for their appreciation in terms of value.

For the value estimation of the full potential of resources, it was developed and proposed to apply in the agricultural units the following methodology expressed by the relation [9].

$$V \cdot P \cdot R = S_{a.v.} + MF + FR + Cm$$

$$\text{or } V \cdot P \cdot R = \frac{S_{i.a.c} \cdot B_i \cdot \bar{P}}{\bar{B}} + MF + FR + Cm$$

where:

$V \cdot P \cdot R$  = the full potential resource potential, thousands lei

$S_{av}$  - value of agricultural land, thousand lei / grade-ha

$MF$  - the value of the means of production, MDL thousand

$FR$  - the remuneration fund (the value-equivalent of the labor potential), thousands lei

$cm$  - direct costs of materials, thousands lei

We consider, when estimating the value of agricultural land, it is necessary to consider quantifying their productive capacity through land retention.

According to the Law on the normative price and the way of sale-purchase of land no. 147-149 of 2001 [Law, 2001], in Moldova the value of the agricultural land was estimated at the normative price of 289.53 lei per hectare unit. [6].

Therefore, at the level of the republic, the value of the agricultural land can be estimated in the following way:

$$S_{a.v} = S_{ia} (ha) \cdot \bar{B} (grad / ha) \cdot \bar{P} (lei),$$

where:

$S_{a.v}$  - the surface of the agricultural land expressed in value (the value of the agricultural land), thousands of lei;

$S_{ia}$  - the surface of agricultural land in hectares;

$\bar{B}$  - weighted average grade of bonitation, grade-hectare;

$\bar{P}$  - the normative price for one hectare unit, lei.

The studies on the zoning and the quality of the agricultural land have shown that the productive potential in the Republic of Moldova is appreciated by the average value of 64 hectares of landfill [5].

However, in relation to the fact that the regions, districts, agricultural units are located in different natural - climatic conditions, with different fertility of the soil, we determined the average credit rating on the development regions of the Republic of Moldova.

Thus, the agricultural land in the North development region was appreciated with the highest average score of 70.0 hectare, followed by Chisinau - 64 hectare, the Central region - 59.9 hectares - South - 59.2 degree - hectare and ATU Gagauzia - 56 degree-hectare.

Table 1. Potential of partial and integral production resources in agricultural entities in the Republic of Moldova for two periods 2011-2013 and 2014-2016

Indicator	Average/entity		Average 2014-2016, % compared to 2011-2013
	2011-2013	2014-2016	
The value of agricultural land, thousand lei grade-ha	10,453	10,040	96.0
The average annual value of the means of production, thousands MDL	3,230.5	3,831.1	118.5
Remuneration fund (the value-equivalent of labor potential), thousands lei	535	630.3	117.7
Direct costs of materials, thousands of lei	1,532.4	1,823	118.9
Total value of the full potential of resources, MDL thousand	15,750.9	16,324.4	103.6

Source: calculated by the author and based on the data in the specialized forms on the activity of agricultural enterprises

For each agricultural unit, rayon, region the determination of the value of agricultural land is proposed by the following methodology:

$$S_{a-v} = \frac{S_i ta_c \times B_i \times \bar{P}}{B};$$

where:

$S_{a-v}$  = the area of agricultural cadastral land **and** agricultural unit, (rayon, region);

$S_i ta_c$  -the grade (ha) **and the** agricultural unit (district, region).

The calculation of the value of the differentiated agricultural land according to the proposed method takes into consideration the following main components per district (region, enterprise):

-the absolute size of agricultural land in each unit under study;

-soil quality;

-the price of a differentiated degree-ha depending on the soil quality.

Estimation of labor resources is possible from the point of view of the remuneration of the average annual work of a worker employed in the agriculture of the studied units.

This is explained by the fact that the increase in the level of labor remuneration must be conditional on getting a larger quantity of agricultural production.

Hence, the higher the level of pay for an average annual worker, the higher the value of work resources, hence the potential.

Data analysis demonstrates that, compared with the average of 2011-2013, resource potential on average an agricultural changed as follows:

-Value of fixed productive fund resending and direct cost of materials is increasing, corresponding to: 18.5%, 17.7% and 18.9%.

-The value of agricultural land has decreased by 4%.

-The value of the full resource potential increased by 3.6%.

This situation indicates that the growth rate of the main resources (except for agricultural land) was high, but the value of the agricultural land, which in the structure of the resource potential is more than 60%, has influenced an increase of the full potential only 3.6%.

The data from Table 2 demonstrate that all levels of partial resource yields (excluding agricultural land expressed in value) are in decline.

That is, the link between the growth rates of resources and their returns is inversely proportional. With higher provision of fully-potential entities, the partial resource returns diminish.

The full resource potential is up 2% on average, but compared to the full resource potential is down 1.6 p.p.

The situation created allows us to conclude that agriculture in agricultural entities in the Republic of Moldova is characterized by a low efficiency of using the resource potential.

There are not created systems suitable for structural changes and the Department of Agriculture Development did not create conditions for extended reproduction.

Another methodology for estimating the full potential of resources and the performance determination proposes the establishment of the indices, based on the value assessment of all resources, using the mathematical formula presented below Table 2.

Table 2. Return your potential partial and resources in agricultural entities from restored in Moldova for two periods of the years 2011 to 2016

The indicator	On average, an agricultural entity		Average 2014-2016 in% compared to 2011-2013
	The year		
	2011-2010	2014-2016	
The surface of the agricultural land, ha	610	542	88.8
The value of global agricultural production (in comparable prices), thousands lei	2,450.2	2,577.4	105.1
Agricultural land yield, lei:			
-at 1 ha	4,016.4	4,755.3	118
-per 1 leu worth	0.234	0.256	109
The yield of productive fixed assets, lei	0.75	0.67	89.1
Remuneration fund yield, lei	4.57	4.09	89.5
Yield of direct material costs, lei	1.60	1.41	88.1
Return of full resource potential, lei	0.155	0.158	102.0

Source: calculated by the authors based on the data from Table 1.

$$I_{PIR} = \frac{\frac{Ri_{t.a.}}{R_{t.a.}} + \frac{Ri_{m.f.}}{R_{m.f.}} + \frac{Ri_{f.r.}}{R_{f.r.}} + \frac{Ri_{c.m.}}{R_{c.m.}}}{\frac{S_{a.v.}}{S_{a.v.}} + \frac{VMF_i}{VMF} + \frac{Fr_i}{Fr} + \frac{Cm_i}{Cm}}$$

$$I_{PIR} = \sum \frac{Ri_{integral}}{R_{integral}} \div \sum \frac{Pi_{integral}}{P_{integral}} = \bar{I}r \div \bar{I}p$$

where:

$I_{PIR}$  - index of efficiency of using the full potential of resources;

$Ri_{t.a.}, \bar{R}_{t.a.}$  - return on agricultural land **and** agricultural units (district, region) and the average for the country;

$Ri_{c.m.}$  - the direct cost of raw materials on the  $i$  agricultural units (rayon, region) and on average on the republic, lei;

$Ri_{m.f.}, \bar{R}_{m.f.}$  - return on fixed assets goods for farming **and** agricultural units (district, region) and the average for the country, lei;

$Ri_{f.r.}, \bar{R}_{f.r.}$  - return on labor remuneration fund **and** agricultural units (district, region) and the average for the country, lei;

$S_{a.v.}, \bar{S}_{a.v.}$  - the value of agricultural land at 1 enterprise in units and the average for the republic, thousand lei;

$VMF_i, \bar{VMF}$  - value of fixed assets, thousands lei

$Fr_i, \bar{Fr}$  - the labor remuneration fund at 1 enterprise in units and media on the republic, thousands lei;

$Cm_i, \bar{Cm}$  - direct material costs to one enterprise **and** units and the average for the republic, thousands of lei;

$\sum \frac{Ri_{integral}}{R_{integral}}$  - the sum of the indices u of yield indivisible integral resources used.

$\sum \frac{Pi_{integral}}{P_{integral}}$  - the sum of the individual indices of the full (potential) global resource potential;

$\bar{I}r$  - the average of the full yield;

- the average of the total resources;

$i$  - the number of the surveyed population.

If:

$I_{PIR} > 1$ , then the full potential of resources is used more efficiently in the units under investigation, the yield exceeds the exiting potential of resources;

$I_{PIR} = 1$ , then the full potential resource return remained at the same level, and

$I_{PIR} < 1$ , then the rate of return on the full potential of resources has decreased.

On the basis of the data of the agricultural enterprises on the development regions of the Republic of Moldova, the proposed methodology was applied, calculating the main types of resources in an enterprise and the indicators of the yield of global



agricultural production on average per enterprise based on resources, on their basis were determined the following indices (Table 3).

Table 3. Influence the average index of the full resource potential of economic efficiency of use in farm businesses in North Region of Moldova average of the years 2014 - 2016

Indicators	Groups of entities by average index of the full potential of resources				Total, Average
	I	II	III	IV	
	Up to 0.75	from 0.5 to 0.95	0.95 to 1.15	1.15 and above	
Number of entities	52	62	75	56	245
Average resource potential full index	0.52	0.80	1.1	1.55	1
Individual resource indices:					
the value of agricultural land	0.42	0.90	1.17	1.63	1
of the fixed assets of agricultural production	0.63	0.69	1.16	1.49	1
material resources	0.54	0.86	1.14	1.43	1
the individual indices of the labor remuneration fund	0.52	0.77	0.97	1,68	1
Individual indices of yield					
the value of agricultural land	1.162	0.919	0.947	0.947	1
of the fixed assets of agricultural production	0.75	1193	0.953	1,006	1
direct costs	0.915	0,959	0.972	1,074	1
the labour remuneration fund	0.923	1074	1129	0.902	1
Average Resource Efficiency Index	0.94	1036	1.0	0.98	1
Efficiency Index of Full Resources Potential	1,80	1.29	0.90	0.64	1

Source: prepared and calculated by the author and based on NBS data

The results of the research are presented in Table 3 and Figure 1 and show that in the first two groups of entities accounting for 46% of their total, the average resources of the full

resource potential are lower than in groups 3 and 4.

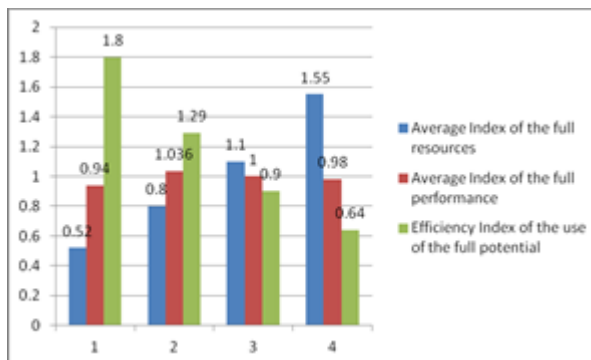


Fig. 1. Full resource potential influence on the economic efficiency of their use in the agricultural enterprises of Transnistria average of the years 2014 - 2016

Note: 1,2,3, and 4 are the groups of entities by average index of the full potential of resources as mentioned in Table 3.

However, the efficiency index of the potential of total resources are higher, i.e. rhythms of growth of yields exceeds the growth rate of resources, which also confirms the results obtained through the value methodology calculated using traditional indicators.

- the individual indices of each resource;
- individual indices of partial yields;
- the sum of the individual resource potential indices;
- the sum of individual returns on resources;
- average index of full-resource potential;
- the average full yield index;
- the efficiency index of the full resource potential.

## CONCLUSIONS

Totally volumes of all resources (natural, human, material, intellectual, etc.) attracted and used in economic activity is potential resources, which are estimated in different units (in hectares agricultural land, capital goods and assets current - in monetary units, and labor resources - in natural indicators, persons).

For comparability to elaborate full indicator methodology to estimate resource potential and their performance.

Research shows that all levels of partial yields (with the exception of agricultural land expressed in value) are in decline. The link between the growth rates of resources and their ranks is inversely proportional. If the full potential of the resource and average during the years 2011-2013 2014-2016 compared to 3.6% when all of them increased only 2%, or 1.6 percentage difference.

The grouping of the agricultural enterprises from the North Development Region according to the average indices of the full potential of resources shows that the indices of the efficiency of the full potential resource resource efficiency in the first two groups are 1.8 and 1.28, respectively, and in the groups III and IV the indices the efficiency of the full yield is down 10% and 36%, respectively, compared to the average for all the investigated units.

