

The Research Institute for Agricultural Economy and Rural Development (ICEADR)
(Ed.)

Proceedings

Agrarian Economy and Rural Development - Realities and Perspectives for Romania. 8th Edition of the International Symposium, November 2017, Bucharest

Provided in Cooperation with:

The Research Institute for Agriculture Economy and Rural Development (ICEADR), Bucharest

Suggested Citation: The Research Institute for Agricultural Economy and Rural Development (ICEADR) (Ed.) (2017) : Agrarian Economy and Rural Development - Realities and Perspectives for Romania. 8th Edition of the International Symposium, November 2017, Bucharest, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest

This Version is available at:

<https://hdl.handle.net/10419/190868>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



THE RESEARCH INSTITUTE FOR AGRICULTURE
ECONOMY AND RURAL DEVELOPMENT
Bucharest, Romania

Agrarian Economy and Rural Development Realities and Perspectives for Romania

International Symposium
The 8th Edition

8th Edition of the International Symposium

**AGRARIAN ECONOMY AND RURAL DEVELOPMENT
REALITIES AND PERSPECTIVES FOR ROMANIA**

Organizer:

**Research Institute for Agricultural Economy
and Rural Development**



**November 2017
Bucharest**

Copyright @ 2017, Research Institute for Agricultural Economy and Rural Development

ISSN 2285–6803
ISSN-L 2285–6803



The publishers are not responsible for the content of the scientific papers and opinions published in the volume. They represent the author`s point of view.

**THE RESEARCH INSTITUTE FOR AGRICULTURE ECONOMY
AND RURAL DEVELOPMENT
Bucharest, Romania**

8th Edition of the International Symposium

**AGRARIAN ECONOMY AND RURAL DEVELOPMENT
REALITIES AND PERSPECTIVES FOR ROMANIA**

in collaboration with

**INSTITUTE OF AGRICULTURAL ECONOMICS
Romanian Academy, Bucharest, Romania**

**UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY
MEDICINE**

**Faculty of Management, Economic Engineering in Agriculture
and Rural Development, Bucharest, Romania**

**INSTITUTE FOR ECONOMIC RESEARCH, FINANCE
AND STATISTICS**

Chişinău, Republica Moldova

**INSTITUTE OF AGRICULTURAL ECONOMICS
Belgrade, Serbia**



under the patronage of

**ACADEMY OF AGRICULTURAL
AND FORESTRY SCIENCES
„Gheorghe Ionescu-Şișeşti”**

SCIENTIFIC COMMITTEE

HERA CRISTIAN, *Academician, Vice President of Romanian Academy - Bucharest, Romania*

SIN GHEORGHE, *Prof., PhD., President of Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu Șișești" – Bucharest, Romania*

GAINĂ BORIS, *Academician of the Academy of Sciences, Technical University of Moldova*

TABARĂ VALERIU, *Prof., PhD., Vice President of Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu Șișești" – Bucharest, Romania*

NICOLESCU MIHAI, *Prof., PhD., Vice President of Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu Șișești" – Bucharest, Romania*

ISTUDOR NICOLAE, *Prof., PhD., Rector of the Bucharest Academy of Economic Studies, Bucharest, Romania*

FÎNTÎNERU GINA, *Prof., PhD., Pro-rector of University Of Agrarian Sciences and Veterinary Medicine , București, Romania*

TAKÁCS ISTVAN, *Department Director of Faculty of Economy and Social Sciences, College Karoly Robert, Gyöngyös, Hungary*

ALEXANDRI CECILIA, *PhD., Director of The Institute for Agrarian Economy, Romanian Academy - Bucharest*

BEGALLI DIEGO, *Prof., PhD., Faculty of Economy University from Verona*

IGNACIO DE LOS RIOS, *Prof., PhD., Polytechnic University - Madrid, Spain*

DINU TOMA ADRIAN, *Prof., PhD., Dean of Faculty of Management, Economic Engineering in Agriculture and Rural Development - The University Of Agrarian Sciences and Veterinary Medicine, Bucharest, Romania*

STRATAN ALEXANDRU, *PhD., Director of The Institute for Economy, Finance and Statistics, Chisinau, Republic of Moldova*

SUBIC JONEL, *PhD., Director of Institute of Agrarian Economy, Belgrade, Serbia*

DRAGO CVIJANOVIĆ, *Prof. Ph., Dean of the Faculty of Hospitality and Tourism in Vrnjacka Banja, University of Kragujevac, Serbia*

BOBOC DAN, *Prof., PhD., Dean of the Faculty of Agro-food and Environmental Economics, The Bucharest Academy of Economic Studies, Bucharest, Romania*

POPESCU GABRIEL, *Prof., PhD., Director of Department of Agro-food and Environmental Economics, the Bucharest Academy of Economic Studies, Bucharest, Romania*

GAVRILESCU CAMELIA, *PhD., Associate Member – Academy of Agricultural and Forestry Sciences*

ANDREI JEAN, *Prof., PhD., Faculty of Economic Sciences, University "Petrol-Gaze" – Ploiesti, Romania*

POPESCU AGATHA, *Prof., PhD., Faculty of Management, Economic Engineering in Agriculture and Rural Development, Scientific Secretary of the Research Institute for Agriculture Economy and Rural Development, Bucharest, Romania*

MERCE EMILIAN, *Prof., PhD., Faculty of Management, Economic Engineering in Agriculture and Rural Development, The University Of Agrarian Sciences and Veterinary Medicine, Cluj Napoca*

BOHATERET MIHAI-VALENTIN, *PhD., Associate Member – Academy of Agricultural and Forestry Sciences, Bucharest*

DRAGHICI MANEA, Prof., PhD., Faculty of Management, Economic Engineering in Agriculture and Rural Development - The University Of Agrarian Sciences and Veterinary Medicine, Bucharest

TUDOR VALENTINA, Prof., PhD., Faculty of Management, Economic Engineering in Agriculture and Rural Development - The University Of Agrarian Sciences and Veterinary Medicine, Bucharest, Romania

ION RALUCA ANDREEA, Assoc. Prof., Faculty of Agro-food and Environmental Economics, The Bucharest Academy of Economic Studies, Bucharest, Romania

STOIAN MIRELA, Prof., PhD., Faculty of Agro-food and Environmental Economics, The Bucharest Academy of Economic Studies, Bucharest, Romania

TEMOCICO GEORGETA, Prof., PhD., Faculty of Management, Economic Engineering in Agriculture and Rural Development - The University of Agrarian Sciences and Veterinary Medicine, Bucharest

IGNAT ANATOLIE, PhD., Head of Department of Economics Agro-food and Rural Development, The Institute for Economy, Finance and Statistics, Chisinau, Republic of Moldova

ANA URSU, PhD., Director of The Research Institute for Agriculture Economy and Rural Development, Bucharest

BEREVOIANU ROZI LILIANA, PhD., Scientific secretar of The Research Institute for Agriculture Economy and Rural Development, Bucharest

CONTENTS

SECTION 1: "THEORIES, EVALUATIONS, ALTERNATIVES AND STRATEGIC DIRECTIONS OF AGRICULTURE AND RURAL ENVIRONMENT"	1
CHETROIU Rodica <i>Structural analysis of domestic meat supply on development regions</i>	2
GAVRILĂ Viorica <i>Instability of Romania's fruit production and the responsible factors for this phenomenon</i>	8
NICA Maria <i>Analysis of competitiveness on the market of milk and dairy products in Romania</i>	14
CREȚU Diana <i>Advanced strategies for assessing the quality of agricultural products</i>	20
DOBOȘ Sebastian <i>Effects and characteristics of the implementation of the 1921 agrarian reform in Iași county</i>	24
C. MERCE, Cristina B. POCOL <i>Autocorrelation- Prevalence of identification of collinearity cause –</i>	32
RUSALI Mirela-Adriana <i>Agri-food manufacturing sector in Romania –internal sizes and in the European context</i>	38
GAVRILESCU Camelia, MATEOC-SÎRB Nicoleta, MATEOC Teoder <i>Romanian agrifood trade with the mediterranean countries – from the Barcelona declaration to the euro-mediterranean partnership</i>	45
PETRE Laurențiu Ionuț <i>The effect of maize production and consumption on prices in Romania</i>	53
SECTION 2 „ECONOMY, MANAGEMENT AND AGRICULTURAL MARKETING”	60
LUP Aurel, ALIM Indira Deniz, MIRON Liliana <i>Agriculture in the Danube Delta</i>	61
BĂDAN Daniela Nicoleta <i>Analysis regarding the fleet and the farm equipment in Romania compared to the European Union</i>	69
BĂDAN Daniela Nicoleta TUREK-RAHOVEANU Petruța Antoneta <i>Comparative anlysis of the production-average consumption proportion of the main fruits in Romania and the European Union</i>	74
BEREVOIANU Rozi Liliana <i>Estimative analysis of breakeven point of marigold crops for seeds in conventional and organic farming system - forecast 2017/2018</i>	81
BRĂTULESCU Alexandra-Marina <i>Establishing a vegetables crop with professional greenhouse</i>	87

CHIȚEA Lorena Florentina, DONA Ion <i>Defining aspects concerning the rural household and the sustainable socio-economic development in Romania</i>	92
CIOBANU (RĂDOI) Eugenia-Dorina, DRĂGHICI Manea <i>Tourism and agrotourism evolution on an european and national level</i>	100
CIOBANU (RĂDOI) Eugenia-Dorina, TUREK-RAHOVEANU Petruța – Antoneta <i>The tourism and agrotourism potential of the Tulcea and Vrancea counties – comparison</i>	106
NECULA Diana Maria <i>Estimative analysis of breakeven point for bell pepper crops in conventional and organic farming system - forecast 2017/2018</i>	110
ȘIMON Alina, CHEȚAN Felicia, CHEȚAN Cornel, DEAC Valeria <i>Research on the influence of the soil tillage system on soybean yield at ards Turda</i>	117
TUREK-RAHOVEANU Petruța Antoneta, BĂDAN Daniela Nicoleta <i>The evolution of the fruit sector in Romania between 2010-2016</i>	124
BUCUR Sorinel Ionel <i>Complex development alternatives in South-Muntenia region –prospective assessments</i>	130
PETRE Laurențiu Ionuț <i>Analysis of the impact of the use or non-use of neonicotinoids in agriculture</i>	138
RUSU Marioara <i>Social and economic dimensions of land reform -a territorial aproach</i>	145
VLAD Mihaela Cristina <i>The impact of granting support schemes on the farm, in the period 2007-2015 using data RICA</i>	151
SIMA Elena <i>Sustainable rural development through tourism activities in dobrogea's rural area</i>	161
POP Ruxandra – Eugenia <i>The impact of the applying of fertilizers on growth production at the national level</i>	167
TUDOR Monica Mihaela <i>Agriculture role in social-economic resilience to major economic crises in Romania</i>	175
DEAC Valeria, CHEȚAN Felicia, CHEȚAN Cornel, ȘIMON Alina, MUREȘANU Felicia <i>The influence of mineral fertilization upon production and quality of spring barley on agricultural research and development station Turda</i>	181
EREMIA Florentina <i>Researches regarding the confirmation of sunflower hibrises by influence of technological verifications in the south water area of Romania</i>	185
SECTION 3 „RURAL DEVELOPMENT AND AGRICULTURAL POLICIES”	190
BRUMĂ Ioan Sebastian, BOHATEREȚ Valentin Mihai, TANASĂ Lucian <i>Profiles of rural households in the North—East Development region of Romania. case studies</i>	191

CIOBANU (RĂDOI) Eugenia-Dorina, NECULA Raluca-Alexandra <i>The material and human basis used in tourism and agrotourism in Tulcea county</i>	197
DUMITRU Eduard Alexandru <i>The influence of european funds in visible development of rural areas - case study, place. Ciugud, Alba county</i>	204
ȘURCĂ Elena <i>Evaluation of Romania's potential for producing renewable energy from agriculture and forestry</i>	210
ȘURCĂ Elena <i>Sugar market in the European Union and Romania. Study on price developments</i>	217
CHEȚAN Felicia, CHEȚAN Cornel, ȘIMON Alina, DEAC Valeria <i>The evolution of chemical properties of soil under the influence of tillage systems and fertilization at the culture of wheat in the period 2007-2016 at ards Turda</i>	224
IGNAT Anatolie, STRATAN Alexandru, LUCASENCO Eugenia <i>Development of coopeatives in the Republic of Moldova</i>	229
VASILIU Codrin Dinu, BRUMĂ Ioan Sebastian <i>The discursive brand analysis of the accommodation units from the touristic basin of Sucevița (Bukovina Region, Romania)</i>	236
TUREK-RAHOVEANU Petruța Antoneta, DRĂGHICI Manea <i>Tourism and agrotourism potentail of Vrancea county – Romania</i>	243
CERTAN Simion, CERTAN Ion <i>Reflections on the impact of the Association Agreement Between the Republic of Moldova and the European Union on the economy of the national rural space</i>	248
DĂNILĂ Daniela Ileana <i>Cooperation programs regarding the development of turnover in rural area</i>	257
MARIUS Cosmin Boiangiu <i>Mitigation vs. adaptation: a critical overview of eu climate change policies and their impact on agriculture</i>	261
SECTION 4 „MODELS OF DEVELOPMENT OF THE SHORT CHAINS FOR CAPITALIZING ALONG THE PATHWAY SERVICE – PRIMARY PRODUCTION – STORAGE – PROCESSING - SALES MARKET”	267
MARIN Ancuța <i>Considerations regarding the association/cooperation of small and medium fruit producers</i>	268
CHEȚROIU Rodica, IURCHEVICI Lidia <i>Analysis based on questionnaire on the situation of fruit producers in the south and south-east area of the country</i>	274
RODINO Steliana <i>Postharvest handling practices for fruit crops</i>	279
BRĂȚULESCU Alexandra-Marina <i>Agricultural cooperatives in developing agriculture in Romania and the European Union</i>	285

Ion RALUCA ANDREEA
Models for short fruits' chain

DOBRE Iuliana
Economic efficiency of investments in fruits processing

MICU Marius Mihai, GIMBĂȘANU Gabriela Florentina, MICU Ana-Ruxandra
Researches about the situation of the import and export of fruits in Romania in the period 2007-2016 **301**

MICU Marius Mihai, MICU Ana-Ruxandra, PETRE Ionuț Daniel
The situation of the import and export of vegetables in Romania in the period 2007-2016 **306**

SECTION 1
THEORIES, EVALUATIONS, ALTERNATIVES AND STRATEGIC
DIRECTIONS OF AGRICULTURE AND RURAL ENVIRONMENT

STRUCTURAL ANALYSIS OF DOMESTIC MEAT SUPPLY ON DEVELOPMENT REGIONS

CHETROIU RODICA¹

Abstract: *The paper contributes to market research in the agri-food sector, by analyzing the structure of domestic meat supply from slaughtering, by species (cattle, pigs, sheep, goats, poultry) at national level and on the eight development regions. Also, for each species presented, the study deepens the age or production categories that are the subject of the meat offer. Thus, at the country level, pigs and poultry provide the largest share of the meat supply, each representing 39% of total, cattle provide 14% of the offer, sheep 7% and goats only 1%. At species level, calves and other young cattle represent the largest part of the cattle supply (67%), and for pigs, almost all pork is provided by animals over 50 kg (99.89%). In the sheep species, lambs provide 67% from slaughtering, and in goats, kids represent 97% of the meat supply of their species. Poultry slaughterings include hens, chickens, turkeys, ducks, geese and other poultry, of which chickens provide the largest share of poultry meat supply (64.8%). At the level of development regions, the most of cattle slaughterings are done in the North-East Region, the West Region occupies the first place in pork slaughterings, the South Eastern Region has the largest sheep and goat meat offer, and the South-Muntenia Region provides the largest quantity of poultry meat.*

Keywords: *supply, meat, market, cattle, poultry*

JEL Classification: *L11, L17, O13, Q13*

INTRODUCTION

The analysis of the main elements of the market functioning mechanism is based on the studying of its two fundamental components, namely demand and supply. Thus, the present study provides a deepening of the structural analysis of the meat supply from internal slaughterings, by species (cattle, pigs, sheep, goats and poultry), and within the species by age or production categories. The analyzes confirmed that most of the meat supply in our country is equally ensured by pork and poultry, followed by cattle.