Determining the efficiency indices of utilization of the full potential of resources according to the proposed methodology allows the following:

-on the basis of individual indices it is possible to compare each resource, the partial randament per unit studied (enterprise, rayon, region), with the level of the comparison base;

-based on the full yield index of the resources used, the share of all resources is appreciated used to obtain the result on each unit studied against the basis of comparison ;

-on the basis of the full yield index the efficiency of the use of the full potential of the resources compared to the comparison base is appreciated;

-TAD maintain efficiency index render full potential resource use permits the speed of overcoming (non-passing) the full return on resources;

-estimating the return on the use of the full potential of resources enables us to identify the place of each agricultural unit in the studied hierarchy given that they are harmonized, have a consecutive increase (decrease) and are comparable.

management. Bucharest: Economic Publishing House, 256 p.

[2]Ciucur, D., Gavrilă, I., Popescu, C., 1999, Economic, University Manual, Economic Publishing House, Bucharest, p.250.

[3]Dobrota, N., 2000, Political Economy. Bucharest: Economic Publishing House, 495 p.

[4] Economics, 2000, Bucharest: Economic Publishing House, 550 p.

[5]Land cadastre of the Moldavian Republic 1 November 2005. The Agency Land Relations and Cadastre of RM, Chisinau, 2006.

[6]Law on the normative price and the way of sale - purchase of land, Monitorul Oficial of the Republic of Moldova, nr 147-149 (with subsequent amendments and completions) - Cișinău, 2001, p. 9.

[7]Moldovanu, D., 2005, Capitalism or subterranean market economy. Chisinau, p.208

[8]Panțiru, P., 2003, Economics and Agricultural Policy, Galați, 260 p.

[9]Timofti, E., 2008, Intensive and efficient agriculture based on the rational capitalization of the resource potential: in Agricultural Science, - Chisinau, no 2, pp. 96-100.

[10]Toba, A., Malai, A., Toba, D., 2001, General Economic Theory, Chisinau, 288 p.

[11]Zahiu, L., 1999, Agricultural Management. Bucharest: Economic Publishing House, p.115.

## REFERENCES

[1]Capanu, I., Anghelachi, C., 2000, Economic indicators for micro and macroeconomic



## MODELLING SMART ECONOMY AND EDUCATION-RELATED ENVIRONMENTS USING SYSTEM DYNAMICS PRINCIPLES

Victor TIȚA<sup>1</sup>, Nicolae BOLD<sup>2</sup>, Doru Anastasiu POPESCU<sup>2</sup>, Daniel NIJLOVEANU<sup>1</sup>

<sup>1</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Management, Economic Engineering in Agriculture and Rural Development, Slatina Branch, 150 Strehareți St., Slatina, Romania, Emails: victortita@yahoo.com, nijloveanu\_daniel@yahoo.com

<sup>2</sup>Proeuro-Cons Association, 5 Garofiței St., University of Pitești, Faculty of Sciences, Physical Education and Informatics, 1 Târgul din Vale St., Pitesti, Romania  
Emails: bold\_nicolae@yahoo.com, dopopan@yahoo.com

**Corresponding author:** bold\_nicolae@yahoo.com

### Abstract

*We live in a world powered by information. This truth gives us the potential to master as much information as we can in order to make our activity more efficient. The development of technology gives us both the means and the capabilities to gather and analyze this large amount of information so that we can use more efficiently the limited resources that we dispose of. Basically, this paper presents a modality of modelling smart university and smart enterprise environments based on the principles of System Dynamics, the model of economic map presented in previous papers and the concept of smartness within an environment. In these terms, smart is referred to the usage of new methodologies and technologies in order to optimize the activity in a controlled economy-based or educational environment.*

**Key words:** smart, education, enterprise, training, system dynamics, economic map

### INTRODUCTION

The educational background of the people working within a company is essential for the economic and social performance of the enterprise.

Moreover, this background potential is affecting positively both the career of the student and the image of the affiliate university [6]. As an adult, the educational background is kept and enlarged by training [7]. In this way, the training companies have also a benefit for creating the training process for various persons having educational needs.

The fast development of the technology in every domain [3] eases the intersected benefits of the three contexts: the university education, adult training and enterprise environment.

In this way, technology acts like a binding element between their parameters and helps at creating better education for more performant enterprises from economic and social point of views. Besides the actual technology aid to

the structure and flows within the activity [4], universities give technology a boom due to immense amount of research.

In this matter, this paper presents the first steps of modelling an environment that borrows elements from university education, adult training and enterprise environments and the way it is influenced by the advances in technology, in a way that the literature refers to it as smart characteristic that forms smart universities, smart enterprises and, finally, smart education.

This model is created using a method known as System Dynamics, widely known for their capability to reflect the real character of an environment in a structured way using concepts such as flows, stocks and cause-effect feedback.

Practically, the paper will contain a short description of the method and the particular characters of its appliance for the issue. Then, we will start to apply it to our particular case and complete the first part of the method

consisting in the conceptualization of the model.

## MATERIALS AND METHODS

The main three notions presented in the introduction are linked together so that changes in the economic and social space regarding one of them influences the others in different manners. The technology adds a greater degree of difficulty to the determination of the influence of the parameters on the market. Thus, we can consider them subsystems of a bigger more complex system. In this way, their behaviour can be modelled using various existing methods, one of them being known as based on the dynamic characteristic of a system.

System dynamics method is widely used in order to model a great range of systems, from theoretical issues, such as the behaviour of a spring in a period of time, to particular problems as the evolution of a contagious disease within a population or the dynamics of economic parameters within an enterprise. The unlimited and usual cases that can be modelled comprise management issues [2], environment cases [5] and economy optimization problems [8]. Starting from a particular situation, the method permits the users to obtain a graphical representation of the origin system of the problem. Usually, the final result is a diagram containing the parameters taken into account and the way that influence each other. Thus, the result is either a stock-and-flow diagram or a causal-loop diagram.

The method consists in going through several parts. The first one of them and also the most important is the conceptualization. The correct representation of the system in this point is crucial for the best approximation of the system behaviour.

Conceptualization has four main steps [1]:

-The definition of the modelling purpose, which means actually setting the objective of the modelling process. Defining the purpose let the modeler to focus on the final results and to obtain a valid usable diagram.

-The determination of the model boundary and the key variables, which consists in the

setup of a context and the choose of the components that form the model.

-Drawing the behaviour of the variables presented above. This step requires gathering historical data about the components selected in the previous step or a trial of their description is data is not available.

-Finally, the modeler creates the mechanisms and the feedback loops, which is the final step of the conceptualization part.

The other three parts of building a model using system dynamics method are the formulation of the model, the testing and the implementation. While the formulation helps at converting diagrams to level and rate equations and testing does the validation part, the implementation applies the model to different policies and convert the results into readable data.

Regarding our particular case, the final result would consist in finding the influence of the technology on the three components described in the introduction. The purpose of the model building is to determine the degree of positive influence on the education and enterprise environment.

## RESULTS AND DISCUSSIONS

### The purpose of the model

Basically, the purpose of the model can be established in this form:

The purpose of the model is to determine to what extend technology helps at creating smart education in universities and training centres and smart performance in enterprises. Having determined the objective of our research, we will go further to the next step.

### The boundary and key variables

We will select the boundaries and the key variables based on some principles:

- the components must be necessary
- the similar components must be aggregated
- the components must be directional.

Also, we will split the list in two categories: endogenous and exogenous parameters.

In our case, the parameters considered for our model, as well as their classification, is presented in Table 1.

Table 1. The key parameters considered for building the model

Parameter	Type [Stock/Flow]	Exogenous	Endogenous
Number of students	S	x	
Rate of enrolling	F	x	
Student level of education	F	x	
Potential students	S	x	
University research in technology	F		x
Number of training companies	S		x
Number of trainees	S	x	
Rate of register	F		x
Funds for training	S		x
Training cost	F		x
Training quality	F		x
Potential trainers	S		x
Profit investment rate	F	x	
Employer potential income	F		x
Employment rate	F		x
Technology investment	F	x	
Employer education level	F	x	
Potential employers	S		x
Number of enterprises	S		x
Potential entrepreneurs	S		x
Technology costs	F	x	
Available technology	S		x
Technology growth	F		x
Technology embodiment	F	x	
Graduation rate	F		x

Source: Own conception.

### Reference modes

This step requires the plot of the system variables enunciated in the previous step over time. The major challenge of this step is the determination of this time of measurement, which may be relevant or irrelevant to the given issue and which may influence the analysis. For our case, the time taken into consideration is 5 years.

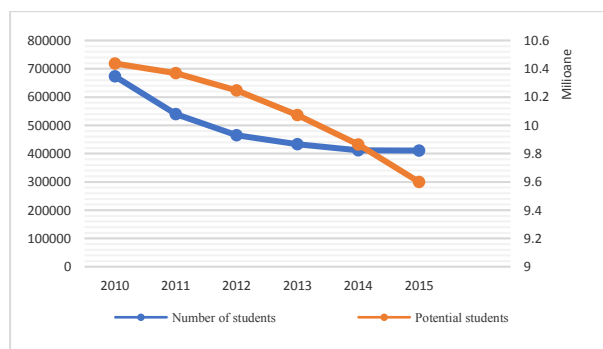


Fig. 1. University indicators

Source: NIS, Romania (<http://statistici.insse.ro>)

Other challenges refer to the historical or hypothetical character of the series of data

referring to variables. If data is known for a variable, it may be helpful in further steps of the method.

The variables grouped in components are shown in the figures presented in this paper.

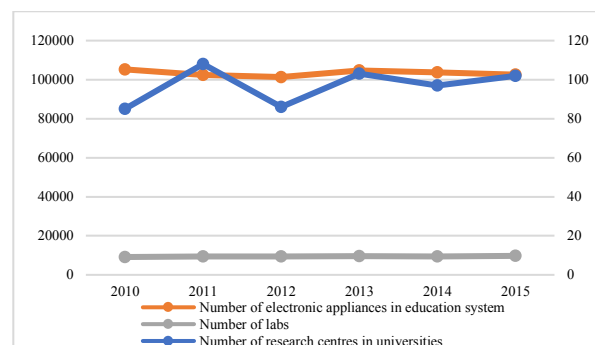


Fig.2. Technology research

Source: NIS, Romania (<http://statistici.insse.ro>)

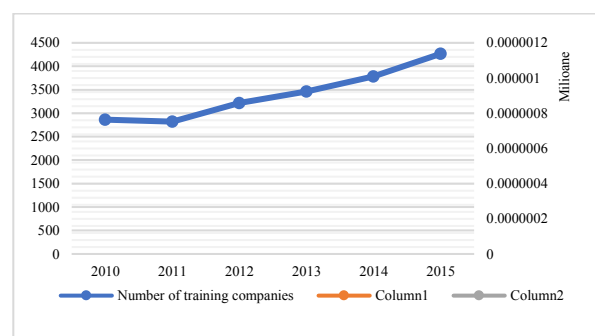


Fig. 3. Training indicators

Source: NIS, Romania (<http://statistici.insse.ro>)

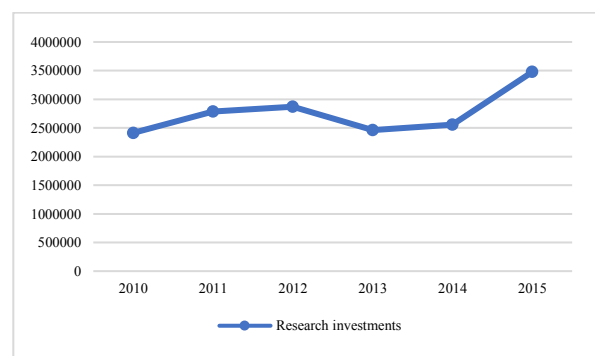


Fig. 4. Research investments

Source: NIS, Romania (<http://statistici.insse.ro>)

### Building the mechanisms and feedback loops

Given the data above, we have created the scheme presented in Figure 5, which presents the relations between the variables taken into consideration. The scheme is a proposition that can be updated by modelling it after the exact situation given in reality. The scheme was obtained using a free version of Vensim Software.