MATERIAL AND METHOD

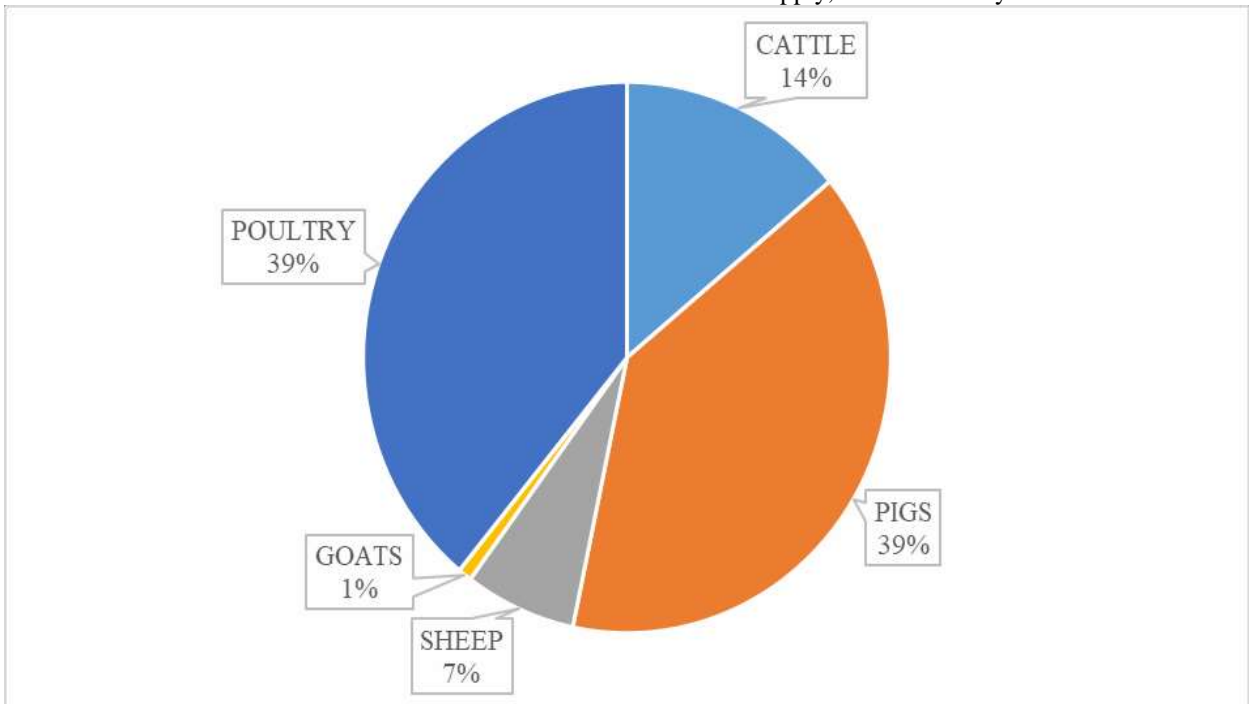
The researches in this paper are based on statistical data from the publications provided by the National Institute of Statistics NIS in 2016 on livestock and livestock production in 2015, namely the number of animals slaughtered and their live weight, by development regions, processed with Microsoft Excel.

RESULTS AND DISCUSSIONS

The results of the research show that, on the first place in the domestic meat supply, is pork, which in the year 2015 totals 562,277 tons, representing 39% of the total slaughterings at the country level. A short distance away is poultry meat, with 558,014 tonnes (about 39%), and the next place, with only 199,711 tonnes, representing 14%, is beef. Sheep participate in the meat offer of the country with only 7% of the quantity (97,671 tonnes), and the goats with only 1% (11,936 tonnes) (Chart 1).

¹ PhD. Chetroiu Rodica, Scientific researcher III – Research Institute for Agriculture Economy and Rural Development, e-mail: rodica.chetroiu@iceadr.ro

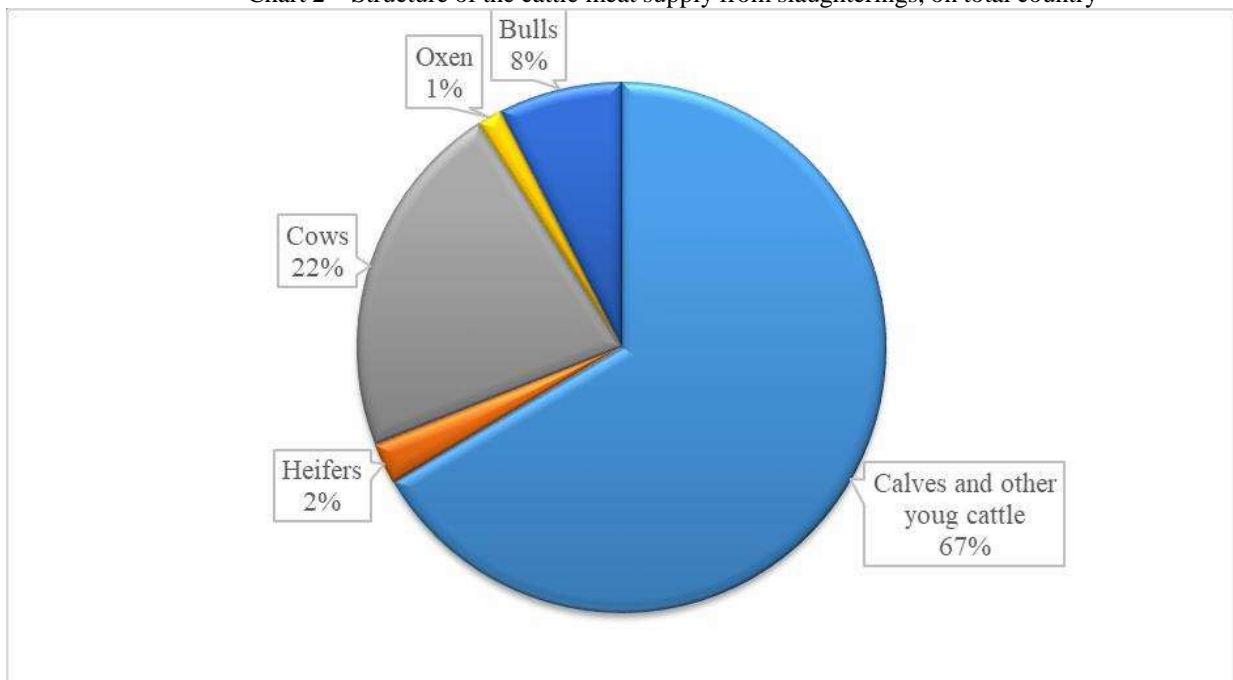
Chart 1 – Structure of domestic meat supply, on total country



Source: Own calculations following NIS data

In Chart 2, the domestic supply of beef is presented at country level, indicating that the largest quantity (67%) is represented by the category of calves and other young cattle (132,908 tons).

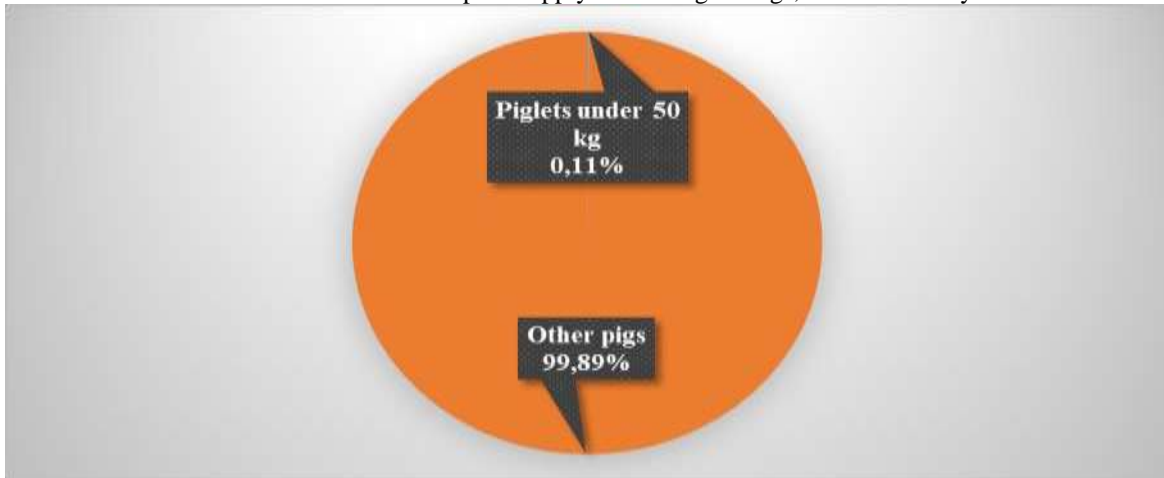
Chart 2 – Structure of the cattle meat supply from slaughterings, on total country



Source: Own calculations following NIS data

With regard to pork, statistical data indicate that slaughterings at this species are made for pigs weighing more than 50 kg almost totally (562 thousand tonnes) and only 0.11% (609 tonnes) are piglets below this weight, as illustrated in Chart 3.

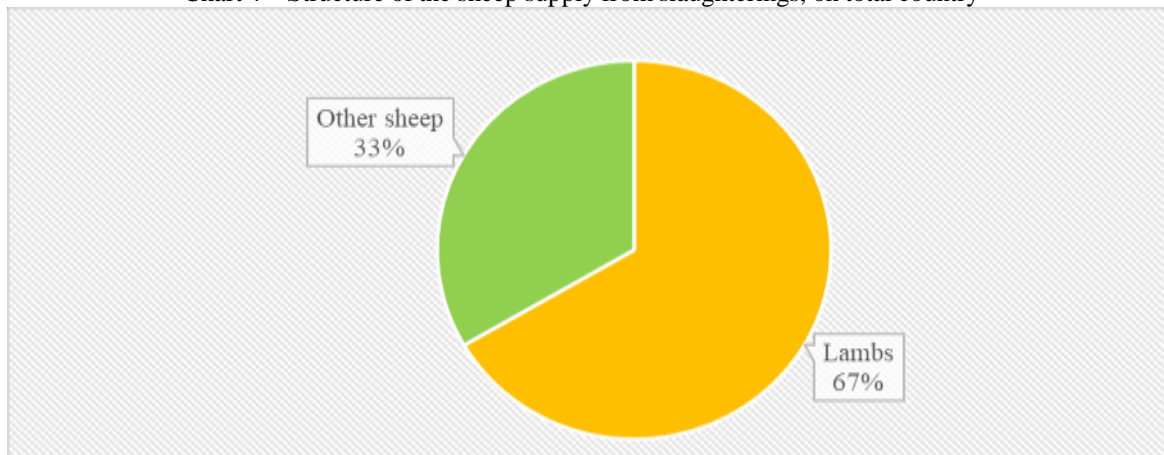
Chart 3 – Structure of the pork supply from slaughterings, on total country



Source: Own calculations following NIS data

Sheep meat from internal slaughterings has as dominant lambs (67% - 65,051 tonnes) and only 33% (32,620 tonnes) are other categories of sheep (Chart 4).

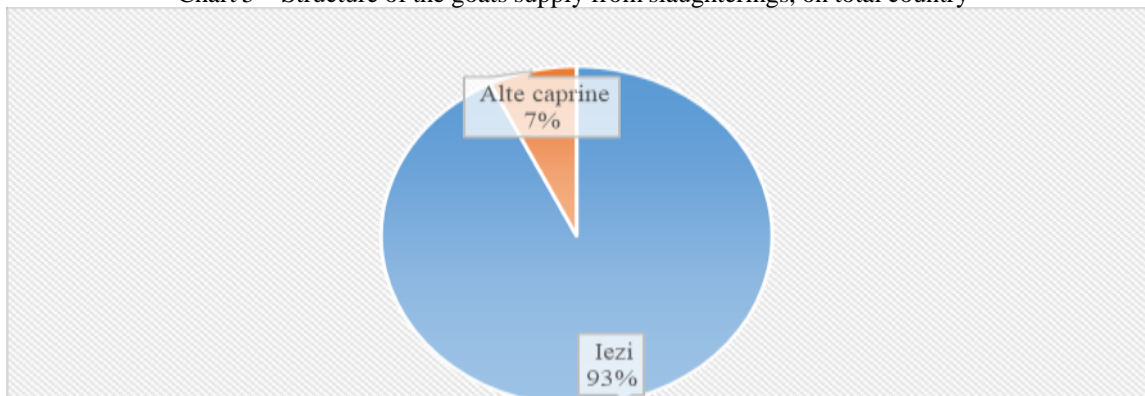
Chart 4 – Structure of the sheep supply from slaughterings, on total country



Source: Own calculations following NIS data

A similar situation is at goat meat supply, where 93% are kids slaughterings and only 7% are other categories of goats (Chart 5).