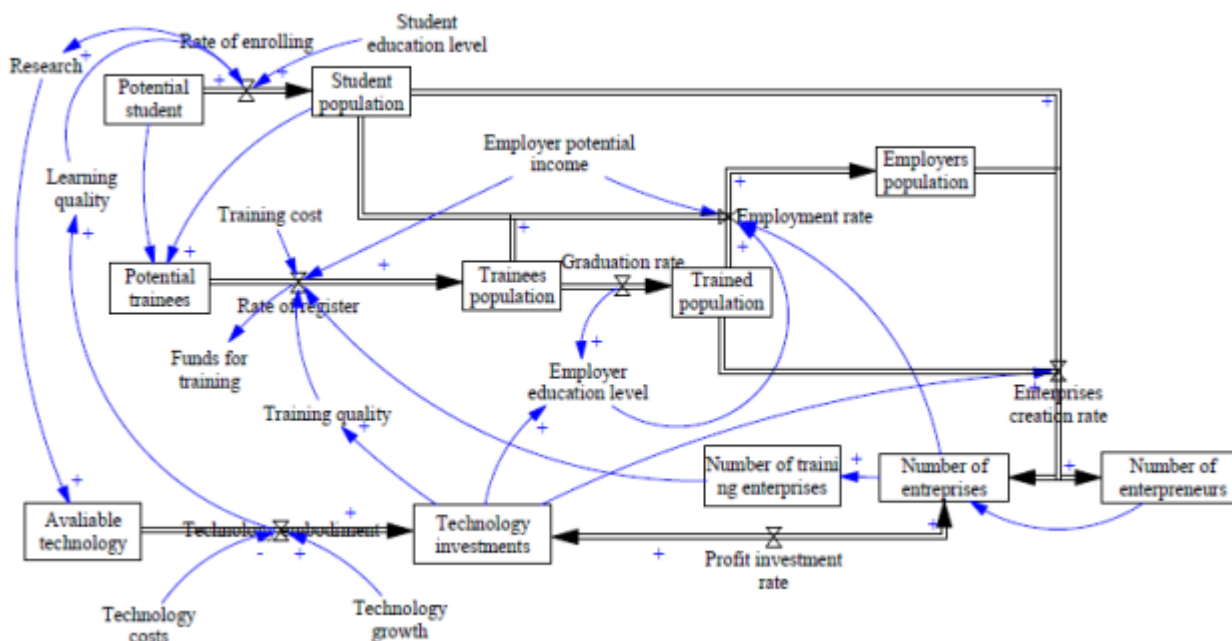


Fig. 5. Proposed diagram for the given issue  
 Source: Own design.

## CONCLUSIONS

The given model is a basis support for a future development of a system dynamic complete analysis of the stated issue. This can be used for further research in order to observe the system behaviour and to use the results for further development. A future work would refer to the completion of the system dynamic development and the description of an actual implementation of technology in the three main components: education, training and enterprise.

## REFERENCES

[1]Albin, S., 1997, Building a System Dynamics Model. Part 1: Conceptualization. Prepared for the MIT System Dynamics in Education Project Under the Supervision of Dr. Jay W. Forrester.  
 [2] Morecroft, J. D. W., 2018, Management Attitudes, Learning and Scale in Successful Diversification: A Dynamic and Behavioural Resource System View. System Dynamics pp 69-106.  
 [3]Necula, R., Necula, D., 2011, Innovation in agriculture-use of computer systems. Agricultural Management Series I, Vol. 13, Number 1.  
 [4]Popescu, D. A., Nicolae D., 2013, Generating a class schedule with a reduced number of constraints. The International Scientific Conference eLearning and Software for Education. Vol. 2, pp. 297.  
 [5] Saavedra, M. R. M., de Fontes, C. H. O., Freires, F. G. M., 2018, Sustainable and renewable energy supply

chain: A system dynamics overview. Renewable and Sustainable Energy Reviews, Volume 82, Part 1, February 2018, pp. 247-259.

[6] Stoian, E., Dinu, T. A., Mituko-Vlad, I., 2015. The Quality of the Educational Programs in Romania. A Case Study of Masters Degree in Agriculture. Agriculture and Agricultural Science Procedia, Vol. 6, pp. 696-703.  
 [7]Tița, V., Necula, R., 2015, Trends In Educational Training For Agriculture In Olt County. Scientific Papers Series-Management, Economic Engineering In Agriculture And Rural Development, Vol. 15, Issue 4, pp. 357-364.  
 [8]Wang, D., Nie, R., Long, R., Shi, R., Zhao Y., 2018, Scenario prediction of China's coal production capacity based on system dynamics model. Resources, Conservation and Recycling, Volume 129, pp. 432-442. February 2018.

## A STUDY ON AGRITOURISM SERVICES IN ROMANIA

Ioana-Alexandra TOADER, Dorina MOCUTA

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd,  
District 1, Bucharest, Romania, Emails: toader.i.alexandra@gmail.com,  
dorinamocuta@yahoo.com

*Corresponding author:* dorinamocuta@yahoo.com

### *Abstract*

*In the contemporary world economy, services have a distinct role, being a true driver of sustainable development. And in the field of tourism, as in other economic sectors, the quality of services is increasingly emphasized as a defining element for revenue generation. Over time, tourism has been on the rise, becoming according to the World Tourism Organization (UNWTO) "one of the fastest-growing sectors in the world". Tourism in Romania is based on a very generous tourist potential. The patrimony elements, which can attract many Romanian and foreign tourists if properly utilized and promoted, start from the diversity of landscape and continue with the troubled history of the Romanian people, highlighted in numerous material and spiritual testimonies. Thus, one of the forms of tourism that is often promoted in our country is agritourism. In this context, the quality of services in agritourism has special valences, which determine the attractiveness for this sector. In conclusion, in order to be accurately assessed, this type of services requires a combination of social and economic elements.*

**Key words:** agritourism, quality of service, income growth, sustainable development

### INTRODUCTION

In today's society, the quality and importance of services in all economic branches is increasingly emphasized. Reality has shown that services can systematically contribute to the development and prosperity of a country, with a significant share of GDP.

Due to the heterogeneity of services, finding an exact definition of the concept is impossible. Most definitions set out one or more service features, emphasizing both the differentiation of tangible products and the fact that they do not materialize in a product with its own existence. Other statements highlight the utilities, advantages or rewards they produce, or the changes they can make to goods, people or social relationships.

The explanatory dictionary of the Romanian language proposes the following definition: "services are considered to be a sector of the national economy in which a useful activity is carried out to meet certain social needs without necessarily materializing in goods or goods" [3].

Kotler and Armstrong's opinion [6] is that "services are activities or benefits provided in immaterial form by a supplier or a

beneficiary, without transferring the ownership rights to the purchaser.

Services are usually linked to material goods, although this is not a mandatory condition" [2]. The emphasis on the main characteristic features of services is important for their identification and delimitation with respect to other structures of economic and social activity.

First of all, services are characterized by immateriality and intangibility. The immaterial aspect of the service makes its assessment difficult and often subjective. Unlike a material good that exists in itself, the service is generally impassable, intangible, cannot be seen, tried. This makes its assessment difficult and, most of the time, subjective. Without a material form, services cannot be stored and kept for future consumption. Although the main difference between goods and services is intangible property, making a distinction between a good and a service is difficult to achieve. This is because "purchasing a product is often accompanied by certain support services (such as installations) and purchasing a service often includes assistive goods (e.g. food in a restaurant). Any acquisition involves material



goods and services in various proportions" [7].

The importance of services is spoken in all economic sectors, but more importantly than anywhere, it is reminded of their quality in tourism. "Tourism is a branch of the national economy with complex functions that brings together a set of goods and services offered for consumption to people who travel outside their usual environment for less than a year and whose main reason is other than the exercise of a activities paid within the visited site" [11].

Today, the volume of tourism business is equal to or even exceeds that of oil, food or car exports, according to UNWTO [13]. Tourism provides one of the main sources of income for many developing countries, bringing them hope and prosperity. The development of this economic sector is accompanied by a continuous diversification of services and competition growing between destinations.

According to global statistics, tourism in rural areas has gained more and more followers in today's society. Although in our country agritourism has developed especially in recent years, it is not a new phenomenon in the countries of the European Union. Vacations in the countryside are more and more preferred, making it profitable both for tourists and for farmers.

Analysed by the fact that it is a component of tourism, agritourism represents an economic activity, a means of increasing incomes and the quality of life of the inhabitants of the area where it is practiced, of preserving the geographic space and its values.

The objectives of this study derive from the need to analyze agritourism services as a mean for development of this economic sector and agritourism evolution over the last years in our country.

## MATERIALS AND METHODS

Among the many definitions that have been attributed to agritourism, the following is of particular relevance: "a form of tourism practiced in rural areas, based on the provision of accommodation, meals,

recreation and other services within the household, thus making the most of the resources natural and anthropogenic aspects of the area and contributing to raising the living standards of the rural population" [12]. According to the Wikipedia site, "agritourism is able to capitalize the existing accommodation surplus in the peasant household by involving the tourists in the life of the household and their provision of services and activities (mass, accommodation, interaction with the socio-natural environment), which are the peasant's household, without its specificity. Rural tourism embraces all the tourism activities carried out in the rural area with the aim of capitalizing on the natural and human potential of the village" [1].

Thus, we are talking about a main component, the actual tourist activity, which implies basic services: accommodation, meals, recreation, but also a secondary component of economic nature. This is focused on the production and processing of agro-food products in their own household and selling them further to visitors. By their specificity, tourism services imply the creation of a framework for spending leisure time in nature, contributing to ensuring active rest. "They must be designed in such a way that, as a result of their consumption, the tourist acquires more information, knowledge, even new skills" [8].

In order to meet the interest of all those involved in rural tourism, the European Federation of Rural Tourism, EuroGite approved in 2005 the European quality criteria common to rural tourism. These standards have been approved by the 24 EuroGites member countries, being developed on the basis of a common quality agreement. "Standards contain those aspects that are present in the quality schemes of all EuroGites. The criteria are grouped into five categories:

- Equipment
- Surroundings
- Accommodation and surroundings
- Intangible aspects such as personal attention, intimacy, or ambient
- Security" [4].

All these aspects have been established on the basis of the results of a survey conducted among international clients on the quality of tourism and the purpose of discovering the needs of tourists.

The survey, conducted within the project QUALITOOL (“Transfer of Quality Insurance Tools for European Rural Tourism Sector”, 2008-1-LV-LEO05-00125) [5] was repeated in 2009-2010, with 3,487 people surveyed in 55 countries.

The survey found that the average respondent is about 37 years of age, has a vocational or higher education and earns average income. This allows him to take his vacation three times a year, with stays of 3 to 10 days. All respondents' answers were analysed according with two main components: age and nationality. Six age groups (under 20, 21-30, 31-40, 41-50, 51-65, over 65) were established, respondents being asked to score from 1 to 5 for each factor analyzed.

## RESULTS AND DISCUSSIONS

Analyzing the answers provided by those surveyed, we can observe a number of important issues related to agritourism services. To the question “What is important to you during your stay?” the preferences differ clearly depending on age groups. (Fig. 1).

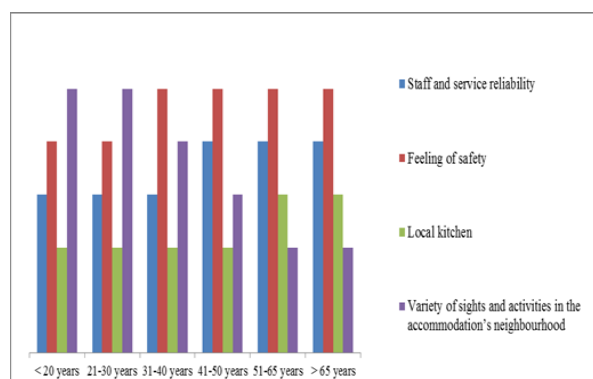


Fig. 1. Top preferences identified during the stay analyzed by age groups  
 Source: Processed based on the data provided by EuroGites [4]

If for the youngest population the most important is the diversity of the fun activities offered by the guesthouse or proximity, for

the elderly one the feeling of safety takes precedence. The Figure 1 shows a comparison of 4 of the most important issues identified in the question above.

The preference for these types of services highlights how important it is to ensure a pleasant and safe climate during the stay, which can only be achieved through diversified and high quality services. Considerations such as the authenticity of rural life and traditions, local hospitality, and the opportunity to buy local products should be also considered. And for a vacation to be successful, it is important that when tourists arrive at the guesthouse, their first impression to be favourable. Based on the survey responses, the most important aspect of boarding appeared to be the friendly and warm attitude of the owners and staff. Nevertheless, the majority of the respondents appreciated as critically important that the information described on the guesthouse website or in any other means of promotion matches the reality. This emphasizes how important it is for agritourism to have real, adequate, realistic and reliable information about accommodation. The quality of the furniture is the third important factor, and the fourth place in the preferences of the interviewed persons is the view from the room's window (Fig. 2).

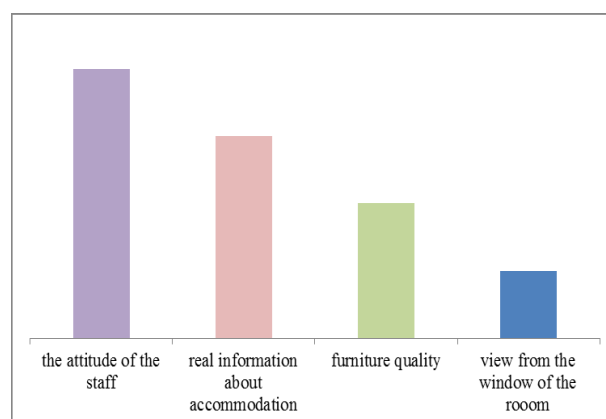


Fig. 2. Top preferences on arrival at the guesthouse  
 Source: Processed based on the data provided by EuroGites [4]

To the question “What is important when planning a vacation?” the respondents had to note different factors according to their preferences. It is interesting that for all age

groups, nature and the environment is the most important factor in choosing a holiday, in while internet connection is it on the last place. The explanation derives from the wishes and motivations of tourists who feel the need to escape from the usual space, to recover both physically and mentally, to try and to know new activities. At the same time,

the location and services offered must positively mark the memory of the tourist so that he returns to the guesthouse and share the experience of friends and acquaintances. Table 1 shows a ranking of five preferred answers by the respondents in the question above.