Chart 5 – Structure of the goats supply from slaughterings, on total country



Source: Own calculations following NIS data

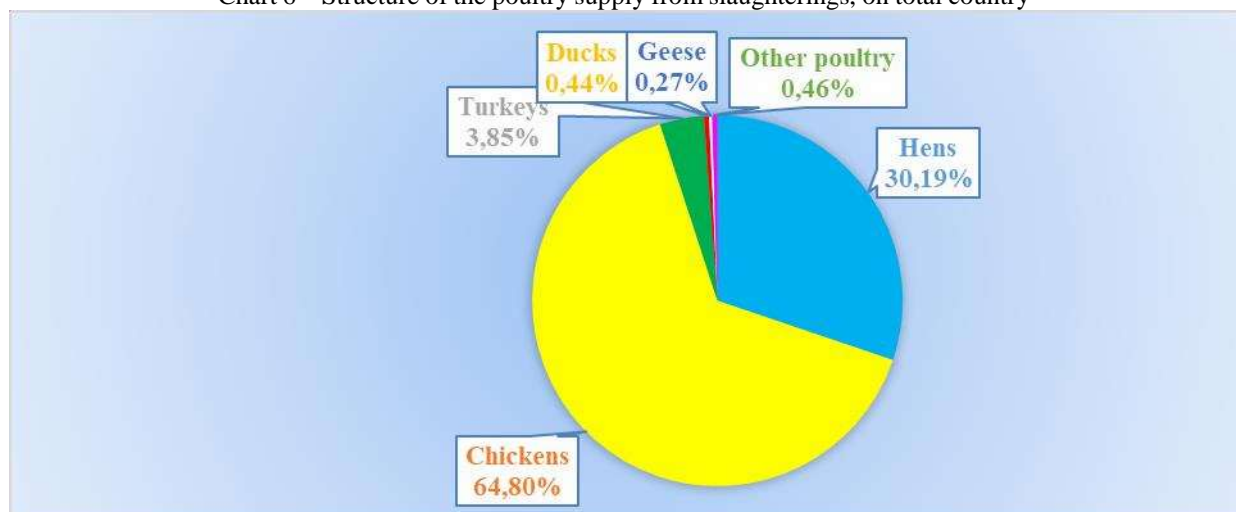
The offer of poultry meat is more diversified, including hens, chickens, turkeys, ducks, geese and other poultry, as shown in Table 1 and Chart 6.

Table 1 – Quantities of poultry meat slaughtered, on total country

Specification	Quantity (thousand tons life weight)
Hens	168.4
Chickens	361.6
Turkeys	21.5
Ducks	2.4
Geese	1.5
Other poultry	2.6
Total poultry	558.0

Source: NIS

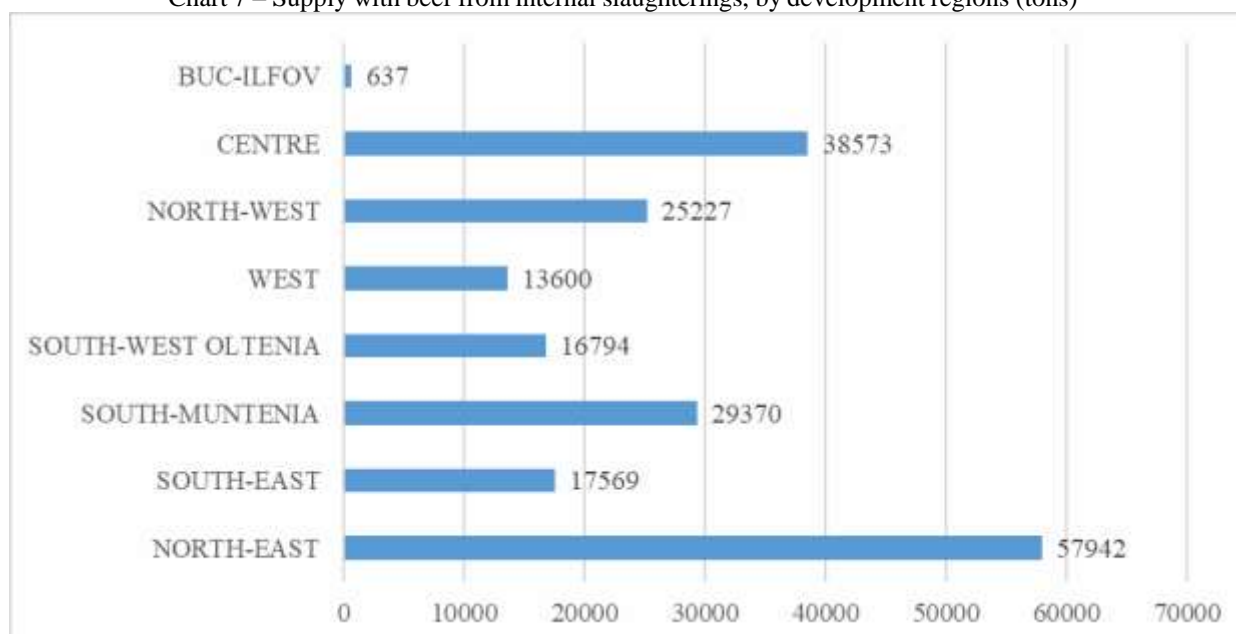
Chart 6 – Structure of the poultry supply from slaughterings, on total country



Source: Own calculations following NIS data

Distribution by development regions of domestic supply of beef, as shown in Chart 7, indicates that the North-East Region ranks first with 29% and second is the Central Region with 19, 3% of the offer.

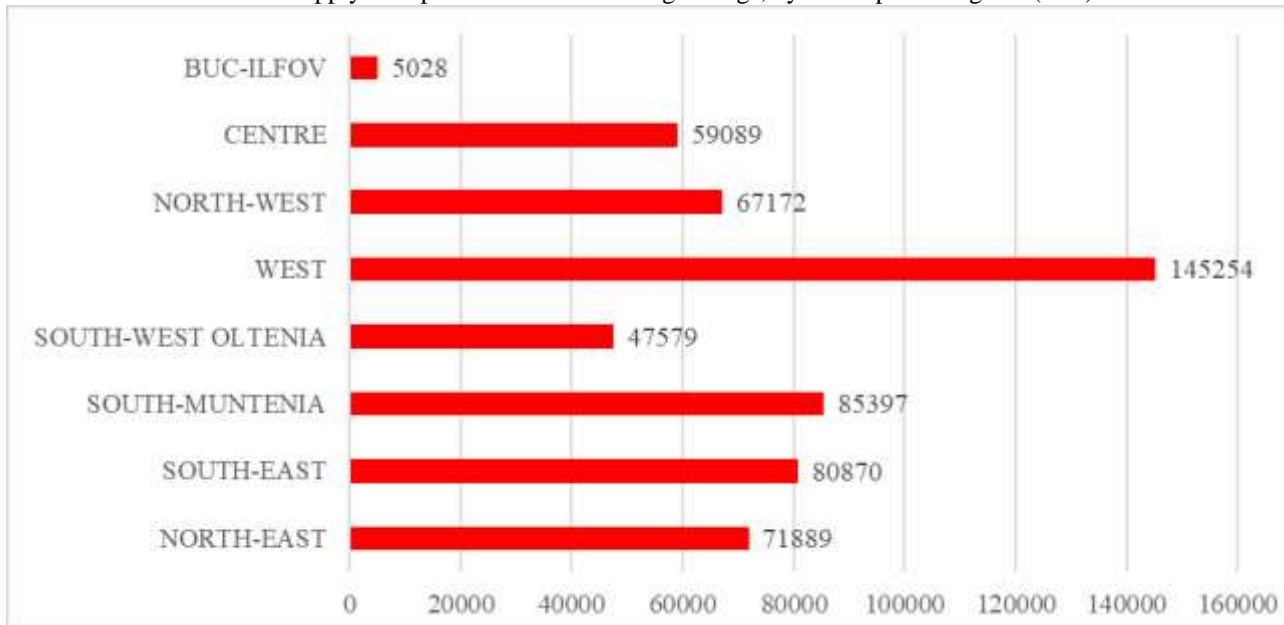
Chart 7 – Supply with beef from internal slaughterings, by development regions (tons)



Source: NIS

The largest amount of pork is offered by the West Region, which is distinct from the other regions by 25.8%, followed by the South-Muntenia Region, by 15.2%, the last being Bucharest-Ilfov Region (Chart 8).

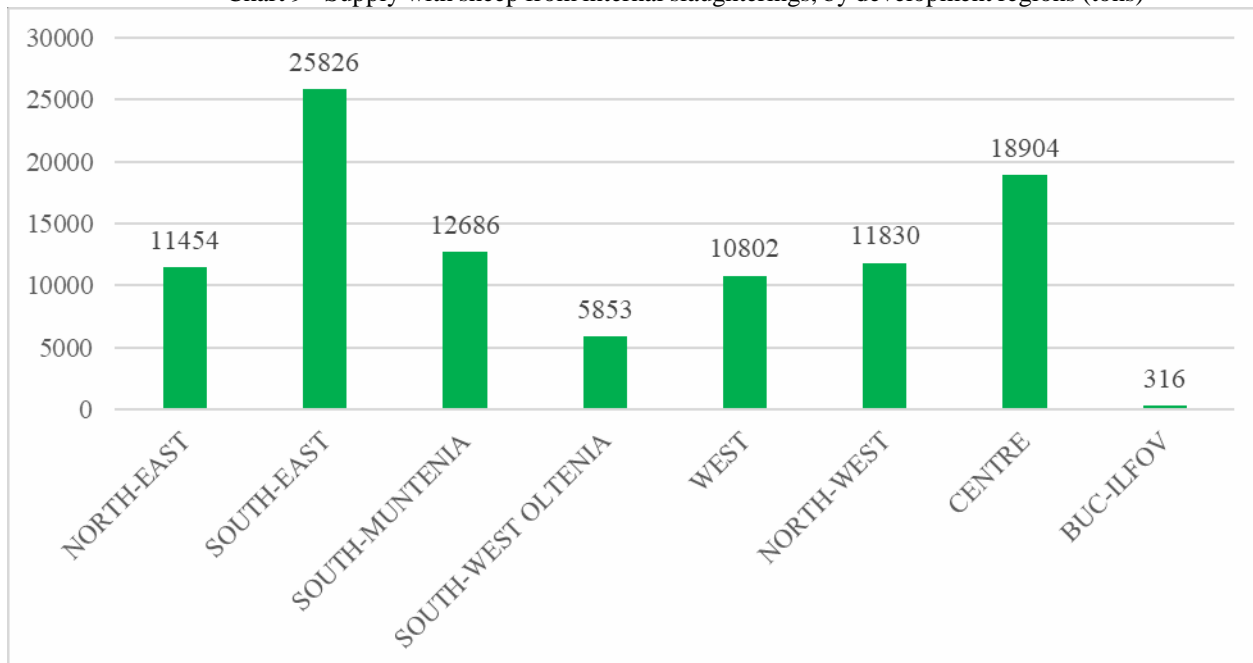
Chart 8 - Supply with pork from internal slaughterings, by development regions (tons)



Source: NIS

The sheep meat supply primarily reveals the South East Region, with 26.4% of total, followed by the Central Region, which provides 19.3% of slaughterings (see Chart 9).

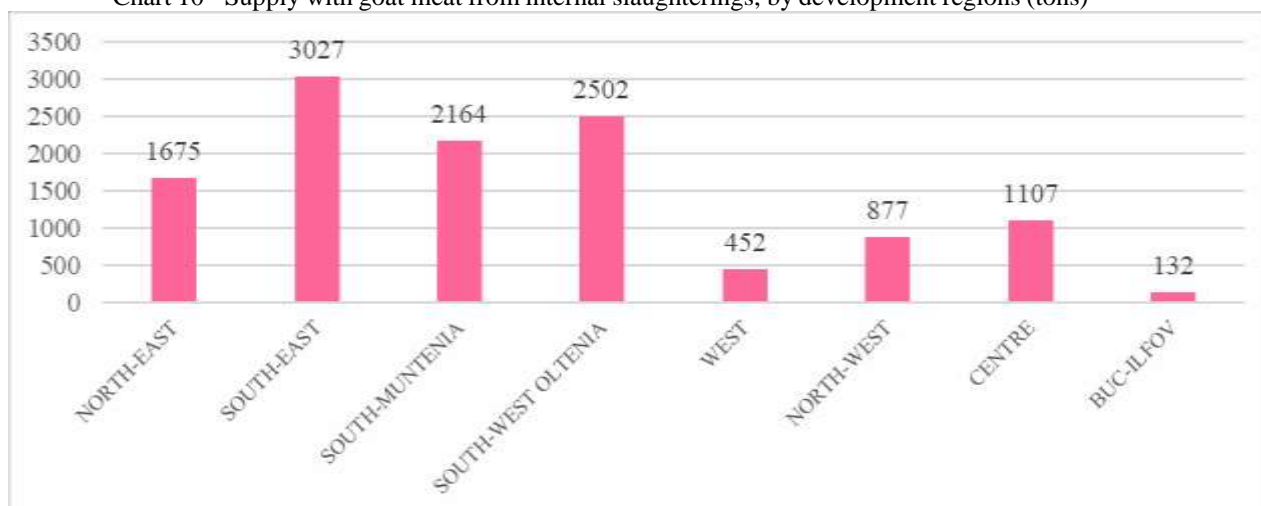
Chart 9 - Supply with sheep from internal slaughterings, by development regions (tons)



Source: NIS

The South East Region also ranks first in the goat meat slaughterings (25.4%), followed by South-West Oltenia Region, with almost 21% of the offer (see Chart 10).