Table 1. Top 5 decisive factors for holiday

Top preferences	Age					
	<20	21-30	31-40	41-50	51-65	>65
1	Attractive nature or landscapes					
2	Complete and reliable information on the accommodation	Price	Complete and reliable information on the accommodation		Good location	
3	Price	Complete and reliable information on the accommodation	Price		Quiet and peaceful setting	
4	Easy and secure booking		Quiet and peaceful setting		Complete and reliable information on the accommodation	
5	Good location	Recommendations by friends	Easy and secure booking		Price	Comfort of the accommodation

Source: EuroGites. [4]

This classification shows that similar priorities can be observed for age groups 31-40 and 41-50, as well as 51-65 years and over 65 years. The responses of the youngest age group highlight different priorities from other age groups.

It is obvious that the choice of a tourist destination is not easy at all, which is influenced by a number of factors related to age, education, expectations, budget, but also to the existence of a varied offer of accommodation possibilities.

In our country, the number of agritourist guesthouses has steadily increased, reaching 2,556 units in 2017.

According to the National Institute of Statistics, agritouristic guesthouses are reception accommodation structures with a capacity of up to 8 rooms, “operating in the dwellings of citizens or in independent buildings, which provide in specially arranged spaces the accommodation of tourists and the conditions for preparing and serving meal, as well as the possibility of taking part in the household or crafts activity” [9].

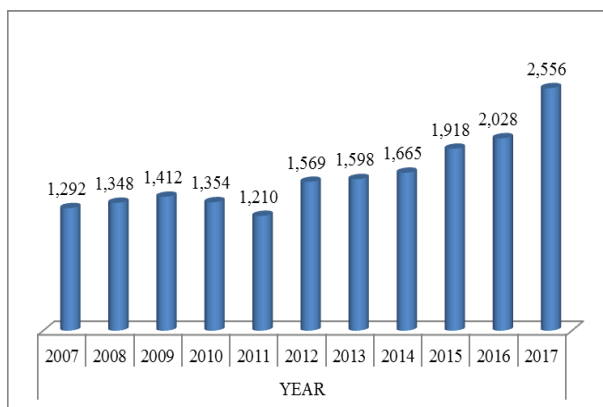


Fig. 3. Evolution of the number of agritourism guesthouses in Romania from 2007 to 2017

Source: Processed based on the data provided by INSSE

In Figure 1, it is noted that the number of agritourist guesthouses has changed in the ascending order each year, registering a 97.8% increase in 2017 compared to 2007. Interesting is also the evolution of the number of agritourist guesthouse in terms of comfort offered (Fig. 4).

According to Order of Ministry of Tourism No. 1296 from 2010 for the approval of the Methodological Norms regarding the

classification of the tourist accommodation structures, "the tourist accommodation structures are classified on stars and respectively on flowers in the case of agritouristic guesthouses depending on the constructive characteristics, the facilities and the quality of the services offer [10, 12]. The classification of the tourist reception facilities has as a priority the protection of the tourists, being a codified form of a synthetic presentation of the level of comfort and the offer of services".

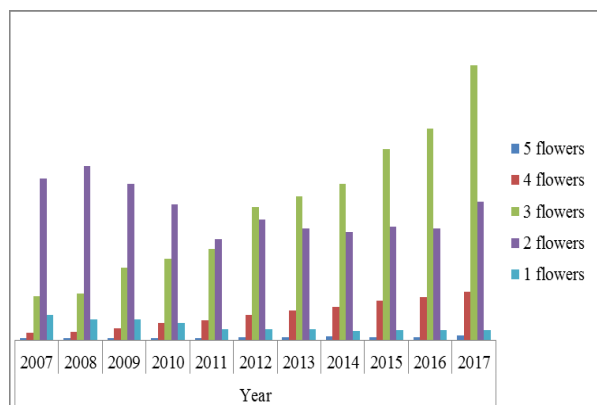


Fig. 4. Evolution of the number of agritourist guesthouses in Romania, 2007-2017

Source: Processed data provided by INSSE

The Fig.4 highlights the fact that investments in this sector, as well as improving the quality of services offered to tourists, led to a 518% increase of guesthouses classified with 3 flowers in 2017 compared to 2007 and 537% of guesthouses classified with 4 flowers. Although the number of the units classified with 5 flowers is low (about 26 units in 2017) they recorded a 160% increase in the analyzed range.

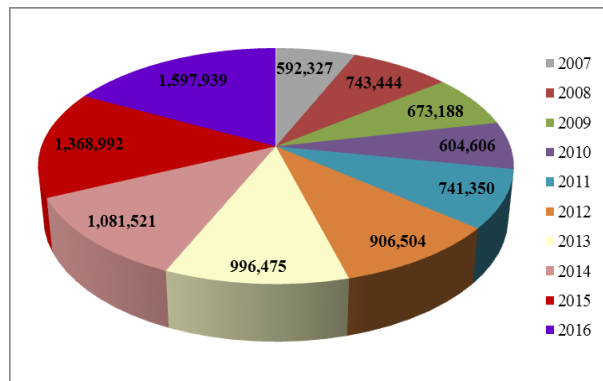


Fig. 5. Number of overnights in agritourist guesthouses in the period 2006-2016

Source: Processed based on the data provided by INSSE

There is also an increase in the tourists' interest for agritourism, leading to a 170% increase in the number of visitors who overnight in agritourism guesthouses in 2016 compared to 2007.

According to the National Institute of Statistics, the "tourist overnight stay is the 24-hour period, starting with the hotel hour, for which a person is registered in the tourist accommodation space and benefits from the accommodation for the occupied space, even if the actual stay is inferior to that range. It is also envisaged the overnight stays of extra beds (paid by customers)".

Although the number of tourists who preferred agritourism has increased steadily, the accommodation capacity of the guesthouses has been used at a low percentage, the accommodation capacity reaching 15.5% in 2016, with a maximum of 18.4% in 2008 (Fig. 6).

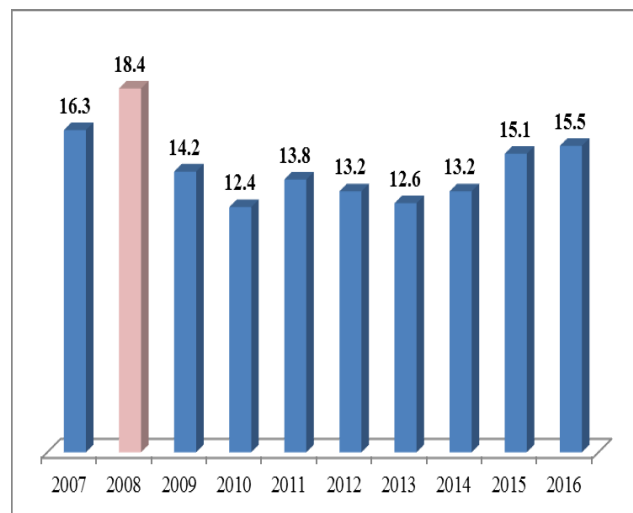


Fig. 6. Index of the use of tourist accommodation capacity in agritourism guesthouses

Source: Processed based on the data provided by INSSE

The usage index of the tourist accommodation capacity in operation is calculated by reporting the number of overnight stays made to the tourist accommodation capacity in operation during the respective period"[9]. These data highlight once again the need to align the standards offered by the agritourism providers in Romania with those offered by the EU providers. A sustained effort is needed

both by state authorities and agritourism providers. All investments must be made on the basis of feasible economic analyzes designed to delimit correctly the needs of each area. Tourism support in the rural areas and agritourism, was made somewhat chaotic, under SAPARD program, and thus, while busy tourist areas such as Moeciu appeared, some have lost their glamor, and in others, guesthouses were opened without potential clients, namely, the investments were made without economic dimension. In order to be able to meet the requirements of the market, each agritourist reception structure must offer a guarantee of quality, issue that every tourist is looking [5].

The index of using the accommodation capacity by categories of comfort (Fig. 7) highlights the preferences of the tourists for the guesthouses of 5 and 4 flowers, which strengthens the ones expressed above. Therefore, agro-tourism services management implies a long-term strategy that leads to a continuous improvement of the quality of rural tourism products and services coupled with the ability of the owners to meet and exceed the needs of tourists, facilitating the increase of labour productivity and profit.

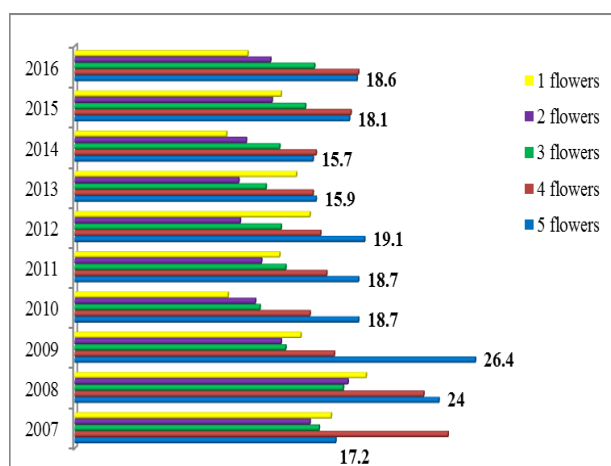


Fig. 7. Index of using agritourist accommodation capacity by categories of comfort  
 Source: Processed based on the data provided by INSSE

We can speak of a high quality agritouristic package only to the extent that both the product and the tourist service fully satisfy the needs and expectations of consumers, and it is imperative that they become aware of these.

Thus, in conceiving packages of high quality agritourism services, two fundamental elements must be taken into account:

- products and services offering to meet the needs of tourists so that they can return or recommend their destination to other people;
- involving the local community in managing the destination.

## CONCLUSIONS

When talking about services, we need to consider the interdependence created between the service provider and the beneficiary. The quality of the outcome depends on both the provider and the consumer. However, the experience of the products and services provider and their offering are often guarantees of performance.

To talk about the performance in agritourism in Romania requires a much more dynamic involvement of all actors involved in this field. Although the nature and landscape is a priority for tourists, it is especially important for them to feel safe throughout their stay, to receive accurate and real information about the offer, to be kindly treated by the staff of the guesthouses, to enjoy the products prepared at the farm from local ingredients and, last but not least, to choose from a multitude of activities offered for recreation and relaxation.

In order to be properly assessed, agritourism services require a combination of social and economic elements. That is why the agritourism offer should not be focused on quantity, but on the degree of tourist satisfaction. Therefore, it is necessary to continuously diversify the offer, to constantly study potential clients, to analyze them according to typologies, preferences and expectations.

Starting from the experience of European countries in agritourism, it is necessary to broaden the range of tourist activities provided in the native rural environment through a series of services adjacent to the accommodation activity consisting of:

- products offering from local gastronomy
- recreation and relaxation activities specific to the village areas

- dedicated activities for children
- traditional transportation
- pilgrimages to consecrated places of worship
- highlighting craft activities.

Concluding, the EuroGite Tourism Federation emphasizes that “there is only one way to experience the real Romania: stay in our farms, at our homes, in the villages with the most varied landscapes you can imagine”.