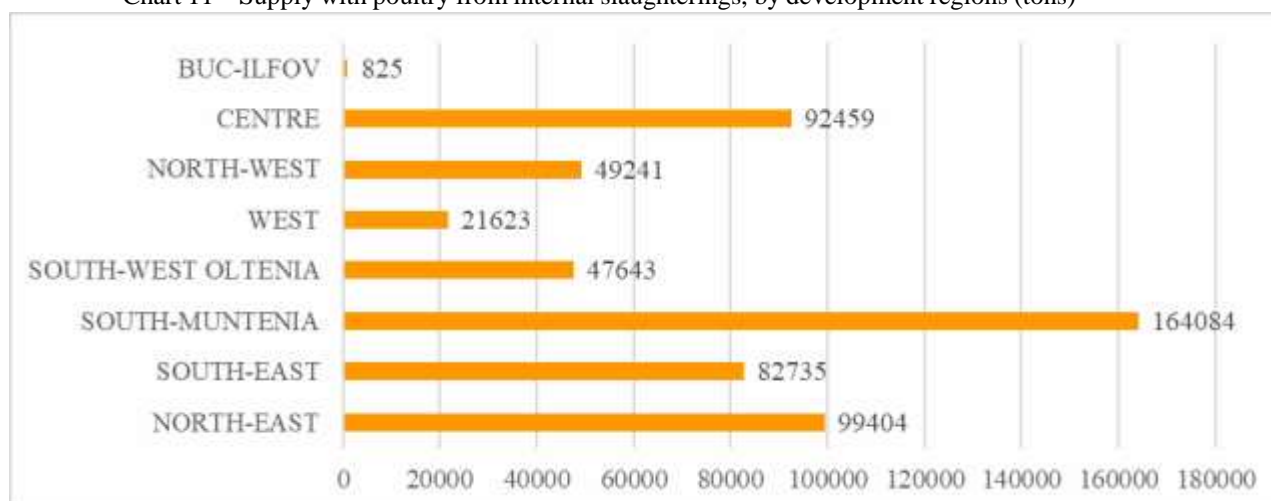
Chart 10 - Supply with goat meat from internal slaughterings, by development regions (tons)



Source: NIS

The South-Muntenia Region is clearly distinguished by poultry meat, with 29.4%, followed by the North-East Region, by 17.8% and by the Central Region, by 16.6% (see Chart 11).

Chart 11 - Supply with poultry from internal slaughterings, by development regions (tons)



Source: NIS

CONCLUSIONS

The meat supply from internal slaughterings includes a wide range of species and animal categories, distributed differently across the 8 development regions. Pork, together with poultry, accounts for 78% of the quantities, confirming the population food preferences. In sheep and goat meat, the fact that the vast majority of the slaughtered is young people also indicate the seasonality of consumption in these species. In cattle, the decline in the number of herds from recent years is also reflected in the reduced quantity of slaughtering, but the outlook is optimistic given the support measures for this species and also the fact that the cow for meat begins to permeate more and more on Romanian farms.

BIBLIOGRAPHY

1. ICEADR (2016), *Market reports – cattle, pigs, poultry*, Internal research plan
2. National Institute of Statistics (2016), *Number of animals and animal production in 2015*, <http://www.insse.ro/cms/ro/comunicate-de-pres-a-view...>

INSTABILITY OF ROMANIA'S FRUIT PRODUCTION AND THE RESPONSIBLE FACTORS FOR THIS PHENOMENON

GAVRILĂ VIORICA¹

Abstract: *The paper offers a framework of understanding the stability/instability degree of the fruit domain's production system both at national and regional profile. We chose the utilization of Cuddy Della Valle variability index. We followed the evolution of the variability index for two different periods, respectively: 1996-2005 (P1) and the period 2006-2015 (P2). Reducing the variability index through the time is confirming the hypothesis that in case of fruit trees' orchards in our country the production's stability is greatly affected by the structural factors.*

Key words: *production, fruits, instability*

JEL Classification: Q 11

INTRODUCTION

Fluctuations in the fruit production is substantially affecting prices, the stability of the producers' incomes and implicitly the producers' engagements regarding the future investment actions.

In the specialty studies, the agricultural production stability is analysed from more perspectives for example, the relationship to the climate factors, economic factors and technological ones.

From the perspective of the relationship to the climate factors, the threat of the late spring frosts combined with more frequent gentle winters, this represents a challenge even for the resistant species (Burroughs W.J., 2002).

The economic aspects include the production costs' increase, the ensurance of some constant prices or decreasing ones for the consumers, the retail sale consolidation, the decrease of the demand for certain fruits. Within the assessment of the agro-climate and pedological potential of Romania at the fruit trees' species the results show that there are few cases in which the less favorable score (1.5-2.5) was granted, and in most cases it is inscribed in the moderate favorable interval (2.5-3.5) for the fruit trees' crops.

In very few situations the scores exceed 3.5 (very favorable), from different reasons, in all cases, being imposed the potentiation of the environmental factors' low level through technological measures, irrigation being one of most important (Coman M, Chițu E., 2014).

For the optimization of fruit production's profitability there are different agricultural protocols: through the conventional production, through the respecting of some norms regarding durability (through the ecological production) or through intermediary systems, the so-called integrated production systems (Cerutti A, 2011).

MATERIAL AND METHOD

In order to determine the instability degree of the present production system in the fruits' domain, we chose the utilization of the Cuddy Della Valle variability index. The index represents a modification of the variation coefficient [VC] with a flattening factor of the trends which, regularly, are present in the economic data of the time series, after the formula:

$$I_x = CV(x)\sqrt{(1 - R^2)}$$

¹ Ph.D. SRIII VIORICA GAVRILA, Institute of Agricultural Economics. NIER, Romanian Academy, 13 Calea 13 Septembrie, 5 sector, Bucharest, tel/fax:021/3182411; e-mail: vio.gavrila@yahoo.com

where :

I_x = the instability index,

VC (x) =the variation coefficient,

R^2 =the determination coefficient.

We followed the evolution of the de variability index for two different periods, respectively: 1996-2005 (P1) and period 2006-2015 (P2).

In order to identify the instability nature in the fruits' production we took into calculation the instability degree for the yields and for the trees' number (because at regional level there is no available data regarding the areas with orchards by fruit-trees species). The variability index was calculated both for total fruits and for the more important species in the production and consumption structures. There were utilized the statistical data series from the period:.

RESULTS AND DISCUSSIONS

In the year 2016, the orchards' area was of 138.7 thousands hectares, of which 40.1% apple orchards, 47.3% plum orchards. The other species are covering small areas, with shares in total area of: 4.4% cherries and morello cherries orchards, 2.3% pears' orchards, 1.6% those of apricots, 1.3% peaches and nectarines' orchards.

In the period 2006-2015 (P2) we can observe a positive evolution from the perspective of the increase in the fruit production stability degree, mainly due to the reduction of yields' variability. The stability increase can be explained through the elimination from the production zone of they orchards reaching decline and manifesting a strong phenomenon of fruitage alternance and the partial replacement of these with new plantations, fact which can be seen also from the increase of the variability index value for the trees' number in P2 comparatively to P1 (Table 1).

Table 1. Variability of production, the yields and trees' number at national level by total fruits and by species

Species	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits	0.26	0.28	0.01	0.11	0.14	0.10
Plums	0.36	0.34	0.02	0.15	0.20	0.17
Apples	0.37	0.39	0.01	0.11	0.10	0.02
Pears	0.21	0.20	0.03	0.12	0.12	0.05
Peaches	0.25	0.38	0.05	0.19	0.24	0.09
Cherries and morello cherries	0.23	0.29	0.04	0.15	0.14	0.04
Apricots and <i>Prunus armeniaca</i>	0.33	0.37	0.10	0.18	0.13	0.08

Source: calculations after the Tempo Online database, NSI

In the North-West region the production stability remained at a medium level, with small improvements. The most important yield increases at peach and apricot were accompanied by the variability index increase, passing from a medium to a high level. In this region, the cherry tree is the specie with the best time stability of the production and yield (Table 2).

Table 2. Variability of production, the yields and trees' number, by total fruits and by species in the region: North-West

Region: North-West	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits - regional	0.26	0.26	0.05	0.19	0.22	0.07
Plums	0.36	0.33	0.03	0.24	0.25	0.09
Apples	0.33	0.35	0.08	0.21	0.26	0.09
Pears	0.24	0.24	0.05	0.17	0.26	0.14
Peaches	0.21	0.26	0.08	0.29	0.33	0.08
Cherries and morello-cherries	0.18	0.20	0.06	0.15	0.19	0.11
Apricots and <i>Prunus armeniaca</i>	0.26	0.22	0.17	0.40	0.39	0.09

Source: calculations after the Tempo Online database, NSI

In region Center, although per ensemble the areas with orchards diminished as expansion, the production stability increased in P2 comparatively to P1, mainly at pear and peach. The pear represents the species with the most reduced variability, both for the production and the yield, comparatively to the other species, but also within the regions. Although the apricot was expanded in crop, the yield is diminishing opposed to P1 and yet is registering a high yield variability (Table 3).

Table 3. Variability of production, yields and number of trees, by total and by species in the region: Center

Region: Centru	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits - regional	0.34	0.31	0.03	0.25	0.22	0.05
Plums	0.27	0.28	0.03	0.38	0.27	0.18
Apples	0.48	0.45	0.05	0.27	0.27	0.07
Pears	0.30	0.25	0.06	0.11	0.11	0.13
Peaches	0.29	0.41	0.13	0.10	0.19	0.12
Cherres and morello cherries	0.30	0.30	0.06	0.18	0.18	0.09
Apricots and <i>Prunus armeniaca</i>	0.53	0.47	0.16	0.25	0.30	0.17

Source: calculations after the Tempo Online database, NSI

In region: North-East in the interval 1996-2005 (P1) the total fruits production is characterized by a medium variability level. The total fruits production stability was maintained in the following period, too, mainly through the yield's stabilization.

From the production stability perspective the best evolution was registered at apple, which passed from a high to a reduced stability, even this thing was realized also through the reduction of the trees number and production. A positive aspect is registered at the peaches' production, where the productivity increases were accompanied by a reduction of the production and yield's variability. If the pears production maintains the variability degree through the time at a medium level, the cherries production has become more volatile. This evolution is explained by the dynamics of the trees' number and less through the yields' variability. In evolution, the plum is the deficitary species in this region. (Table 4).

Table 4. Variability of production, yields and trees' number, by total and by species in the region: North-East

Region North-East	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits - regional	0.21	0.20	0.04	0.20	0.14	0.07
Plums	0.22	0.17	0.04	0.43	0.26	0.17
Apples	0.46	0.44	0.06	0.14	0.13	0.05
Pears	0.18	0.14	0.04	0.19	0.12	0.15
Peaches	0.26	0.38	0.22	0.18	0.19	0.09
Cherries and morello cherries	0.23	0.23	0.05	0.29	0.18	0.11
Apricots and <i>Prunus armeniaca</i>	0.39	0.32	0.22	0.35	0.24	0.55

Source: calculations after the Tempo Online database, NSI

In region: South-East, the elimination from crop of the old orchards has brought an important contribution in the increase of stability degree of the productions and yields, passing from a high variability of production and yields to one of medium level for all the analysed species (Table 5).

Table 5.

Variability of production, yields and trees' number, by total and by species in the Region: South-East

Region: South -East	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits -regional	0.34	0.36	0.04	0.16	0.14	0.04

Plums	0.55	0.52	0.04	0.27	0.23	0.07
Apples	0.33	0.35	0.07	0.19	0.18	0.05
Pears	0.36	0.34	0.07	0.17	0.13	0.09
Peaches	0.38	0.49	0.13	0.29	0.28	0.16
Cherries and morello-cherries	0.31	0.34	0.06	0.21	0.17	0.08
Apricots and <i>Prunus armeniaca</i>	0.36	0.39	0.11	0.29	0.25	0.14

Source: calculations after the Tempo Online database , NSI

In Region: South-Muntenia, the variability of total fruits production was reduced by more than one half in the second analysed period. Although the importance of the region as a peaches' producer is a reduced one (6% from total country), in this region the production and the yield at peaches are among most stable. Also, both total peaches' production and the yield are registering the lowest variability index. The plum remains the specie with a high variability level of the yield, but production has become more stable on the background of expanding in crop (Table 1 6).

Table 6. Variability of production, yields and trees' number, by total and by species in the Region: South-Muntenia

Region: South -Muntenia	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits - regional	0.37	0.39	0.04	0.16	0.26	0.37
Plums	0.53	0.53	0.02	0.21	0.34	0.60
Apples	0.37	0.40	0.03	0.19	0.17	0.11
Pears	0.26	0.27	0.04	0.19	0.18	0.06
Peaches	0.41	0.43	0.20	0.11	0.12	0.10
Cherries and morello cherries	0.31	0.28	0.20	0.15	0.16	0.08
Apricots and <i>Prunus armeniaca</i>	0.32	0.31	0.38	0.16	0.13	0.14

Source: calculations after the Tempo Online database, NSI

The evolution of Bucharest-Ilfov Region as a fruit producer is a negative one, with important areas' reductions and production losses for all species, but also an increase of the yield at main species (pears, peaches, cherries/morello cherries and apricots). It is the only region in which there has taken place a significant increase of the yields and production variability. Comparatively to the other regions, here there are registered the highest variability indices from the period 2006-2015, less for the apples (Table 7).

Table 7. Variability of production, yields and trees' number, by total and by species in the Region: Bucharest-Ilfov

Region Bucharest - Ilfov	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits- regional	0.19	0.29	0.08	0.39	0.23	0.22
Plums	0.22	0.23	0.16	0.83	0.53	0.23
Apples	0.38	0.92	0.25	0.30	0.32	0.22
Pears	0.34	0.27	0.24	0.56	0.15	0.49
Peaches	0.38	0.29	0.20	0.52	0.37	0.44
Cherries and morello cherries	0.15	0.22	0.09	0.41	0.28	0.28
Apricots and <i>Prunus armeniaca</i>	0.33	0.28	0.10	0.35	0.31	0.48

Source: calculations after the Tempo Online database, NSI

In region South-West Oltenia production variability decreased for all species analysed. The total fruits production has the lowest variability index from all the regions. Region South-West Oltenia is the only region in which the plums production has a reduced variability, although the yield is not very stable. In this region the cherry/morello cherry represents the species with the best stability. Comparatively to the other regions, the cherry has the lowest variability index both for the production and for the yield (Table 8).

Table 8. Variability of production, yields and the trees' number, by total and by species in the Region: South -West Oltenia

Region:SOUTH -WEST OLTENIA	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fructe regional	0.38	0.43	0.01	0.11	0.16	0.17
Plums	0.42	0.45	0.01	0.12	0.20	0.25
Apples	0.50	0.54	0.05	0.23	0.21	0.08
Pears	0.45	0.45	0.05	0.23	0.16	0.11
Peaches	0.83	0.98	0.19	0.20	0.21	0.24
Cherries and morello-cherries	0.41	0.41	0.05	0.10	0.14	0.06
Apricots and <i>Prunus armeniaca</i>	0.57	0.58	0.09	0.18	0.16	0.05

Source: calculations after the Tempo Online database, NSI

In region West, the production variability decreased during the time passing from a high level to a medium one at majority of species. Although the total apricots production increased, this became more volatile. Anyhow, the apricot represents the only specie at which the yields variability is extremely high and increasing opposed to the previous period (Table 9).

Table 9. Variability of production ,yields and trees' number, by total and by species in the Region: West

Region WEST	Index P1(1996-2005)			Index P2 (2006-2015)		
	Production	Yield	No. trees	Production	Yield	No. trees
Total fruits- regional	0.35	0.34	0.02	0.17	0.14	0.13
Plums	0.42	0.42	0.03	0.20	0.16	0.15
Apples	0.47	0.53	0.07	0.29	0.19	0.29
Pears	0.34	0.26	0.12	0.25	0.30	0.27
Peaches	0.24	0.23	0.13	0.30	0.21	0.23
Cherries and morello-cherries	0.34	0.35	0.08	0.18	0.25	0.18
Apricots and <i>Prunus armeniaca</i>	0.42	0.39	0.07	0.32	0.46	0.25

Source: calculations after the Tempo Online database, NSI

CONCLUSIONS

In the first analysed period (1996-2005), the total fruits production had a medium variability level, which was due greatly to the variability degree of the yields. At regional level the fruits production had a medium level of variability in three regions: North-West, North-East and Bucharest -Ilfov; in the other regions the fruits production is characterized by a stressed variability, mainly in South-West Oltenia, region in which also the yields' variability was high.

In the period 2006-2015 it grew the stability degree of the production, mainly due to the variability of yields' reduction. The increase of the stability degree can be explained by the elimination from the production zone of the orchards reaching decline and the partial replacement of the new plantations. During the time, it can be seen a tendency of yields' increase.

At the whole country's level, the best production and yields' stability is registered at the pear trees, and the species with the highest yield variability is the plum tree.

In Region North -West the cherry tree represents the specie with the best stability, during the time, of production and yield.

În Region Center, the pear tree represents the species with the most reduced variability, both for the production and yield, comparatively to the other species, but also within regions.

În Region North-East the best evolution was registered at the apple tree, which passed from a high variability to a reduced one; the production and yield at apples in this region are characterized by the most reduced degree of variability in all the regions.

The Region South -East is to be remarked by the economic performance of orchards, fact explicable through the presence of the corey species, with a high value added. By eliminating from crop the old orchards, the productions' and yields' stability improved, passing from a high variability to one of a medium level for all analysed species.

Although the Region: South Muntenia has a reduced importance as a peaches' producer, in this region the production and the yield at peach are among most stable. Also, both the production and yield at apricot are registering the lowest variability index.

Evolution of Region Bucharest -Ilfov as a fruits producer is a negative one, with important areas; reductions and production losses at all species. It is the only region where there has taken place a significant increase of the variability of yields and production.

South-West Oltenia is the only region in which the plums production has a reduced variability although the yield is not so stable. Comparatively to the other regions, the cherry tree has the lowest variability index both for the production and the yield.

In Region West it was reduced the variability index at majority of species from a high level towards a medium one. Apricot represents the only specie in the region at which the yield variability is extremely high and increasing opposed to previous period.

The reduction of the variability index during the time is confirming the hypothesis that, in case of the fruit trees orchards in our country, the production stability is affected greatly by the structural factors.

BIBLIOGRAPHY

1. W. J. Burroughs, *Gardening and climate change*, Weather, Volume 57, Issue 5, 2002 P. 151–157
2. Cerutti A. K, Bruunb,S, Gabriele L. Beccaro, Bounousa G, *A review of studies applying environmental impact assessment methods on fruit production systems*, Journal of Environmental Management, Volume 92, Issue 10, October 2011, Pages 2277–2286
3. Coman Mihail, Chițu Emil coord, *Zonarea speciilor pomicole în funcție de condițiile pedoclimatice și socio-economice ale României*, editura Nivel Multimedia, ISBN 978-973-1886-93-0,

ANALYSIS OF COMPETITIVENESS ON THE MARKET OF MILK AND DAIRY PRODUCTS IN ROMANIA

NICA MARIA¹

Abstract: *The dairy sector is indispensable for the overall development of an economy because it provides a vital link between agriculture and industry. This helps diversify and market agricultural products; increases farmer income; creates markets for food exports, and generates more employment opportunities. The purpose of this paper will be to identify consumers' preferences for these products, the reasons for non-consumers, the wishes of consumers, the economic and financial situation of the main milk and dairy producers, the competitive dairy market as well as the information revealed by the consumer profile questionnaire sources of information and brands known to consumers. The stage of the milk and dairy market in Romania will be assessed, and then the competitiveness on the milk and dairy market in Romania will be analysed. Competitiveness requires special attention, each company has to compare products, prices, promotion and have competitive advantages constantly. In order to determine competitiveness, marketing researches on consumer preferences for milk and dairy products will be used; at the same time, the economic and financial performance of the main economic agents on this market will be analysed. The end of this study will be concretized by the comparative analysis of consumer preferences and the order of companies offered by their economic performance.*

Key words: *competitiveness, milk market, economic performance, marketing research*

JEL classification: Q12, Q13

INTRODUCTION

Milk and dairy products are important components of people's diet.

The dairy sector is indispensable for the overall development of an economy because it provides a vital link between agriculture and industry. This helps diversify and market agricultural products; increases farmer's incomes; creates certain markets for food exports, and generates more employment opportunities.

In the increasingly competitive market today, it is not enough to understand customers for the company to succeed and earn profit. Companies need to pay special attention to their competition. They must constantly compare their products, prices, channels and promotional efforts with their close competitors to identify areas of competitive advantage and disadvantage.

The purpose of this paper was to identify the consumer preferences of these products, the reasons for non-consumers, the wishes of consumers, the economic and financial situation of the main milk and dairy producers, the competitive dairy market, as well as the information revealed by the questionnaire used about the consumer's profile, information and brands known to consumers.

MATERIALS AND METHODS

Competitive positioning defines the relative position of a company in competitive space. This allows a firm to create an easy position to defend by choosing strategies based on strengths and weaknesses of the firm as well as on the opportunities and threats imposed by the competition space.

To determine competitiveness, I will conduct a qualitative research, as well as a quantitative research on the milk and dairy market, with the help of the interview guide and the questionnaire.

Qualitative and quantitative research should not be considered as competing and contradictory, but should be viewed as complementary strategies appropriate to different types of research questions or issues.

¹ Ph Student ASE - Faculty of Agro-Food Economics and Environment, Email: nicamaria93@yahoo.com

RESULTS AND DISCUSSIONS

The interview guide was applied to a sample of 8 people aged 22-24 years of age, with a similar level of education - higher education. Of these 8 respondents, by gender, 2 were men and the other 6 women.

If we refer to the residence environment of interviewees, most of them live in rural areas, and the rest in urban areas.

The most frequent monthly income of the sample persons is between 1000 and 1500 lei, 5 persons out of 8 are here, and one for the other three groups (1500-2000, 2000-2500, and over 2500). Thus most of the respondents earn below the minimum wage, with a monthly income between 1000-1500 lei.

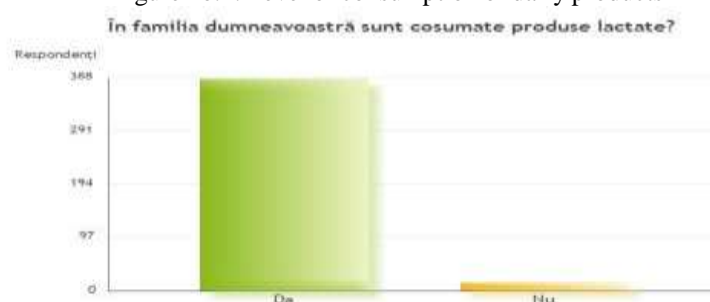
Of those interviewed, one consumes milk or dairy products every 2-3 days, the rest consuming these products every day.

Depending on the fat, most (5 out of 7) prefer fat 3,5%, one standard milk fat 1,5%, and the last one out of 7, prefer fat-free milk (0%). With regard to milk flavor, the majority of 6 out of 7 people, preferring "no flavor", "classic" or "standard" milk, one person prefers coffee flavored milk.

Quantitative research is a study that involved the use and analysis of numerical data using statistical techniques. Quantitative research methods are designed to produce statistically reliable data that tells how many people do or believe.

The questionnaire was developed on a sample of 400 people, to be completed, it was created on www.isondaje.ro and distributed on social networks.

Figure no.1. Level of consumption of dairy products



Source: Transpose data available on www.isondaje.ro

In this question 96.2% responded affirmatively, 61.2% are female consumers, 9% are married and 52.2% are unmarried and 35% are male, 5.5% are married and 29.5% are unmarried. People who do not consume milk and dairy products are 3.8%, of these non-consumers, 1.8% are females, 1% are married and 0.8% are unmarried, and 2% are male and unmarried.

As we can see in the following figure, the Danone brand achieved the highest percentage, namely 14.3%, 10.31% of the interviewees are urban and 4.03% are rural.

Figure no.2. Level of knowledge of the mark on the market



Source: Transpose data available on www.isondaje.ro

The Zuzu brand achieved a percentage of 12.8%, 9.60% live in the urban area and 3.27% live in the rural area, Covalact obtained a percentage of 11.9%, 9.0% of the interviewees are from urban area and 3% are rural. The Albalact brand achieved 11.4%, 8.43% of the interviewed people live in urban areas, and 3.09% of them live in rural areas; the Napolact brand achieved a 9%, 6.54% interviewees live in urban areas and 2.46% live in rural areas.

The other consumers who have chosen other brands have collected a coefficient of 0.8%. Of these consumers, 0.22% chose the Pilos brand and dwell in the urban area, 0.31% chose imported dairy products and live in the urban area, 0.13% chose the Kaufland brand and live in the urban area, and 0.14% said they consume milk and dairy products from their own household and are from rural areas.

Figure no.3. The order of preference of the brands on the market



Source: Transpose data available on www.isondaje.ro

With regard to the order of preference of the brands: Danone won 1st place with 1051 points, Zuzu second place with 1495 points, Covalact third place with 1548 points, Napolact fourth place with 1652 points, Albalact place of fifth with 1594 points, Muller ranked sixth with 1598, and Olympus seventh place with 1924 points.

Those who chose 1st place in the order of preference for Danone brands have collected a share of 38.44%, 24.16% are urban and 14.28% are from rural areas. Those who have chosen Zuzu for the 1st place have collected a 20% share, 17.63% are urban and 2.33% are rural.

Those who opted for the 1st Covalact have collected a share of 7.79%, 5.98% are urban and 1.81% are from rural areas, those who have chosen 1st place for the Napolact brand, have collected a share of 12.46%, 8.31% live in urban areas, and 4.15% live in rural areas, those who have opted for Albalact's 1st place, have a 7.79% share, 5.72% live in urban area and 2.07% live in rural areas. Those who chose Option 1 for Muller have a percentage of 7.27%, 4.42% live in urban areas, and 2.85% live in rural areas. Those who chose Olympus 1 have a 6.25%, 5.22% live in the urban area, and 1.03% live in the countryside.

Comparative analysis of consumer preferences and economic performance of milk and dairy producers

Finally, in order to be able to conclude the differences between societies from the economic and financial point of view, we made a comparison using the rank ordering method; so we have a table in which we have ordered the four companies per place according to the 5 indicators presented: net turnover, average number of employees, labor productivity, gross profit and profit rate.

In order to be able to offer a score to each company, we awarded points for each place, so for the 1st-4th place; 2nd-3rd place; 3rd to 2th place; fourth place - one point, and the results are as follows:

$$\begin{aligned} \text{SC Danone SRL: } & 4+3+4+3+2 = 16 \\ \text{SC Albalact SA: } & 3+4+2+4+4 = 17 \\ \text{SC Covalact SA: } & 2+2+1+2+3 = 10 \\ \text{SC Napolact SA: } & 1+1+3+1+1 = 7 \end{aligned}$$

Table no.1. Evolution of differences between societies

Indicators	First place	Second place	Third place	Fourth place
Net turnover	SC Danone SRL	SC Albalact SA	SC Covalact SA	SC Napolact SA
Average number of employees	SC Albalact SA	SC Danone SRL	SC Covalact SA	SC Napolact SA
Work productivity	SC Danone SRL	SC Napolact SA	SC Albalact SA	SC Covalact SA
Gross profit	SC Albalact SA	SC Danone SRL	SC Covalact SA	SC Napolact SA
Profit rate	SC Albalact SA	SC Covalact SA	SC Danone SRL	SC Napolact SA

Source: Transpose data available on <http://www.mfinante.gov.ro/>

Following these orders, according to the economic and financial indicators, SC Albalact SA ranked first, second place SC Danone SRL, third place SC Covalact SA, and SC Napolact SA.

In order to be able to evaluate the order of preference of the milk brands I calculated the score using the ranking method: for the place I I was awarded 7 points, for the second place I granted 6 points, for the third place I awarded 5 points, for IV place I granted 4 points for the V place we awarded 3 points, for the 6th place we awarded 2 points, and for the last place I awarded a single point.

Quantitative research was developed on a sample of 400 people, addressed to students from The Bucharest University Of Economic Studies, to employees of SC Fly Point RO SRL and to those interested in research who buy milk and dairy products.

In the survey, 385 people responded affirmatively and specified their preference for dairy brands.