## REFERENCES

- [1]Agriturismo, Wikipedia,  
<http://ro.wikipedia.org/wiki/Agriturismo>, Retrieved  
January 4, 2018
- [2]Cristureanu C., 1999. The Economics of Immaterial:  
International Transactions with Services, All Beck  
Publishing House, Bucharest
- [3]DEX, 1989. Scientific Publishing House, Bucharest,  
949
- [4]EuroGite, <http://www.eurogites.org>, Retrieved  
January 4, 2018.
- [5]Iova A. R., Năstase M., Lascăr E., 2016,  
Development of rural tourism and agritourism in  
Romania by implementing European programs,  
Scientific Papers Series Management, Economic  
Engineering in Agriculture and Rural Development,  
Vol. 16, Issue 1, 234.
- [6]Kotler, P., Armstrong, G., 1995, Marketing financial  
services, Butterworth Heinemann Publishing House, 32
- [7]Militaru, G., 2010, Service Management, C.H. Beck  
Publishing House, Bucharest, pp.7.
- [8]Minciu, R., 2001, Tourism economy, Uranus  
Publishing House, Bucharest, 215-216.
- [9]National Institute of Statistics.<http://www.insse.ro>,  
Retrieved January 4, 2018.
- [10]Order no.1296, Ministry of Tourism, 15 April  
2010.
- [11] Ordinance no.58, Ministry of Tourism, 21 August  
1998.
- [12]Stanciulescu, G., Lupu, N., Țigu, G., Țitan, E.,  
Stancioiu F., 2002. Lexicon of tourist terms, Oscar  
Print Publishing House, Bucharest, 14-15.
- [13]UNWTO, <http://www2.unwto.org/content/why-tourism>,  
Retrieved January 4, 2018





## AGRICULTURAL POLICY OPTIONS TO BOOST THE PRODUCER SURPLUS: THAILAND'S NATURAL RUBBER MARKET EQUILIBRIUM

Özlem TURAN, Serkan GURLUK, Abdulhakim MADIYOH

University of Uludag, Faculty of Agriculture, Department of Agriculture Economics Nilufer, Bursa, Turkey. Emails: ozturan@uludag.edu.tr, serkan.gurluk@gmail.com, chul987@gmail.com

**Corresponding author:** serkan.gurluk@gmail.com

### **Abstract**

*For Thai farmers natural rubber is a significant product and an economic crop. It has also some social benefits of rubber cultivation in this country. Yet, rubber producers of Thailand have not been receiving intended revenues in spite of expanding planted areas and increasing production. Current paper focuses on Thailand's natural rubber market equilibrium which is influenced by global and local impacts. The paper uses two-stage least squares methodology in order to estimate demand and supply response of Thailand. Input costs, planted area, agricultural credit amount dedicated to agriculture, palm oil prices are explanatory variables of supply. Indonesia production, per capita income of the world, car production of the world, exchange rate and rubber production of Indonesia are explanatory variables of demand. Rubber price is endogenous variable while resuming variables are exogenous. The econometric analysis will present opportunities to understand how to increase the producer surplus by simulating abovementioned variables. Producer's surplus is calculated 10,719,174,750 USD/Year in the equilibrium conditions. When financial supports are increased, it caused about 9.5 percent decreases in producer's surplus. The impacts of bilateral agreements was simulated with 10% and the 5% decreases of production amount. There was almost no difference on producer's surplus in case of a production decrease of 5% or 10%.*

**Key words:** rubber, Thailand, two-stage least squares approach, market equilibrium

### **INTRODUCTION**

World's rubber consumption is primarily concentrated in China, European Union, India, and the USA. Those countries' consumption is over one million tons annually. Those countries are accepted top four countries of natural rubber consumption in the last years. Yet, there are only two countries which are respectful of the world's production with the share of 60 percent: Thailand and Indonesia. Although current study focuses on Thailand producers, simulations concern producer-countries.

Thailand, with 47 percent of rural population, is an agricultural country, and the rubber is important export production with the contribution to gross agricultural value of the country [4]. Yet, Thai producers' surplus has fluctuations due to changing world price that are tending to decline. The main aims of this study are to develop a demand and supply model to predict the world natural rubber prices, to make simulations to increase Thai producer's surplus and to suggest policy

recommendations to policy-makers. In addition, two important hypotheses are analyzed at the paper. One of them is to investigate whether financial resources transferred to agriculture of Thailand have impacts on increasing producer surplus and it is analyzed changes in price and producer surplus in the case of two major producer countries reducing rubber processing. The results give insights to producer countries at the region such as Thailand, Indonesia, Vietnam, and Malaysia.

Several researches were carried out on rubber supply-demand model. Jaitung [7] studied the rubber demand of Thailand by using "natural rubber price, oil price, exchange rate, nominal effective exchange rate, GDP of China, U.S. and Japan" as factors. The GDP of China may have on rubber demand. Yet, the China use the rubber for all the world. Therefore current study considers per capita GDP of the world instead of the GDP of China. In addition, we think that oil prices and rubber supply-demand are uncorrelated because oil prices are influenced by many exogenous factors. In



some studies labor factors and planted areas variables were used in the econometric analysis. These results shows that land area used in rubber production and the price of rubber affects the supply of rubber. Also the land area used in rubber production is affected by rubber price and labor factors. These analysis show that prices have an effect on the rubber supply [3;8]. The results of these studies can be used as a model in supply trends that affects prices globally. Therefore we used the input costs including labor factors by looking at micro-level studies. Input costs were obtained by [11] by dividing planted area at related year. Some studies stated the important of substitution of the rubber production [2] while some studies emphasizes the importance of supply-demand equilibrium rather than individual estimations [10]. Current study considers all suggestions at the literature, and put some new variables such as financial resource to agriculture sector and local input costs, and investigates producer's surplus in order to understand policy implementations.

**MATERIALS AND METHODS**

The paper considers many demand and supply variables depending on microeconomic theory with macroeconomic data. Factors affecting the rubber demand are considered as rubber price (USD/tonnes), per capita GDP of the world (USD), car production of the world (number), Indonesia's rubber production amount and exchange rate (USD/Baht). Factors affecting the rubber supply are also considered as rubber price (USD/tonnes), input costs coming from five production regions of Thailand (USD/Ha), planted area (Ha), financial support to agriculture sector (USD/year), palm oil price (USD/tonnes). Rubber price is endogenous variable while resuming variables are exogenous. In this study, the two-stage least squares method is used for solving the demand and supply equations [1]. We jointly determined the one or more explanatory variable with dependent variable in order to carry out the simultaneous equation model. Therefore the simultaneously determined variables had an equilibrium

equation. According to theory, such variables can be explained when the model is in equilibrium [12]. At this study, reduced form equations are employed to jointly determine the price. Reduced form equations are as following:

$$Q_t = \pi_{11} + \pi_{21} Pin_t + \pi_{31} ar_t + \pi_{41} r_t + \pi_{51} Ps_t + \pi_{61} pci_t + \pi_{71} cpw_t + \pi_{81} indpr_t + \pi_{91} excr_t + v_{t1} \tag{1}$$

$$P_t = \pi_{12} + \pi_{22} Pin_t + \pi_{32} ar_t + \pi_{42} r_t + \pi_{52} Ps_t + \pi_{62} pci_t + \pi_{72} cpw_t + \pi_{82} indpr_t + \pi_{92} excr_t + v_{t2} \tag{2}$$

At the first stage, these equations are estimated by least squares since the right-hand-side variables are exogenous and uncorrelated with the random errors  $v_{t1}$  and  $v_{t2}$  [6]. The reduced form equations were used to obtain  $p_t$  (estimated  $P_t$ ,  $P_{est}$ ) which will be used in place of  $P_t$  on the right hand side of the supply and demand equations in the second stage of two-stage least squares [9]. In the second stage, the structural models are estimated separately by using the estimated rubber price variable ( $P_{est}$ ). The structural models are as follows:

Supply equation:

$$Q_{ts} = \alpha + \beta_1 Pin_t + \beta_2 ar_t + \beta_3 r_t + \beta_4 Ps_t + \beta_5 P_{est} \tag{3}$$

Demand equation:

$$Q_{td} = \alpha + \beta_1 pci_t + \beta_2 cpw_t + \beta_3 indpr_t + \beta_4 excr_t + \beta_5 P_{est} \tag{4}$$

$$Q_{ts} = Q_{td} \tag{5}$$

**RESULTS AND DISCUSSIONS**

The estimated supply and demand curve results are in Table 1 and 2, respectively. Note that the coefficient of price is positive in supply estimation, and negative in demand estimation. These values indicate that as the market price rises the quantity demanded of rubber declines as predicted by the law of demand. One may state the reverse for supply. Financial support to agriculture and cultivated rubber area has positive impacts on rubber supply while palm oil price has negative impact. Increases in the price of substitutes for rubber decreases the supply for rubber.

The standard errors that are reported are obtained from 2SLS estimation. They and *t*-values are valid in large samples, and indicate that the estimated slope of the supply and demand curves are significantly different from zero.

Table 1. 2SLS Estimations for Rubber Supply

Variable	Estimate	Std. Error	<i>t</i> -value
Constant	2,474,234	289,033.1	8.560
$Pin_t$	-4,446.56	441.88	-10.063
$ar_t$	0,255	0.168	1.518
$r_t$	0.000136	0.000	3.865
$Ps_t$	-413.72	299.95	-1.379
<i>Pest</i>	366.53	38.35	9,557

$Pin_t$ : Input cost per hectares (USD)

$ar_t$ : Cultivated rubber area (Ha)

$r_t$ : Financial support to agriculture

$Ps_t$ : Palm oil price (USD/Tonnes)

*Pest*: Estimated price (USD)

Source: Own results.

Table 2. 2SLS Estimations for Rubber Demand

Variable	Estimate	Std. Error	<i>t</i> -value
Constant	1,335,559	172,957.1	-7.722
$pci_t$	695.28	92.176	7.543
$cpw_t$	0.031	0.009	3.444
$indpr_t$	0.039	0.265	0.147
$excr_t$	10,348.53	8,081.572	1.281
<i>Pest</i>	-625.828	146.42	-4.274

$pci_t$ : Per capita income of the world (USD)

$cpw_t$ : Car production of the world (number)

(USD/Year)  $indpr_t$ : Indonesia rubber production

$excr_t$ : Exchange rate (Baht/USD)

*Pest*: Estimated price (USD)

Source: Own results.

Calculations of the producer's surplus of the supply-demand equilibrium model are possible after finding solution in balance, and therefore it may be attempted to make many simulations. First of all, we give the producer's surplus at the equilibrium. Commonly estimated price variable is employed to find supply and demand equations including related variables. Therefore these two equations can be confronted in the same analytical plane. After calculating the price at the equilibrium, it is calculated the volume of transaction in order to find the producer's surplus. We consider ten-years-average of all variables apart from

*Pest* variable while using supply and demand equations. According to estimated equilibrium price is 7,046 USD while the amount of volume is 3,493,864 tones. Therefore producer's surplus is calculated 10,719,174,750 USD/Year in the equilibrium conditions (Table 3.).

Financial supports supplied to agriculture may not always be an enhancement of agricultural productivity [5]. It is very important to generate effective policies including well defined target groups. In addition to find right policies and target population, finding a policy that is purified of political influence on the world is desired. Consequently, every policy put into practice has a political cost. In this study, the financial support variable was found statistically significant. However, interestingly, this variable does not positively affect the rubber manufacturer. Because the sign of the variable is negative. This can be explained in various ways. Firstly, an agriculture policy support diverged from the efficiency may be on the agenda. On the other hand, resources transferred to agriculture provide more benefits to other agricultural production varieties. Finally, it is observed that subsidies to agriculture contribute to the consumer surplus; or this subsidies increase analytically deadweight losses. We can infer from the results that a 10% increase in the financial support caused a 9.5% decrease in the producer surplus (Table 3).

The impact of changes in the price of palm oil variable is remarkable. Rubber supply and palm oil price have a negative relationship meaning that when the price of palm oil decreases, the quantity of rubber produced increases. It reflects the importance of producers to switch to an alternative crop.

If bilateral agreements in the field of agriculture have a disruptive effect on world trade, international competition is not welcomed by regulatory agencies. However, the advantages supplied to establisher countries (the first 12 countries) of the European are indisputable facts since the 1950s. Therefore investigation of the impacts of possible bilateral agreements between Thailand and Indonesia countries would be remarkable. We used the model in a

simulation where Thailand and Indonesia reduced their rubber production capacity by 5 percent and ten percent in order to see their effects on producer surplus.

We observed that the producer's surplus are not being increased by further reducing production. In other words, in preference between 5% and 10% reduction in production capacity there is a favored advantage in reducing 5% of production. We can infer from this simulation that decreasing the output capacity may affect other parameters and adversely affect the producer's surplus. Using such policies continuously and increasingly can cause economic losses to Thai rubber producer sector.

Table 3. Simulations results of changing producer's surplus

Simulations	USD/Year	Change to equilibrium PS (%)
Increase of agricultural support (%10)	9,785,036,845	-9.5
Bilateral agreement (%10 decrease of production)	15,447,034,620	30.6
Bilateral agreement (%5 decrease of production)	15,656,508,360	31.5
Equilibrium PS	10,719,174,750	

Source: Own results.