Table no.2. Evaluation of the Milk Trademark Preference Order

Brands / Places	1 st place	2 nd place	3 rd place	4 th place	5 th place	6 th place	7 th place
DANONE	148	73	49	40	26	15	34
ALBALACT	30	66	67	54	57	51	60
COVALACT	30	60	80	66	43	63	43
MULLER	28	57	56	71	66	75	32
NAPOLACT	48	34	67	61	82	60	33
OLYMPUS	24	35	31	45	60	70	120
ZUZU	77	60	35	48	51	51	63

Source: Transpose data available on www.isondaje.ro

$$P_{\text{DANONE}} = \frac{148 \cdot 7 + 73 \cdot 6 + 49 \cdot 5 + 40 \cdot 4 + 26 \cdot 3 + 15 \cdot 2 + 34 \cdot 1}{385} = 5,24$$

$$P_{\text{ALBALACT}} = \frac{30 \cdot 7 + 66 \cdot 6 + 67 \cdot 5 + 54 \cdot 4 + 57 \cdot 3 + 51 \cdot 2 + 60 \cdot 1}{385} = 3,87$$

$$P_{\text{COVALACT}} = \frac{30 \cdot 7 + 60 \cdot 6 + 80 \cdot 5 + 66 \cdot 4 + 43 \cdot 3 + 63 \cdot 2 + 43 \cdot 1}{385} = 3,97$$

$$P_{\text{MULLER}} = \frac{28 \cdot 7 + 57 \cdot 6 + 56 \cdot 5 + 71 \cdot 4 + 66 \cdot 3 + 75 \cdot 2 + 32 \cdot 1}{385} = 3,84$$

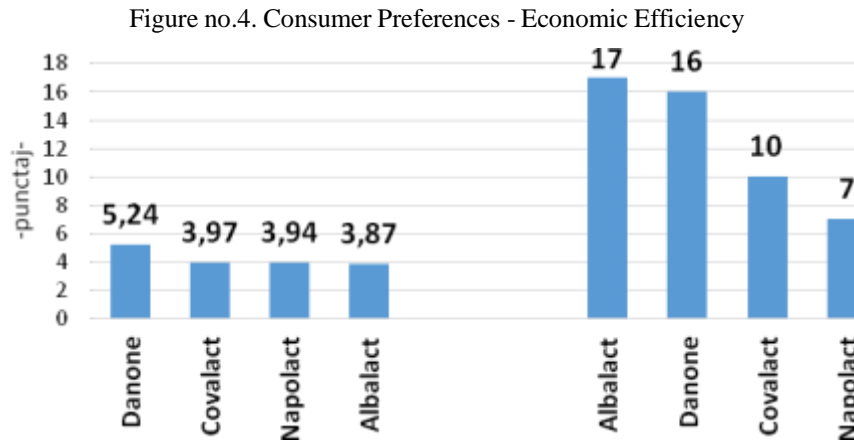
$$P_{\text{NAPOLACT}} = \frac{48 \cdot 7 + 34 \cdot 6 + 67 \cdot 5 + 61 \cdot 4 + 82 \cdot 3 + 60 \cdot 2 + 33 \cdot 1}{385} = 3,94$$

$$P_{\text{OLYMPUS}} = \frac{24 \cdot 7 + 35 \cdot 6 + 31 \cdot 5 + 45 \cdot 4 + 60 \cdot 3 + 70 \cdot 2 + 120 \cdot 1}{385} = 2,99$$

$$P_{\text{ZUZU}} = \frac{77 \cdot 7 + 60 \cdot 6 + 35 \cdot 5 + 48 \cdot 4 + 51 \cdot 3 + 51 \cdot 2 + 63 \cdot 1}{385} = 4,11$$

The order of preference for milk brands is as follows: Danone (5.24), Zuzu (4.11), Covalact (3.97), Napolact (3.94), Albalact (3.87), Muller and Olympus (2.99).

For the comparative analysis between the dairy preference order and the economic and financial analysis, I will only consider the brands of SC Danone SRL, SC Napolact SA, SC Albalact SA and SC Covalact SA because the economic and financial analysis we made only for these companies.



Source: Own calculations

In the order of preference of the consumers of milk and dairy products, Danone is the first one and, from the economic and financial point of view, following the use of the rankings method, is second only to a one-point difference from Albalact.

Covalact ranks second in the preference line of milk brands and third place in economic and financial terms during 2011-2015.

Napolact ranks third in the order of preference for milk brands and fourth place in terms of economic and financial indicators.

Albalact achieved the highest economic and financial score and the smallest score in the order of preference of brands, because some consumers have another perception of this brand and believes that Danone deserves the first place in the order of preference, society SC Danone SRL having the best marketing strategy compared to other companies.

CONCLUSIONS

Competitive analysis requires an understanding of competitiveness theory and how it is applied in the economy, competitiveness being an important objective for each economy.

The ultimate goal of the competitive analysis is to know a competitor as best to be able to think in the same direction as the competitor, so only the competitive strategy of the firm can be formulated to take into account the likely actions and responses of competitors.

Qualitative research has been done to make the subject more clearly defined or understood to provide a better understanding of marketing research. Most people consume dairy products daily, most prefer fatty and no-flavored milk. When purchasing milk and products, most of them appreciate the quality of the products, most of the sample people are open to novelty and consider that the products are being promoted sufficiently, all respondents consider domestic products to have advantages compared to imported products, the main advantage being the taste.

Most interviewees consume milk and dairy products, most of them feminine and unmarried. Non-consumers are also feminine, but they are married and the reasons they do not consume milk and dairy products are: they do not like the taste, they prefer milk substitutes, they have lactose intolerance or do not consider them beneficial for their health.

The most well-known brands of milk and dairy products are: Danone, Albalact, Napolact, Covalact, but those who have chosen other brands have also specified the following brands: Pilos, Kaufland, Carrefour or even the fact that they prefer milk on their own household. As regards the order of preference, the Danone mark is the favorite among the interviewed consumers, followed by Zuzu, Covalact, Napolact, Albalact, Muller and Olympus.

Most of the interviewed consumers are aged 18-25, they are female, unmarried, students, they have the income between 1000-1500 Ron, the last form being higher education and live in the urban area.

For the financial analysis we analyzed the main economic and financial indicators of the companies, such as: number of employees, net turnover, gross profit, labor productivity and profit rate. I chose to analyze four of the big competitors on the dairy market to establish competitiveness on this market and the following companies are: SC Danone SRL, SC Albalact SA, SC Covalact SA and SC Napolact SA.

Danone is ranked first in the consumer preference line and is second only to a one-point difference from Albalact in economic terms, as marketing greatly influences consumers' perception of consumed products rather than efficiency their economies. Danone is among the top five dairy brands worldwide with a magical formula consisting of health, diversity and education.

Covalact is ranked second in consumer preference and third place financially, and Napolact is ranked third in the dairy consumer preference line, and fourth in terms of economic-financial.

Albalact has the best place from the economic and financial point of view, but unfortunately does not have a good marketing strategy and in the order of the consumers got the lowest score.

BIBLIOGRAPHY

1. Aiginger Karl, Barenthaler Sieber Susanne, Vogel Johanna, (2013) *Competitiveness under new perspectives*, Ed. Working Paper,
2. Baranova Veronika, (2013) *Review of Economic Perspectives*, Ed. Obzor,
3. Boshoff Willem, (2013) *Why define markets in competition cases*, Ed. Bureau for Economic Research,
4. Hackler Darrene, Resiliency, (2012) *Competitiveness, and Innovation*, Ed. Government Finance Review,
5. Porter Michel, Leading (2012) *Competitiveness Guru*, Ed. Rangan& Roy,
6. Schwab Klaus, (2010) *The Global Competitiveness Report 2010-2011*, Ed. Word Economic Forum,
7. <http://www.mfinante.ro/>
8. www.isondaje.ro

ADVANCED STRATEGIES FOR ASSESSING THE QUALITY OF AGRICULTURAL PRODUCTS

CREȚU DIANA¹

Abstract: *The new developments in the agri-food product market in terms of quality, but also due to changes in the consumer behavior of agri-food products, it is necessary to implement new strategies on this market. These are primarily reflected in assessing and improving the quality of agri-food products. As will be presented in this paper, this evaluation process calls for the continued development of various economically efficient analysis methodologies. Their role is to provide safety, quality and traceability of products in the process of modeling, taking into account the needs of consumers and the legislative framework in place. The present paper will present the latest results with the help of modern science related to food and nutrition. Analytical techniques for assessing the quality of food products will also be presented according to their operating principles as well as other evaluation criteria. As well as methods used for this work, I mention the documentation and dissemination of specialized papers in Romania and abroad. As well as the results obtained, new approaches of the analysis strategies for the evaluation of the quality of the agrifood products will be presented.*

Keywords: *modeling techniques, agri-food products, qualitative strategies.*

JEL Classification: *L15, Q18, O32.*

INTRODUCTION

In order to assess the quality of agrifood products, a continuous development of robust, sensitive and economically efficient analytical methodologies is required to certify food safety, quality and traceability, in line with current legislation and consumer requirements. The development of a modern global agri-food distribution system relies heavily on food quality assessment beyond their simple characterization as a tool for: quality control, new product development, implementation of food safety regulations and rules, and settlement Minuses regardless of their nature. In addition, the huge interest in the sanogenic properties of food is of great interest, as a result of public concern about ways to improve health through so-called functional foods, functional and nutraceutical ingredients. There is no doubt about the necessity and importance of developing new techniques for assessing the quality of agrifood products that are prepared to cope with all present and future challenges. The interaction of modern science with nutrition and food, with disciplines such as pharmacology, medicine or biotechnology, offers a number of impressive opportunities and challenges. Researchers in the field of food science and nutrition go from classical theories to more advanced strategies, borrowing innovative methods, verified from medical, pharmacological and / or biotechnology research. From this research emerged advanced analytical methodologies such as omic and bioinformatic approaches - commonly used in conjunction with in vitro and in vivo techniques and / or clinical trials that were applied to investigate food and nutrition science topics that a few Nor were they intangible now becoming applicable.

In the modern approach to food science and nutrition, terms such as: utrigenomic, nutrigenetic, transgenic, nutritional genomics, functional foods, genetically modified products, nutritranscriptor, nutriproteomic, biological systems are in the process of expansion.

The classification of analytical techniques for assessing food quality according to their operating principle is as follows:

Mass Spectrometry (MS)

Nuclear Magnetic Resonance (NMR)

Infrared Technology (infrared -IR)

Atomic Spectroscopy (atomic spectroscopy -AS)

Immunological Techniques (ELISA)

Biological Techniques: Polymerase Chain Reaction (PCR)

¹ ASC Crețu Diana, ICEADR, București, cretu.diana@iceadr.ro

Biosensor Techniques

Electrochemical techniques for separation (High Performance Liquid Chromatography - HPLC),

Gas Chromatography (GC);

Capillary Electrophoresis (CE) Capillary Electrophoresis;

Supercritical Fluid Chromatography (SFC) chromatography;

Extraction of Supercritical Fluid Extraction (SFE);

Flow Injection Analyzes (FIA);

Flow Injection Analysis (PAT)

Microwave Assisted Extraction (MAE)

Techniques by Automatic Thermal Desorption (ATD)

Connected techniques (coupled operation of separation techniques and spectroscopic techniques).

MATERIAL AND METHOD

In this paper the main method of dissemination of existing information in the literature, both international and local, related to the techniques of evaluation of the quality of agro-food products will be used as the main method. Emphasis will be placed on the progress made in recent years in the field of quality management strategies, aiming at highlighting the benefits these innovative techniques can bring to the final food product.

RESULTS AND DISCUSSIONS

From the literature, the chromatographic separation based on the most numerous applications, using the various chromatographic liquid formats, including hydrophilic interaction chromatography, nano-liquid chromatography or counter-current high-velocity chromatography, few.

We can enumerate other techniques such as: gas chromatograph, which plays a very important role in food analysis (for the analysis of volatile fractions or fatty acids in food)

In recent years mass spectrometry in the evaluation of the quality of agrifood products has evolved greatly, which deserves a careful analysis.

In the 1990s, this technique was most commonly used as a gas chromatograph detector to confirm the identification of analytes. Mass spectrometry has been used over the past decade to directly identify and quantitate food compounds, usually coupled with other separation techniques, such as liquid chromatography and, to a lesser extent, capillary electrophoresis. Quadrupole mass spectrometry was limited to screening, as these instruments are not in line with the most current conditions set by regulations for agri-food products, especially those relating to the number of identification points.

Mass Spectrometry Tandem Detection (SM-SM) Mass Spectrometry Technique has improved selectivity, can help simplify the extraction procedure if attention is paid to ion suppression phenomena.

Triple quadrupole analyzers, ion trap and latest time of flight are currently being used.

Other applications of mass spectrometry include the following: analysis of pesticides and their metabolites for food and water brands, analysis of food and peptide proteins, basic analysis methods for characterization of genetically modified crops, analyzes of MALDI-TOF mass spectrometer for proanthocyanidines from Plants or multistage mass spectrometry to assess the quality, safety and origin of food.

Spectroscopic techniques are based on the principle that molecules and atoms can interact with electromagnetic radiation. These techniques are of great importance in assessing the quality of food, and they are very used because of the speed at which the results are obtained, offering the direct dimensioning of food constituents, do not involve toxic reagents and solvents, they can be used in

linear processes, Are destructive, are non-invasive, and some of them can detect multiple components at once.

The techniques for assessing the quality of the agri-food products mentioned above have enabled a large number of possibilities in food analysis to be created. A concrete case is online mass spectrometry mass spectrometry or mass spectrometry (SM-SM) tandem that has been applied on a large scale to ensure food safety, especially in the analysis of residues of antimicrobial agents in food of animal origin, Antibiotics from food samples, clenbuterol residues, food allergens.

Developments in this area have made remarkable progress in:

- 1) DNA-based techniques and molecular methods that have allowed sensitive and rapid detection of Salmonella in food or microbial composition for different foods
- 2) Biosensors, which are analytical analyzers, composed of a biological recognition element coupled to a chemical or physical transducer that converts the chemical signal into an electrical response.
- 3) Use of nucleic acid peptide technologies for food analysis and food authentication or the development of new immunological methodologies for the analysis of residues of veterinary medicinal products in food or for the analysis of residues of veterinary medicinal products in foodstuffs or characterize herbal food allergens.