## CONCLUSIONS

Current study seeks demand and supply models to predict equilibrium in amount and price on rubber market by using Thailand-sided data from 1980 to 2016. Its methodology depends on two-stage least square technique and simultaneous equations. The paper uses two-stage least squares methodology in order to estimate demand and supply response of Thailand. Input costs, planted area, agricultural credit amount dedicated to agriculture, palm oil prices are explanatory variables of supply. Indonesia production, per capita income of the world, car production of the world, exchange rate and rubber production of Indonesia are explanatory variables of demand. After making estimations of reduced form equations

complying with two-stage least square technique structural equations are reached in order to make simulations by taking considerations of producer's surplus for changing policy recommendations. The paper focused on two hypothesis. One of them was related with the efficiency of financial support to agriculture sector in Thailand. Another was related with possible bilateral agreements between the countries Thailand and Indonesia. The econometric analysis will present opportunities to understand how to increase the producer surplus by simulating abovementioned variables. Producer's surplus is calculated 10,719,174,750 USD/Year in the equilibrium conditions. When financial supports are increased, it caused about 9.5 percent decreases in producer's surplus. The impacts of bilateral agreements was simulated with 10% and the 5% decreases of production amount. There was almost no difference on producer's surplus in reduction the production with the amount of 5% and 10%. The results give insights to producer countries at the region such as Thailand, Indonesia, Vietnam, and Malaysia at the same geographical area and similar socio-economic background. Results indicates that rubber demand is nearly perfectly inelastic in terms of price. Countries are willing to pay almost any amount to purchase rubber, because its substitute is not observable. Consequently, producer countries should try to favor the international market conditions. Switching the alternative productions may provide benefits to producers. In conditions where the market is fluctuating this may create opportunities to save revenues. It is recommended to use several of the different resources used in rubber production to some other uses. It will diversify the agricultural economy of Thailand and decrease its dependency on rubber. Yet, in this diversification a consideration should be given to exports and the feasibility of production. Production of products that will increase export earnings of the country should be prioritize. Therefore the policy options on productions would not damage to agricultural contribution to Thailand's economy.

## REFERENCES

- [1] Arunwarakorn, S., Suthiwartnarueput, K., Pornchaiwiseskul, P., 2017, Forecasting equilibrium quantity and price on the world natural rubber market. *Kasetsart Journal of Social Sciences*. (Article in press <http://dx.doi.org/10.1016/j.kjss.2017.07.013>).
- [2] Amoro, G., Shen, Y., 2013, The Determinants of Agricultural Export: Cocoa and Rubber in Cote d'Ivoire. *International Journal of Economics and Finance*, 5(1):228-233.
- [3] Chawananon, C., 2014. Factors affecting the Thai natural rubber market equilibrium: Demand and supply response analysis using two stage least squares approach. Dissertation of the Faculty of California Polytechnic State University.
- [4] FAO, 2017, FAO Statistical Database, <http://www.fao.org/faostat/en/#data>, Retrieved December 6, 2013.
- [5] Gurluk, S., 2017, Adaptation economics to climate change: key vulnerabilities of small-holder farms. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development* Vol. 17, Issue 2:165-171.
- [6] Hill, C., Griffiths, W., Judge, G., 1997, *Undergraduate Econometrics*. John Wiley & Sons, USA.
- [7] Jaitung, C., 2011, The Effect of Macroeconomics Variables on the Rubber Demand of Thailand (Master's thesis). Retrieved November 11, 2013, from [http://library.cmu.ac.th/faculty/econ/Exer751409/2554/Exer2554\\_no40](http://library.cmu.ac.th/faculty/econ/Exer751409/2554/Exer2554_no40).
- [8] Purcell, T., 1993, The Factors Affecting the Long Run Supply of Rubber from Sarawak, East Malaysia, 1900-1990: An Historical and Econometric Analysis (Master's thesis). Retrieved December 6, 2013, from [https://espace.library.uq.edu.au/eserv/UQ:206177/purcell\\_magst93.pdf](https://espace.library.uq.edu.au/eserv/UQ:206177/purcell_magst93.pdf)
- [9] Sakarindr, P., 1979, An econometric study of Thai rubber industry and the world rubber market. *Retrospective Theses and Dissertations*. 6620. <http://lib.dr.iastate.edu/rtd/6620>, Retrieved November 11, 2013.
- [10] Suwanakul, S., Wailes, E. J., 1987, Estimates of Structural Relationships for the World's Rubber Market with Particular Emphasis on Thailand's Natural Rubber Industry. *Kasetsart Journal: Social Sciences*, 8(2), 173-188.
- [11] Viswanathan, P. K., 2008, Emerging smallholder rubber farming systems in India and Thailand: A comparative economic analysis. *Asian Journal of Agriculture and Development* Vol:5 No:2.
- [12] Wooldridge, J., 2012, *Introductory econometrics: A modern approach*. Cengage Learning.



## COOPERATION AMONG INDIVIDUAL FARMERS IN ROMANIA: CONSTRAINTS AND OPTIONS

Axel WOLZ<sup>1</sup>, Judith MÖLLERS<sup>1</sup>, Marius Mihai MICU<sup>2</sup>

<sup>1</sup>Leibniz Institute of Agricultural Development in Transition Economies (IAMO), 2 Theodor-Lieser-Str., 06120 Halle (Saale), Germany, Emails: wolz@iamo.de, moellers@iamo.de

<sup>2</sup>University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, Email: micumariusmihai@yahoo.com

**Corresponding author:** wolz@iamo.de

### Abstract

*Since the collapse of the socialist regime, Romania's farm structure is characterised by a bi-modal pattern; i.e. there are almost three million farms farming, on average, less than two hectares and less than 10% of total utilised agricultural area (UAA) on the one side and about 13,000 farms cultivating more than 100 hectares each and about one half of national UAA on the other. Most smallholders rely on subsistence farming as a survival strategy. They might barter and sell any surplus. In such a situation, it may be assumed that they unite and cooperate among each other to improve their situation, as it has been observed in many other parts of the world. However, in Romania as in many other post-socialist economies, farmers are reluctant to form or join formal organisations of mutual assistance, like cooperatives or producer groups. In this contribution, we want to discuss the major bottlenecks why farmers are hesitant to commit themselves to formal modes of collaboration. This analysis is based on an own survey, updated by a literature review, statistics and key informant interviews.*

**Key words:** consumption, organic products, Romania

### INTRODUCTION

Agriculture plays an important role in the Romanian society and economy. While its share to national GDP stands at 4.3% (2016), about one fourth of the total labour force is employed by this sector [1].

However, farms are characterised by a dual structure. There are about three million small-scale and semi-subsistence oriented farms on the one side and just about 13,000 farms cultivating 100 ha and more on the other. These large farms cultivate about one half of the total utilised agricultural area (UAA). Medium-sized farms cultivating 5 – 50 ha are almost missing [16].

This fragmentation of agricultural producers prevents efficient operation of small-scale farms. In general, these farms operate in isolation and lack adequate access to financial services, marketing channels, input supply and extension services. In theory, it might be expected that in such a situation smallholders join hands and collaborate to tackle these deficiencies. According to behavioural theory (March & Simon, 1961), individual people

voluntarily unite if they perceive that they can achieve more together than individually. Self-determined individuals decide to form or join a group of mutual assistance if the total incentives offered to them by this organisation exceed the contributions expected by them [10]. Hence, whoever joins a group intentionally expects to be able to utilise the group's benefits to realise one's own needs and interests. The incentives to join cover material as well as immaterial ones.

Ways of cooperation are manifold. Individuals might do so informally in small groups within families and among friends and neighbours or formally in form of producer groups, associations or agricultural service cooperatives. Formal groups are registered as legal entities to do business activities. At a certain stage of economic development, formal registration is essential to effectively participate in economic life.

In formal cooperatives members fulfil three major roles, as users/beneficiaries, controllers and as financiers [8].

Draheim (1955) emphasised the "double nature" of cooperatives, as individuals do not

only join a business organisation to improve their economic well-being, i.e. the “cooperative enterprise”, but also become members of a social group, i.e. the “cooperative society” [5]. Individuals will only form or join an organisation and stay loyal if they have a certain level of (interpersonal) trust among each other. They must have a certain degree of certainty that the co-members fulfil their obligations and observe their given commitments [12].

In Romania as in most other post-socialist economies, small-scale farmers show a strong psychological resistance to forming or joining formal organisations of mutual assistance [2, 13].

In this contribution, it will be discussed what are the major constraints and options for small scale farmers for self-organisation.

## MATERIALS AND METHODS

This analysis is focused on individual farmers who are group members and those who are not, so far. What are the individual constraints of farmers in joining and how have others overcome these constraints? We will contribute to the understanding of why cooperation does not work well up to now among small-scale farmers in post-socialist economies, and under which conditions a willingness to cooperate may be formed.

This analysis is based on a survey among small-scale farmers in 2013 [13]. These findings have been updated by literature review and national statistics. In addition, key informant interviews have been performed among individual farmers (members and non-members of agricultural service cooperatives and agricultural producer groups), group leaders and public officials at national and regional levels.

## RESULTS AND DISCUSSIONS

### Major constrains for formal cooperation

There seem to be a number of reasons why Romanian farmers do not form or join organisations of mutual support. The most relevant ones seem to be as follows.

One of the most forceful arguments is that the destructive impact of the totalitarian communist legacy persists [7]. This led to a high degree of distrust among farmers against any type of collective action as well as between farmers and other actors of the agricultural sector. Cooperative farms were attached with a very bad image and all types of cooperation where the word “cooperative” was still included were seen as a link to the disliked communist legacy [4].

But also the years following regime change did not encourage farmers to set up formal organisations of mutual assistance. The Law 36/1991 used the term “agricultural societies”, but these societies just gave the former collective farms a new label. Members left if possible and their number declined rapidly during the 1990s and early 2000s [16].

Lack of trust seems to be one of the most important factors of influence why formal organisations of mutual assistance did not emerge after regime change. This mutual distrust among the inhabitants in many villages, in addition to low level of human and financial capitals, leads to low information exchanges and a strong scepticism towards new developments [15]. To overcome this bottleneck of missing trust is in the first place the task of a trustworthy and skilful leadership. However, such leadership is the scarcest factor for establishing new formal organisations [9].

But there might be a structural factor. In general, cooperatives are formed neither by the smallest farms nor by the bigger ones. There seems to be a “middle-size bias” [6].

In Romania, as shown by statistics, there are simply not that many farms operational which can be subsumed as “middle-size” farms which might be the first to expect any benefits from organisations of mutual assistance.

Finally, an additional factor might be the rational choice of farmers not to form or join formal organisations at all. Farmers might estimate their independence and autonomy very highly. Following the moral economy school of thought, it is argued that small-scale farmers will resist any commercialisation of agriculture and the impersonalisation of economic transactions. As Roger (2014)

argues, small-scale farmers in Romania are semi-subsistence oriented and have no investment capacity. They want to stay independent from anybody, maintain full control over their assets and be in a position to face unexpected events. Semi-subsistence ensures them a living. Seen from an economic perspective, this type of farming might be inefficient in terms to return to labour and any factor input, but it assures survival and a basic standard of living [14].

### **Options for formal cooperation**

However, while a deficit of collective entrepreneurship and trust can be observed, this does not mean that there is no preference in cooperation as shown in altruism and reciprocity among the farmers. They do cooperate in an informal way; they help each other in case of need and in form of loosely-tight farmers' associations [7]. In Romania, small-scale farmers often formed small informal groups based on social and familial ties to overcome labour peaks or exchanging any type of information [15].

In addition, a special form of informal cooperation had become very popular among those farmers who wanted to earn income from farming, i.e. joint farming. These informal groups comprise, in general, 4 to 15 families. With the help of the group they could achieve higher levels of production. They pool their resources, divide tasks within the group members and specialise in certain activities (crops, livestock) in order to increase returns to agriculture. This type of "family association" has only quite loose requirements on each partner. As informal groups they do not have to pay any taxes and no need for employed staff [15, 17]. While informal groups of mutual assistance are of high relevance, there are no figures about their number and performance available.

While farmers are reluctant or, even, not in a position to set up organisations of mutual assistance, the government might step in and encourage and support farmers to do so. It might be argued that such government-created cooperatives may be better for the farmers than no organisations of mutual assistance at all. There might be the expectation that these "top-down" organised groups might after

some time become genuine self-help organisations ("bottom-up"). However, Golovina & Nilsson (2011) in their review about government-initiated agricultural cooperatives conclude that, in general, these types of top-down initiated organisations were not successful over time. There seem to be no successful management practices available in how to eventually convert them into businesses controlled and owned by members. In general, these groups become dormant once government support dries up or public officials decide on all relevant matters [8].

Nevertheless there is an important role which governments have to fulfil in order to promote agricultural cooperatives. They will not emerge without the implementation of a proper legal framework [9]. The Romanian government had been very reluctant to provide such a framework. During the pre-accession period to the EU it did not prepare a coherent strategy for supporting agricultural service cooperatives which had been an option. There seemed to be a vicious cycle: Since there are a low number of agricultural service cooperatives and producer groups, no institutional lobby exists in favour of them and, hence, there is a lack of political and economic interest in their support. There is no strong lobby for these organisations and little pressure on governments to design strong policy measures promoting them [3].