As mentioned above, because of the stricter food safety requirements, creating conditions for the unprecedented development of analytical tools and methodologies for analyzing pathogens generating food poisoning, contaminants, and the effect of agri-food products processing (fruit and vegetables) containing pesticide residues.

At present, there are important concerns about the evaluation of agri-food products not only as a source of energy but also as a natural source of valuable components that can provide additional health benefits, following this trend emerged new terms such as functional foods, Functional or nutraceutical ingredients that are currently used in many laboratories around the world that investigate the linkages between the composition of foods and their benefits for human health.

Analysis strategies have changed significantly over the past 15-20 years, due to the following approaches:

- new analytical techniques such as comprehensive gas chromatography;
- solvent-free sample preparation techniques;
- fast gas chromatography with related techniques;
- Data generation strategies that produce a higher level of information analysis and dissemination;
- New operational strategies, based on approaches developed for other areas, and applied to analyze food.

CONCLUSIONS

Food research has evolved considerably over the last 10 years, focusing on multidisciplinary approaches that include: physics, chemistry, physiology and psychology to study food fractionation, sounds during biting and mastication, microstructure, muscle movements During mastication and swallowing and food acceptability.

Most studies have highlighted: the use of molecular techniques for the detection and characterization of pathogens generating food poisoning; The use of molecular, biological and immunological techniques for food chemistry; Mass spectrometry in food safety; Food analysis tools, dairy analysis, preserving and preserving identity and traceability for cereals, food contaminants, antibiotic residues in food, and fortified foods with vitamins. Many studies have focused on the use of Fourier transform infrared spectroscopic technique for authentication and rapid detection of food alteration; Over time the nuclear magnetic resonance domain applied to food; On biosensors connected to functional food safety; On the use of advanced analysis and methods of separation in food assessment; In identifying allergens in food; On the study of natural bioactive compounds and nutrigenomics.

The development of biological sampling techniques is the most important current and prospective trend compared to the previous period, along with the significant decrease in the use of

radiochemical and thermal techniques, probably due to the specific information provided on a large scale by new and advanced technologies, Capable of providing more faithful and sensitive information. Well-established techniques such as separation techniques continue to be used to a large extent, but are overcome by spectroscopic techniques that are currently the most widely used in food analysis.

BIBLIOGRAPHY

1. Noye D., 2000. Practical Guide to Quality Control. Technical Publishing House Bucharest.
2. Jäntschi L., 2004. Physical Chemistry. Chemical and instrumental analyzes, AcademiaDirect Publishing House, Cluj-Napoca
3. Scorei R. et al., 2000. Application of quality principles in the agro-food industry. Agora Publishing House
4. Olaru Marieta. Quality management. Economic Publishing House, Bucharest, 1999.
5. Rose K., 2005. Project Quality Management - Why, What and How, J.Ross Publishing, Inc.

EFFECTS AND CHARACTERISTICS OF THE IMPLEMENTATION OF THE 1921 AGRARIAN REFORM IN IAȘI COUNTY

DOBOȘ SEBASTIAN¹

Abstract: *The historiographical and socio-economic topic of the 1918-1921 agrarian reform, marked by a considerable degree of difficulty due to a multitude of objective, quantitative as well as qualitative factors, represents a point of reference in the research endeavours focused on the social and economic evolution of Romania. In fact, the major difficulties in the scientific approaches dedicated to the reform initiated by decree in 1918 are inherently determined by the statistical and historical sources, the causes being the stages of registration, sampling, centralization and processing processes, as well as the material and personnel resources which were very limited at that time. The issue of statistical and economic data volume deficiencies can be easily observed upon consulting archived documents, which contain numerous modifications, alterations and other interventions, researchers encountering real difficulties in extracting data and exploiting their real potential. The effects of the 1921 agrarian reform on the evolution of the inter-war society of Iasi County were overall multiple and complex, influencing to a greater or lesser degree all spheres of activity: economy, politics, culture, a.s.o. Substantial changes in the agricultural property structure following the implementation of the agrarian reform resulted in the small peasant household as a basic economic unit in the primary sector of Iasi County. The inter-war agricultural censuses corroborated with the statistics compiled by the authorities show that land ownership in Iasi county underwent substantial changes, compared to the situation prior to the year 1918.*

Key words: *agricultural sciences, economic history, historiography, interdisciplinarity, rural economy*

JEL Classification: N00, N30, N50

INTRODUCTION

The issue of the agrarian reform of 1918-1921 was approached by a number of economists, sociologists, historians and reputed politicians who reflected, studied and offered arguments for and against this cardinal event of national history. It is also appropriate to mention the sustained efforts of a series of dedicated teachers, archivists and other professional groups interested in the field of history. Due to their research efforts, materialized in larger or smaller, but certainly relevant works, the success of the interwar reform has gradually yielded a series of multiple interpretations, the researchers' perspective being influenced by the socio-political context. At the same time, it is imperative to mention the contribution of numerous foreign authors who brought a better understanding of the problem of the 1921 agrarian reform in the Kingdom of Romania, which shows peculiarities at the level of its administrative-territorial components, in accordance with the political programs implemented by the ruling parties. The interest of foreign researchers in the history of Romania, the agrarian reform carried out between the two world wars included, can be accounted for in terms of its amplitude compared to the other similar reforms carried out over time in the countries of Eastern Europe as well as the importance of Romania as a country with a predominantly agrarian economy, a vital supplier of cereal products for the highly industrialized economies located of Western Europe, particularly until the 1929 crash.

MATERIALS AND METHOD

Researching this reference event of the history of Romania involves a number of bibliographic, documentary, analytical and especially statistical difficulties. Part of the study of economic history, the agrarian reform of 1918-1921 is definitely a topic of research with a special status. Although the aim of obtaining quantitative results to support theoretical assertions and assessments derived from primary sources is a fundamental one, the importance of studying and making use of the available archival funds cannot be overrated. Thus the inventories and documents

¹ Doboș Sebastian, CS, Academia Română, Filiala Iași, I.C.E.S. „Gh. Zane”, sebastiandoboș@ices.acadiasi.ro

in the County Offices of the National Archives of Romania, including the Iași Branch, represent an indispensable research resource.

Despite the many established methods of approach, materialized in the form of statistical analyses and tables quantifying the effects of the 1918-1921 reform which appear rigid, difficult to approach by researchers unfamiliar with the rigors of statistical methods, the topic of the agrarian reform undoubtedly calls for more quantitative analyses, which are a major factor in understanding quantitative data. The major difficulties associated with such scientific approaches are determined by the statistical historical documents themselves, which include information concerning the processes of registration, sampling, centralization and processing, all of which were performed at the time not only with inappropriate tools, but by a small number of staff. Thus the archive documents involve statistical and economic data deficiencies (centralizations, figures, amounts or weights), something that is becomes obvious on even a brief consultation of these documents: there are many alterations, rectifications and all sort of corrections, so that potential researchers are bound to experience serious difficulties in extracting the relevant data. Moreover the documents filed in multiple archive units are often found in several copies - sometimes differing versions of the same document, so that the recorded figures and sums vary considerably. According to some researchers, in situations in which there are several variants of the same document, if the accuracy of recorded data cannot be established with certainty or if it is impossible to otherwise determine the degree of accuracy, all the variants of the archived facts should be presented side by side. On the other hand, several researchers and authors agree that the abundance of primary and secondary sources, making up a vast thematic bibliography, both qualitative and quantitative, is in itself a research difficulty. The archival funds that have survived the vicissitudes of time cannot be consulted without considerable efforts of selection and especially synthesis of historical data. On setting oneself the goal of obtaining as objective results as possible, in accordance with the current scientific requirements, it is only fair to admit that complete objectivity is not easily achievable. Consequently, despite possible arguments to the contrary, it can be safely said that, in order to ensure that one obtains results and interpretations as accurate as possible from a methodological point of view, an interdisciplinary approach is an absolute requirement. On engaging the topic of the 1921 agrarian reform in Romania, an interdisciplinary approach will involve, besides historiography in its dual interpretation, the agronomical sciences, demography, economics, geography, statistics, sociology, psychology, law, computer science and possibly more.

RESULTS AND DISCUSSION

The agricultural situation in the county of Iași at the end of the 19th and the beginning of the 20th centuries was plagued by contradictions, a natural consequence of the historical evolution, which also characterized the national economy at large, so that the situation of the county of Iași did not set itself apart from that elsewhere in the country. In this context, the land fund, the main wealth and production factor of Romania in contrast to other European states, was monopolized by the extensive agricultural holdings covering thousands of hectares, the property of landowners and often exploited through the lessees, which constituted a separate social category. In the region of Moldavia a large number of lessees were Jews, a situation was bound to lead to discontent. Many estates were managed and exploited intensively in the interwar period starting in the late 19th century and resulting in the emergence of the “trusturi arendașești” (extensive let out agricultural holdings) which eventually held tens of thousands of hectares, exerting a monopoly – one of the causes of the violent events of 1907. Most of these large-scale agricultural holdings used the workforce of the agricultural proletariat as the legal basis of “tocmeli” or “învoieli agricole”, which were agreements concluded in written form or in many cases orally. Such agreements proved to be an important factor in the evolution of the interwar agriculture of the county of Iași (as shown by many archived testimonies and contemporary literature) as the contractual terms imposed to detriment of the villagers were not abided by, a situation which further contributed to aggravating the severe poverty of the “plugari” (plough-wielding peasants). A major problem, was the

discrepancy between the big landed properties and the small peasant household, which in most cases were burdened by usurer and mortgage debts as well as plagued by structural deficiencies, the main downside being its reduced surface, insufficient to ensure even a subsistence level for small agricultural producers; this tiny plot of land was nevertheless the foundation of the national economy.

Our own investigations of archive documents have shown that prior to 1939, 217 estates had been expropriated in the county of Iași, with a total area of 98,281 hectares. This situation can be accounted for by the expropriation procedure itself, which was an ample enterprise, complicated due to its legal support, and providing for multiple exceptions. Although expropriation was declared broadly finished in 1926, the definitive appropriation of the peasants was hindered by the large volume of work to be carried out by an insufficient number of staff, as the following excerpt from one of many similar reports indicates: “It is now time to acknowledge the titanic work carried out and the strong desire of Mr. Ion Axinte, the Prefect of the county of Iași, to see all the villagers entitled, without anymore grievances. His next objective is to know every villager in possession of his house and arable plot, so as then to ask them to work well and rationally to produce much. For any piece of agricultural cultural propaganda will be useless, if there are further applications for appropriation from people entitled to it. [...] For the purpose of accelerating the plotting work, Mr. Ion Axinte, the Prefect of the County, intervened vigorously at the VI Cadastre Inspectorate, with the result that all the staff of the Inspectorate VI Iași are currently working at plotting and quota measurements. Consequently, the current state of agriculture from the perspective of the effects of the agrarian law looks promising, if only time and man will allow for it to be completed”².

The document entitled „Aplicarea măsurătorii terenurilor expropriate în conformitate cu Decretul Lege de către Direcțiunea Cadastrului (După formularul fișei cadastrale)”³ (“*The measurement of land expropriated in accordance with the Decree-Law by the Cadastre Department - According to the Cadastral Form Norms*”) at the level of the county of Iași, indicates that the total area of the measured estates prior to 1927, as set out in the “Instructions of the Decree Law no. 5697 of 1918” was 82,280.58 hectares, of which 62,088.62 hectares were due to be expropriated. Of these, 727.54 hectares were public domains, while 11,903.09 hectares represented the “unexpropriable areas left to their respective owners”. The cadastral authorities of the time estimated the “total expropriable areas” at 57,991 hectares and 23 ares, while the final measurement of the county's area was 60,634 hectares and 47 ares. The total area of “intangible” cultivated land belonging to landowners was of 15,301 hectares, the final recorded expropriated area in accordance with the decree-law being of 46,515.57 hectares⁴.

However, upon considering the figures listed in various tables of data concerning the measuring, dividing and plotting the expropriated estates according to the final provisions of the land reform law issued in 1921, obtained by compiling and centralizing the data from the cadastral data sheets of the agricultural holdings, a number of discrepancies become obvious. Thus, “Tabela XIV” (*Table no. XIV*) records a rectification of the total expropriated area of 40,419.59 hectares in the county of Iași, which makes for a difference of 6,095.98 hectares. The document certifies that, in accordance with the Decree-law no. 3697/918, at county level, an area of only 31.726 hectares and 84 ares was actually expropriated, while by transposing the final provisions of the decree in their final form in 1921 the area was of only 8,692.75 hectares. The explanation of this quantitative difference is included in the same document, which attests to the repeated changes of decision of the county commissions and the “Comitetul Agrar” (“*Agrarian Committee*”), in the form of two distinct columns, which record the areas returned to the deposed owners following their appeals. This happened in the “Cârligătura”, “Codru”, “Copou”, “Bahlui” and “Turia” administrative units, where a total of 517.75 hectares were returned to their former landowners as a result of successful legal actions, the official written explanation being that “s-a luat în plus proprietarului” (“*the owner*

² A.N.R. Iași, fond *Prefectura județului Iași*, dosar nr. 26, f. 98

³ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 15

⁴ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 3/1927, f. 369

was deprived through miscalculation”⁵). The statistical situation is detailed at the level of all the localities and estates, being possible to determine all the recalculations and corrections made by categories of land use (crops or pastures)⁶. It is important to note that there were cases in which some landowners attempted and sometimes succeeded, to circumvent the provisions of the law and to be granted exemption from expropriation of some estates or parts of estates. The Agrarian Reform Act of 1921 for the regions of Oltenia, Wallachia, Moldavia and Dobrugea (“Vechiul Regat”) allowed the expropriation of pastures and forests only under definite conditions.