Only recently, there seems to be political change. With the Law on Agricultural Cooperatives (No. 566) in 2004 and the Law on Cooperatives (No. 1) in 2005, the government established the legal framework for establishing cooperatives according to the rules of the International Cooperative Alliance. With the adoption of the Ordinance 37/2005 the government gave the option, first to fruit and vegetable farmers only, but later on to all, to form producer groups in line with the EU regulations.

Since then, a modest formation of agricultural service cooperatives and agricultural producer groups (PGs) can be observed. The number of PGs seems to stagnate. While it stood at 152 in 2011, just 145 were operational in early 2018. 690 agricultural cooperatives are registered, but not all of them are operational



[18]. So, their impact on the food markets is still very small. Based on our own survey, farmers seem to become open to the idea of cooperation since they expect better prices. However, the level of distrust is still high [13].

## CONCLUSIONS

Due to negative experiences in the past, reaching from the pre-War, socialist and the first decade of the post-socialist periods small-scale farmers in Romania are still very reluctant to form or join any groups of mutual assistance, like agricultural service cooperatives or agricultural producer groups. Due to their negative image, these groups did not play any role and there had been no lobby for them. Hence, the government did not act to promote them.

Only recently, the government provided the necessary legal framework for their set-up. A modest wave of group formation could be observed. However, these formal groups of mutual support play a marginal role, only. The government is advised to encourage the group formation more rigorously, like e.g. support of campaigning for the cooperative idea, identification and training of potential cooperative leaders, etc.

## ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial support of the EU H2020 project "Building an Excellency Network for Heightening Agricultural Economic Research, (ENHANCE)", PN 691681.

## REFERENCES

- [1]Agra-Europe, 2017, Jeder Vierte arbeitet in der Landwirtschaft [Every fourth persons employed by the agricultural sector]. Agra-Europe, Bonn, Länderberichte (6 November 2017).
- [2]Balint, B., Wobst, P., 2006, Institutional Factors and Market Participation by Individual Farmers: The Case of Romania. *Post-Communist Economies* 18 (1), 101-121.
- [3]Brusselaers, J., Poppe, K., Azcarate, T.G., 2014, Do Policy Measures Impact the Position and Performance of Farmers' Cooperatives in the EU? *Annals of Public and Cooperative Economics* 85 (4), 531-553.
- [4]Calinescu, D., 2012, Support for Farmers' Cooperatives; Country Report Romania. Wageningen, Wageningen UR.
- [5]Draheim, G., 1955, Die Genossenschaft als Unternehmungstyp [The cooperative association as a business enterprise] (2nd ed.). Göttingen: Vandenhoeck and Ruprecht.
- [6]Fischer, E., Qaim, M., 2014, Smallholder Farmers and Collective Action: What Determines the Intensity of Participation? *Journal of Agricultural Economics* 65 (3), 683-702.
- [7]Gijssels, C., Bussels, M., 2014, Farmers' Cooperatives in Europe: Social and Historical Determinants of Cooperative Membership in Agriculture. *Annals of Public and Cooperative Economics* 85(4), 509-530.
- [8]Golovina, S., Nilsson, J., 2011, The Russian top-down organised co-operatives – reasons behind the failure. *Post-Communist Economies* 23(1), 55-67.
- [9]Hagedorn, K., 2014, Post-Socialist Farmers' Cooperatives in Central and Eastern Europe. *Annals of Public and Cooperative Economics* 85 (4), 555-577.
- [10]March, J. G., Simon, H. A., 1961, *Organizations* (3rd ed.). New York: Wiley.
- [11]MADR (2018). Figures on Agricultural Producer Groups and Cooperatives. 18.04.2018.
- [12]Markelova, H., Meinzen-Dick, R., Hellin, J., Dohrn, S., 2009, Collective action for smallholder market access. *Food Policy* 34 (1), 1-7.
- [13]Möllers, J., Traikova, D., Brindusa, A.-M., Wolz, A., 2018, Why (not) cooperate? A cognitive model of farmers' intention to join producer groups in Romania. *Post-Communist Economies* 30(1), 56-77.
- [14]Roger, A., 2014, 'Romanian Peasants' into 'European Farmers'? Using Statistics to Standardize Agriculture. *Development and Change* 45 (4), 732-752.
- [15]Sabates-Wheeler, R., 2005, *Cooperation in the Romanian Countryside: An Insight into Post-Soviet Agriculture*. Lanham, Maryland, Lexington.
- [16]Tudor, M.M., 2015, Small scale agriculture as a resilient system in rural Romania. *Studies in Agricultural Economics* 117 (1), 27-34.
- [17]Verdery, K., 2003, *The Vanishing Hectare: Property and Value in Postsocialist Transylvania*. Ithaca NY, Cornell University Press.

## THE ORGANIC PRODUCTION OF CEREALS IN THE E.U. COUNTRIES AND THE PROFITABILITY OF WINTER WHEAT AND WINTER RYE IN ORGANIC FARMS IN POLAND

Marcin ŻEKAŁO

Institute of Agricultural and Food Economics – National Research Institute, Swietokrzyska 20, 00-002 Warsaw, Poland, Email: Marcin.Zekalo@ierigz.waw.pl

*Corresponding author:* Marcin.Zekalo@ierigz.waw.pl

### Abstract

*The organic production of cereals is a one of main agricultural activity in organic farms in the European Union. That production is very difficult and requires a lot of producers experience and effort. Most of all, the organic production of cereals should meet the environmental goals, but also the economic goals of producers. The first aim of the study was to explore the condition of cereals organically produced in EU countries. Secondly, the profitability of winter wheat and winter rye production in organic farms was examined, based on accountancy data of Polish FADN and Agrokoszty system. Despite the weaker production results, the organic farms in Poland may be competitive with conventional farms (at the similar production level i.e. the cereal's growing area) due to lower direct costs incurred on the production and significant support by subsidies received.*

**Key words:** direct costs, organic cereals production, profitability, subsidies

### INTRODUCTION

The organic production sector in the European Union countries significantly increased and in 2016 occupied 11.9 million ha of the utilised agricultural area, which is almost doubled when compared to 5.7 million ha in 2002 [4]. The majority of the organic agricultural land was located in Spain, Italy, France, Germany (Fig. 1).

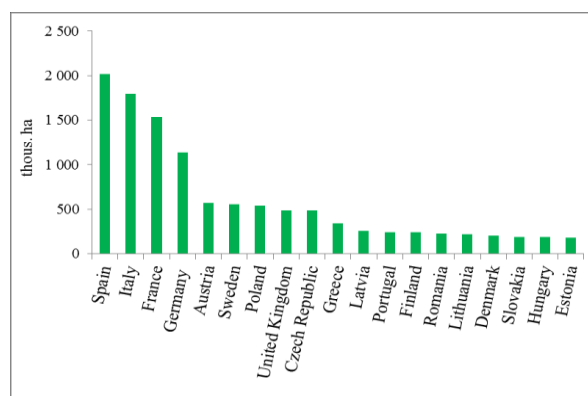


Fig. 1. The area of organic agricultural land in selected countries in EU in 2016  
Source: EUROSTAT [4].

Among crops from organic farms in the EU28 countries, a significant share of the cereals production sector was observed. In 2016, the total cereals production accounted for 36.0%

of the area of all arable land in organic farms in the EU28 countries. The largest producers of organic cereals were Italy, Germany, France and Spain. Among the area of cereals grown in organic farms in the EU28 countries as much as 38.6% was occupied by wheat, 17.6% - oats and spring cereals, 14.4% - barley and 7.9% - rye and winter crops. The largest producers of wheat from organic farms were Italy, France, Germany, Spain and Romania. On the other hand, the largest production of organic rye was in Germany, Poland, Denmark and Austria [4].

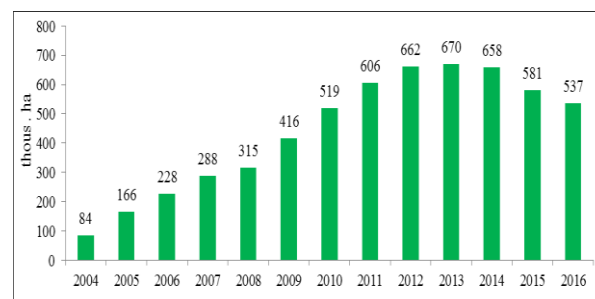


Fig. 2. Utilised agricultural area in organic farms in Poland in 2004-2016  
Source: AFQI [1].

In Poland, according to the statistical data of Agricultural and Food Quality Inspection (AFQI) in 2016, the utilised agricultural area

where the organic production was conducted accounted for about 3.7% of the total utilised agricultural area. In 2016, it was 536,579 ha, decreased by 7.6% when compared to 2015 (Fig. 2).

It is worth noting that in the structure of the utilised agricultural area in certified organic farms a significant share of cereals was observed (Fig. 3). In 2016, cereal crops, with the area of 101,147 ha, accounted for 18.9% of the organic utilised agricultural area (in 2015, cereals occupied 101,436 ha i.e. 17.5% of the organic utilised agricultural area). The production of cereals produced in organic farms in 2016 was at the level of 173,030 tonnes and was higher by 17% than the year before with the production level of 147,830 tonnes [1].

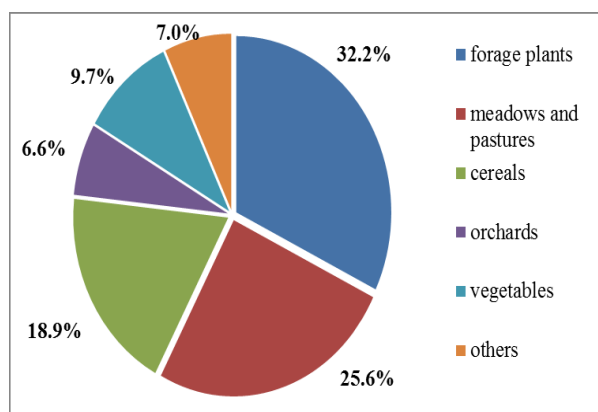


Fig. 3. The structure of the utilised agricultural area in certified organic farms in Poland in 2016  
Source: AFQI [1].

It should also be noted that cereals produced in organic farms enjoyed the interest of organic processors in Poland. In 2016, 17.2% of all organic processing plants worked in the processing of cereal milling products industry (in 2015, it was even 23.8%). In 2016, the production volume (cereal milling) was 8.9 thousand tonnes and was higher by 66.3% than in 2015 [1].

For farmers managing the organic farm, from the economic point of view of importance is the economic result, i.e. income from the activity. In the case of the cereals production, an important role is played by the cereal yield level and the price which may be obtained for grain produced on the organic farm. In organic farms in Europe, taking into account

the yield of arable crops, the level by 30-40% lower than the yield of the same crops on conventional farms was observed [7]. However, differences for individual arable crops may be significant, for example, the yield of wheat grown in organic farms may vary by 30-70% when compared to the conventional cultivation [3].

The diversification of the results also applies to the selling prices of agricultural products from organic farms which depend on the demand conditions for organic products in the country concerned as well as on the price level of conventional products. In the European Union countries, organic farmers receive price premiums for organic raw material within the price higher by 30-200% when compared to conventional raw materials, depending on the country and market sales channels [5]. Prices for organic cereal (for human nutrition) could be even doubled in comparison with conventional prices. For example, the prices of organic wheat reported from Austria and France are above 150% higher than conventional wheat. The higher price was also reported in Switzerland (about 50% higher) and in Denmark (30-40%) [3]. Due to high prices offered to organic products it may be concluded that high profits could be expected in organic arable farms relative to comparable conventional farms [6].

Farmers taking up activity in organic farming may also expect support in a form of subsidies for this sector, which significantly affect the level of income obtained from the agricultural activity. Taking into account subsidies from the agri-environmental programmes allows to compensate for the lower production results (poorer yields) in organic farms [3].

The main objective of the paper was to identify the basic factors of differences among the economic results, expressed by the level of profitability of the direct production of winter wheat and winter rye in organic and conventional farms. The thematic area of studies also includes the issues concerning the direct production costs and the role of support in a form of subsidies for the production of studies cereals in organic and conventional farms.

## MATERIALS AND METHODS

The subject of the studies in organic and conventional farms were the results of the production of winter wheat and winter rye. The studies were carried out in individual farms located throughout the country. Organic and conventional farms for the studies were deliberately selected from a representative sample of farms which was in the field of observation of the Polish FADN (these are the entities which are economically stronger and achieve the higher level of production than individual farms in the country in general). The studies were carried out according to the methodology of the AGROKOSZTY system, as part of which data on the production level and incurred expenses and direct costs is collected.

This is the first income category (according to the gross margin calculation methodology) which is the difference between the production value and direct costs necessary for this production [2]. The calculation of gross margin for agricultural production activities is given as follows:

Production value

– Direct costs

= Gross margin without subsidies

+ Subsidies

= Gross margin.

On the other hand, gross margin without subsidies enables an assessment of the economic efficiency of producing individual agricultural products, depending on crop fluctuations, changes in product prices and prices of means of production. It also allows to assess the competitiveness of production, as it covers the production value obtained and specific direct costs incurred.

A set of indicators was also used to assess the analysed agricultural products, which determine the economic efficiency of their production:

- the unit direct cost – direct costs per unit of production,
- the profitability of production – gross margin without subsidies per unit of production,

- the profitability of labour inputs – gross margin without subsidies per 1 hour of total labour inputs, i.e. unpaid and paid,
- the cost competitiveness of production – share of direct costs in gross margin without subsidies,
- the direct profitability index – ratio of the total production value to direct costs, expressed in percentage terms.

The results of the studies are presented in a tabular and graphic manner, horizontal analysis was used by comparing the parameters of the analysed agricultural products in organic and conventional farms (farms with the similar production scale expressed by the cultivation area of winter wheat and winter rye). The results of the analysed agricultural products were presented, on average, for the study sample of organic and conventional farms.

## RESULTS AND DISCUSSIONS

In 2016, in the AGROKOSZTY system the studies were carried out on winter wheat and winter rye grown, both in farms certified in organic farming as well as in conventional farms. Main specifications of surveyed groups of farms was presented in Table 1.

Table 1. Specification of surveyed groups of organic and conventional farms in 2016

Specification	Winter wheat on average in surveyed farms		Winter rye on average in surveyed farms	
	organic	conventional	organic	conventional
Number of surveyed farms	14	45	27	46
Utilised agricultural area [ha]	33.32	32.18	36.94	65.60
Crop area [ha]	4.44	6.03	8.31	10.00
Yield of grain [dt/ha]	29.4	49.6	18.9	38.9
Annual selling price [PLN/dt]	79.68	58.90	55.31	48.20

Source: Own calculation.

The studies show that, on average, in the study sample of organic farms cultivating winter wheat, the grain yield was 29.4 dt/ha and was by 40.7% lower than the average yield (49.6 dt/ha) in analysed conventional farms; the selling price of grain was PLN

79.68/dt and exceeded by 35.3% the average wheat buying-in price from conventional farms (PLN 58.90/dt). In the case of winter rye, the grain yield was 18.9 dt/ha and was thus lower by 51.4% than its level (38.9 dt/ha), on average, in conventional farms; the selling price of rye grain was PLN 55.31/dt and exceeded by 14.8% the average price of winter rye in the group of conventional farms (PLN 48.20/dt).

Table 2. The economic results achieved (per ha of cultivation) by surveyed groups of farms in 2016

Specification	Winter wheat on average in surveyed farms		Winter rye on average in surveyed farms	
	organic	conventional	organic	conventional
Total production value [PLN]	2,345	2,920	1,053	1,922
Total direct costs [PLN] in which:	400	1,178	146	753
Seeds	290	203	125	181
mineral fertilisers	75	672	6	460
organic fertilisers purchased	35	-	15	-
crop protection and growth regulators	-	303	-	112
Gross margin without subsidies [PLN]	1,945	1,742	908	1,169
Total subsidies [PLN]	1,657	869	1,682	877
Gross margin [PLN]	3,602	2,914	2,590	2,046
Total labour input [hour] in which:	9.1	9.2	5.8	7.2
unpaid labour input	8.9	8.9	5.7	6.9

Source: Own calculation.

The grain yield and its selling price determined the level of income (the value of the potentially commercial production) from the cultivation of analysed cereals. On average, in the study sample of organic farms, winter wheat producers obtained from 1 ha PLN 2,345, i.e. by 19.7% less than in the analysed group of conventional farms. On the other hand, from 1 ha of rye farmers in organic farms obtained PLN 1,053, i.e. by 45.2% less when compared to conventional farms. The production value is a major factor determining the amount of gross margin, however, the direct costs incurred are often of

great importance. On average, in the analysed group of organic farms, the direct costs per 1 ha of wheat were PLN 400, and per 1 ha of rye – PLN 146. In the case of conventional farms, the higher direct costs were incurred – respectively, for wheat they were 2.9-fold and for winter rye - 5.2-fold (Table 2).

The major component of direct costs, for both cereals in question in organic farms, was the cost of seed material (Fig. 3). Its share of the direct cost structure (in total) incurred for the wheat cultivation was 72.4% and for rye - 85.3%. In the case of conventional farms, farmers incurred costs of seed materials lower by 30.0% for wheat and in for winter rye, those costs were higher by 44.8%. In the case of organic farms, the effect of other components of direct costs, i.e. purchased mineral and organic fertilisers was low. In the case of conventional farms, the costs of mineral fertilisers in total and of plant protection products and growth regulators were significant (Fig. 4).

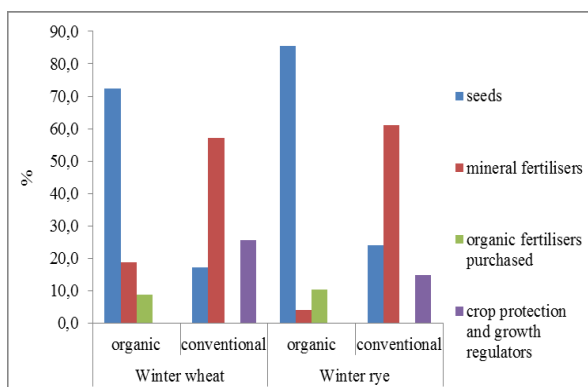


Fig. 4. The average structure of direct costs (per ha of cultivation) in surveyed groups of farms in 2016

Source: Own calculation.

Gross margin without subsidies in the group of organic farms from 1 ha of winter wheat was PLN 1,945, and of winter rye – PLN 908 (Table 2). This result in the case of winter wheat was higher by 11.7%, and for winter rye it was lower by 22.3% when compared to the results of conventional farms. Support for the income of winter wheat and winter rye production were subsidies. In 2016, for the cultivation of cereals the analysed farms could receive single area payment, greening payment, additional payment and for organic farms only – also organic payment.

Financial support per 1 ha of wheat and rye was similar – PLN 1,657 and 1,682, respectively, in the case of organic farms. Payments in conventional farms were lower, on average, by 47.6% for winter wheat and 47.9% for winter rye.

However, the impact of subsidies on the amount of gross margin was different, it was much higher in the case of rye (Fig. 5.)

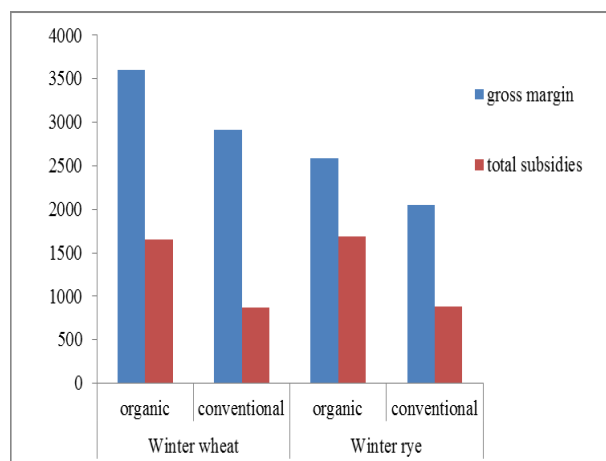


Fig. 5. The gross margin and total subsidies in surveyed farms in 2016

Source: Own determination.

This is evidenced by, inter alia, the share of subsidies in direct surplus with subsidies in group of surveyed organic farms, which amounted to 65.0% for winter rye, whereas in the case of winter wheat – 46.0%. A similar situation took place in relation to cereals in question in conventional farms, only the level of support was lower – 29.8% for winter wheat and 42.9% for winter rye.

For the assessment of the economic efficiency of the winter wheat and winter rye cultivation in organic farms, the direct profitability index (ratio of the production value to direct costs) was applied. On average, in the sample of farms cultivating wheat, this index was 586.2% and in the case of rye it was 720.0%. This high direct profitability index was mainly due to the very low direct costs incurred for the cultivation of these cereals. In the case of the direct profitability index in the group of conventional farms, the ratio of the production value to direct costs was significantly lower – 246.2% for wheat and 255.2% for winter rye.

Table 3. The economic efficiency indices of surveyed group of farms in 2016

Specification	Winter wheat on average in surveyed farms		Winter rye on average in surveyed farms	
	organic	conventional	organic	conventional
Share of direct costs in gross margin without subsidies [%]	20.6	67.6	16.1	60.7
Direct profitability index [%]	586	246	720	255
Direct costs / 1 dt grain [PLN]	13.59	23.75	7.75	19.36
Gross margin without subsidies / 1 dt grain [PLN]	66.09	34.90	48.07	29.93
Gross margin without subsidies / 1 h of total labour input [PLN]	213.10	188.24	156.64	162.94
Share of subsidies in gross margin [%]	46.0	29.8	65.0	42.9

Source: Own calculation.

For more detailed analysis of the economic results from the wheat and rye cultivation, a set of economic efficiency indices was calculated (Table 3). The calculations show that organic farms incurred significantly lower direct costs of producing 1 dt grain of wheat and rye than farmers in conventional farms. The profitability of the production of these cereals, indicated by gross margin without subsidies per 1 dt of grain, was also higher in organic farms – Table 3.

The results of the calculations indicate that labour inputs were used more effectively in organic farms in the winter wheat cultivation. This is evidenced by the higher labour profitability (PLN 213.10/hour, whereas for conventional farms – PLN 188.34/hour). In the case of winter rye, labour inputs were used more efficiently in conventional farms.

## CONCLUSIONS

Due to focus selection of the sample of farms and the small study sample of organic farms, the results cannot be considered as a basis for far-reaching generalisation. The results of the



studies are mainly cognitive, they show the differences in the profitability of the winter wheat and winter rye cultivation in organic farms in relation to the production of these cereals in conventional farms.

The cereals production in organic farms in the EU28 countries is one of the important activities of the crop production. The level of this production in the EU countries is considerably varied, so are its market conditions regarding the obtained cereal yields and grain selling prices. Compared to the conventional cereals production, the cereal yield level is at the lower level, while higher selling prices are obtained for grain of these cereals, which is also confirmed by studies of the winter wheat and winter rye production in the Agrokoszty system in 2016. Summing up the results of these studies, it should be noted that the winter wheat and winter rye yields in organic farms were at the lower level (40.7%, on average, for winter wheat and 51.4% in the case of winter rye), while the selling price of grain was higher (on average, by 35.3% for winter wheat and 14.8% for winter rye) than, on average, in conventional farms with the similar production scale for these cereals.

It is important for organic farms that income from the winter wheat and winter rye production was significantly higher than direct costs incurred, which has been reflected in the high level of the direct profitability index. Direct costs of the winter wheat and winter rye production were significantly lower (mainly due to the low costs associated with low usage of fertilisers) than those for the production of these cereals in conventional farms.

The winter wheat and winter rye production both in organic and conventional farms allowed to obtain income in a form of gross margin without subsidies. After taking into account subsidies, operating income for the analysed cereals was higher in organic farms (for wheat by 23.6%, for winter rye by 26.6%) than in conventional farms. In this case, income of organic farmers is much more dependent on subsidies than the results of conventional farms. The share of subsidies in gross margin was high and amounted 46% for wheat and 65% for rye (for conventional

farms this was, respectively, 29.8% and 42.9%).

## REFERENCES

- [1]AFQI, 2017, The report on organic farming in Poland in 2015-2016, Warszawa.
- [2]Augustyńska-Grzymek, I., et al., 2000, *Metodyka liczenia nadwyżki bezpośredniej i zasady typologii gospodarstw rolniczych*. FAPA, Warszawa.
- [3]David, C., 2012, *Organic Bread Wheat Production and Market in Europe*. Sustainable Agriculture Reviews. Springer, The Netherlands, 43-62.
- [4]EUROSTAT, 2017. Organic farming (org) <http://ec.europa.eu/eurostat/web/agriculture/data/database>, Accessed on January 15, 2018.
- [5]Hamm, U., Gronefeld, F., Halpin, D., 2002, *Analysis of the European market for organic food. Organic market initiatives and rural development*, vol 1. School of Management and Business, University of Wales, 129.
- [6]Offermann, F., Nieberg, H., 1999, *Economic performance of organic farms*. In: Dabbert et al (eds) *Organic farming in Europe: economics and policy*, Vol 5. Universität Hohenheim, Hohenheim.
- [7]Padel, S., Lampkin, N., 1994, *Farm-level performance of organic farming systems: an overview*. In: *The economics of organic farming*. CAB International, Wallingford, 201–221.