According to the data recorded by “Serviciul Agricol Județean Iași” (“*Iași County Agricultural Service*”), by applying the provisions of the final decisions of Decree-Law no. 3697/918, by 1927, a total area of 84,992 hectares and 84 ares had been expropriated in the county of Iași⁷, out of which an area of 84,410 hectares and 54 ares were actually appropriated by the “Agricultural Service of the County of Iași” and distributed to the villages in the “Cârligătura”, “Codru”, “Copou”, “Bahlui” and “Turia” administrative units. The same documents mention that in the “Cârligătura” unit an area of 534 hectares and 30 ares⁸ had not been taken into possession at that date, and in the “Copou” unit, an area of 48 hectares had been returned to its former owner following a decision of the “Comitetul Agrar București” (“*the Agrarian Committee of Bucharest*”)⁹. According to the recapitulation drafted by the same county service and titled “Tablou anexă la situația model A.1927 - Vechiul Regat”¹⁰ (“*Annex to the Model Statement A.1927 The Old Kingdom*”) out of a total of 100,525 hectares and 96 ares, 93,270 hectares and 20 ares were crop areas, while the difference of 7,555 hectares and 76 ares represented pasture areas at the level of all the five regions of the county of Iași at that time. The same statistics also provide information on how the land was actually allotted. Thus, by 1927, out of the total area owned by the newly appropriated peasants, which amounted to 65,332 hectares and 59 ares, the local beneficiaries of the land reform owned 65,025 hectares and 59 ares while the remaining 307 hectares were allotted to the category known as “reangajați împrumătăriți”. The same table mentions an area of about 2,170 hectares which was farmed by lessees who were entitled to appropriation, as well as an area of 2,128 hectares and 35 ares set aside for potential colonists. Of this, an area of 386.75 hectares was destined to settlers from the Iași county, while an area over 4.5 times larger (1,741.6 hectares) had been reserved for use by peasants from the nearby counties. By subtracting from the total areas set aside for the resettlement claimants - 2,128.35 hectares, the remaining available land funds in the administration of the “Casa Centrală a Împrumătăririi Sătenilor” (“*Headquarters of the Agency for the Landed Properties of Villagers*”) amounted to 3,502 hectares and 92 ares¹¹.

The statistical records of „Consilieratul Agricol Iași” (“*Iași County Agricultural Council*”) mention a total of 4,298 hectares and 18 ares that were destined for land appropriation, but which were then farmed by lessees who were entitled to property. As mentioned above the issue of the village commons was a key one in the context of the 1921 reform. That there was a deficit of commons areas is indicated by the statistics compiled by the county councilor; in the county of Iași, out of a total of 22,412 hectares and 98 ares in 1927, an area of about 15,157 hectares had been allocated to this type of land, with the purpose of setting up new areas for grazing in order to satisfy the needs of stockholders. Following the distribution made by the “Serviciul Agricol” (“*Agricultural Service*”), of the available land fund, 15,139 hectares and 22 ares were classified as “date în debit” (“*under payment procedures*”), while only 18 hectares were under lease. Worth mentioning is the fact that, at the level In the five administrative units of the county of Iași, archived documents recorded that 7,255 hectares and 76 ares of commons land came from expropriations carried out under the “Land Reform Law”, having already been handed over by the “Serviciul

⁵ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 16

⁶ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 15-255

⁷ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 2

⁸ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 2

⁹ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 2

¹⁰ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 18

¹¹ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 9

Agricol” (*“Agricultural Service”*). In the “Cârligătura” unit, a total of 662 hectares had been expropriated, in the “Codru” unit an almost double area - 1,223 hectares and 22 ares, in the “Bahlui” unit almost 1,620 hectares, and in the “Turia” unit - 1,661 hectares and 50 ares. It can be noted that the administrative unit with the largest expropriated area was the one in the northern part of the county – “Plasa Copou”.

Archive documents provide information concerning details of general and global purposes, according to the provisions of the Decree-Law and of the Law of Land Reform. Of the total of 3,139.41 hectares of “reserves”: „Școli de agricultură de orice grad” (*“Agricultural schools of all degrees”*) – 106 hectares; „Ferme” (*“Agricultural holdings”*) – 264 hectares; „Locuri ocupate de clădiri” (*“Areas reserved to various buildings”*)– 11 ha.; „Loturi agricole model” (*“Agricultural model plots”*) – 280 ha.; „Loturi pentru Consilierat și Regiuni Agricole” (*“Plots designated for the use of the County Agricultural Council and Regional Agricultural Administrative Units”*) – 55 ha.; „Grădini de zarzavat asupra Casei Centrale” (*“Garden plots managed by the Central House”*)– 99.5 hectares; „Ministerul de Instrucție Publică (afară de școli primare)” (*“Ministry of Public Instruction (except primary schools)”*) – 77.5 hectares; „Ministerul Cultelor, Mitropolii, Episcopii, etc. (afară de biserici)” (*“Ministry of Cults, Metropolitan churches, Bishoprics, etc. (properties of local churches not taken into account)”*) – 100 ha.; „Ministerul de Război pentru orice destinație” (*“Ministry of war”*) – 60 ha.; „Ministerul de comunicații - cantoane de șosele” (*“Ministry of Communications - Road Cantons”*)– 103 ha.; “Subsecretariatul de Stat C.F.R., cantoane, stații etc.” (*“ State Undersecretariat for the Railways, Cantons, Stations, etc.”*) – 107.5 ha.; „Ministerul Sănătății Publice, pentru spitale, infirmerii” (*“The Ministry of Public Health for hospitals, infirmaries”*)– 50.94 ha; „Școli primare rurale” (*“Rural primary schools”*)– 545.36 ha.; „Biserici rurale” (*“Churches in rural areas”*) – 135.50 ha.; „Cimitire de oameni” (*“Cemeteries”*)– 20 ha.; „Cimitire de animale” (*“Burial plots for animals”*) – 10.75 ha.; „Terenuri tir și sport” (*“ Fields for practicing sports”*) – 83 ha.; „Drumuri de parcelare” (*“Agricultural access roads”*)– 760.31 ha.; „Serviciu Zootehnic (Loturi)” (*“Plots for the Livestock Service”*) – 123.50 ha.; „Ministerul de Industrie” (*“Ministry of Industry”*)– 2 ha.; „Iazuri cu stuh” (*“Ponds with reed”*)– 26 ha.; „Ministerul de Justiție” (*“Ministry of Justice”*) – 6 ha.; „Obor comunal” (*“Areas reserved for stock markets”*) – 1.40 hectare; „Lot apicol” (*“Beeharvesting plots”*) – 3 ha.; „Iarmaroace rurale” (*“Sites designated for rural fairs”*)– 0.20 ha.; „Fundăția <Carol>” (*“Carol Foundation”*) -14.45 ha.; „Tușișuri” (*“Bush-covered areas”*) – 126 ha.)¹². While in the year 1928 the total areas designated as reserves in the entire Kingdom of Romania amounted to 395,442 hectares, in 1930 the total was of only 353,781 ha.¹³.

RESULTS AND DISCUSSIONS

The surviving records of the “Consilieratul Agricol Județean Iași” (*“Iași County Agricultural Advisory Board”*), also include data that supports the process of reconstitution and evaluation of the effects of the 1921 agrarian reform. Thus, although the authorities had officially declared the works completed by 1926, the data provided by the available primary sources shows as in other interwar counties, that the official declarations, made for various reasons, did not quite correspond to reality, not unlike the situation in the rest of the country. Thus, in the county of Iași, although apparently insignificant considering the more than 100,000 hectares under the agrarian law of 1921, an area of 3,502 hectares of “crop land” was registered as being “available” in the statistical documents in the former archives of the “Casa Centrală a Cooperației și Împroprietăririi Sătenilor” (*“Headquarters of the Agri-coop Agency for the Appropriation of Peasants”*): 2,280 hectares and 39 ares in the “Turia” unit; 1,160 hectares and 35 ares in the “Bahlui” unit and only about 62 hectares in “Plasa Copou”, all of which had already been leased at the time. The figure, although small, is indicative of the delays in the actual field operations.

¹² A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 18; f. 11-12

¹³ Anghel Frunzănescu, *Evoluția chestiunii agrare în România*, p. 112 (apud Dumitru Șandru, *Reforma agrară din 1921 în România*, Editura Academiei R.S.R., București, 1975, p. 163)

It can be noted moreover that out of a total of 100,525 hectares and 96 ares measured by the “Cadastral Technical Inspectorate” teams, about 90% was registered as already sold or otherwise “handed over”. The fact that by 1927 only 10,769 hectares (10%) were registered as leased can be taken as an indication of the overall success of the agrarian reform in the county of Iași.

An important problem related to the reform in 1921, in the whole country as in the county of Iași is the distribution of the land earmarked for expropriation which was then sold to the entitled peasants, by categories of use. Thus, “The Iași County Agricultural Advisory Board” recorded the existence of a total of 72,264.39 hectares of arable and pasture lands in the five administrative-units, a fact which also confirms that most of the available land was arable. Then as now this was very much a characteristic of all the counties in Moldavia. Further records mention the forested areas - 150 hectares in the “Bahlu” unit, only 16 hectares in the “Copou” unit as well as the 195 hectares of land “unsuitable for farming purposes”, located in the „Plasa Bahlu” (the “Bahlu” administrative-unit), which is crossed from the NW to the SE by the homonymous river, which makes for the existence of extended areas of land that is unsuitable for farming. The 948 hectares of “Water bodies and marshlands” further mentioned by the Advisory Board were also unsuitable for farming purposes.

The prevalence of arable land at the expense of other categories in the interwar period is further recorded by the many detailed statistics of the “Iași County Agricultural Advisory Board” and its successor institution, “The Iași Agricultural Service”, which was set up in 1933. Thus, the document titled “*Situația recapitulativă de modul cum s`au folosit terenurile luate în primire de regiunea agricolă II Codru*”, created in accordance with specifications provided by the „*Tabel anexă la situația model A. 1927 Vechiul Regat*”, mentions the fact that in 1927 out of the 7,522.1 hectares included in the agricultural circuit in all of the 15 villages in the “Plasa Codru”, 83.73% represented land registered in column “Column B”- “Culture”, of the table. The “Codru” unit comprised 15 villages in 1927, however note must be made of the extremely frequent alterations that were made in the structure and boundaries of the administrative units during the interwar period, including dismantling of hamlets, villages and / or communes). In the 15 constituent rural communes there were 1,223.22 hectares of pastures, a fact which proves that the farming of arable land was the main occupation of the small household members, particularly given the geographical features of the county bordering on the Central Moldavian Plateau and the Moldavian Plain.

While the total areas of land registered as “available for appropriation purposes” in Column h of the general statistics equal 4877,77 hectares, the following document in the same historical source, titled “*Situația statistică pe comune și moșii a repartiției după folosință a terenurilor expropriate în mod definitiv prin aplicarea Decretului Lege și Legii Agrare luată în primire de „Regiunea agricolă II Codru”* (“*Statistical assessment by communes and agricultural holdings of the distribution, with the breaking down of land use, of definitely expropriated properties in accordance with the stipulations of the `Decree Law` and the `Agrarian Law` in the `Codru II Agricultural Unit`*)¹⁴ mentions a total of 7,270.60 hectares that had been expropriated for purposes of appropriation of the inhabitants of the 15 constituent villages of the “Plasa Codru: „Buciumi, Bârnova, Ciurea, Cornești, Mirolava, Costuleni, Prisăcanii, Voinești, Mogoșești, Mironeasa, Schitu-Duca, Pocreaca, Poieni, Tomești, and Osii¹⁵. Another general statistics of the “Iași County Agricultural Advisory Board” titled “*Table II Implementation of the Law of Land Reform*”¹⁶ contains information concerning the application of final legal decisions of the “Expropriation Commissions”, including the fact that 790 hectares and 96 ares had been expropriated for the purpose of establishing communal pastures in the “Codru” unit and distributed to a number of villages; further information refers to detailed quotas by village and details of the expropriated estates¹⁷.

¹⁴ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 108-109

¹⁵ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 19

¹⁶ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 3

¹⁷ A.N.R. Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927, f. 22; f. 39; f. 58; f. 75; f. 92; f. 112; f. 129; f. 146; f. 165; f. 181; f. 196; f. 213; f. 181; f. 244

Unlike the official estimates and initial law provisions, the process of peasant appropriation took place during the entire interwar period, at a higher pace in the period between 1918 and 1928. By the year 1938, in the county of Iași, 22,988 villagers, including “settlers”, had been appropriated with an average plot of 4.3 hectares, most of them Romanian nationals, unlike in other counties in Romania; a situation which can be accounted for in terms of the demographic structure of the county with a Romanian majority. At the same time, historical documents indicate the fact that a large number of entitled peasants were left either unappropriated or only provisionally appropriated. The causes of this unfortunate situation were multiple, ranging from lack of available land to numerous perpetrated abuses. The situation was different from one locality to another, depending on the land available.

CONCLUSIONS

The effects of the 1921 agrarian reform on the evolution of the interwar society in the county of Iași were clearly complex and multifaceted, with far-reaching consequences in all the fields of activity: economic, political, cultural, mentalities, etc. Substantial changes in the structure of agricultural property, determined by the application of the land reform law provisions, finally imposed the small peasant household as the main economic unit in the agricultural sector of the county of Iași. As evidenced by the interwar agricultural censuses, corroborated with the statistics compiled by the agricultural authorities, in line with the tendencies recorded throughout the country, land ownership underwent major restructuring, compared to the situation prior to 1918.

The major restructuring process of land property was a particularly active process in the interwar period, resulting from the constant dissolution of farmland into ever smaller agricultural plots. The 1921 agrarian legislation did not go unchallenged, for example by invocation of the fact that it failed to attach appropriate importance to the medium-sized property category. On the other hand, other contestants criticized the artisans and the responsible authorities of the agrarian reform on the grounds that its transposition into practice had failed to succeed in creating an economically self-supporting rural population category, given that despite the official publicly-assumed deadlines and the initial objectives of the law, in the end most villagers had been de facto appropriated with plots under the 5 hectare threshold, a limit considered by many specialists as the minimum necessary to ensure survival of an average rural household.

The research also aimed to determine the effects, developments and implications of the 1921 agrarian reform within the rural economy of the county of Iași, while including a brief comparison with the effects of the other major agrarian reforms of 1864 and 1945 at county level. The study aimed, last but not least, to establish the extent to which the ideological constraints influenced the research conducted prior to 1989, thus distorting the objectivity of the results. The research sought to highlight the modern character of the 1921 agrarian reform by introducing foreign bibliographic sources unavailable to researchers prior to 1989.

Given the literally overwhelming number of articles and studies devoted to the agrarian reform, careful study and further inquiry into the particularly valuable relevant results obtained through previous research proved necessary. This case study relies on the author’s own archival research, identification of relevant documents, followed by theoretical and statistical information processing through complementarity of both qualitative and quantitative research methods to the extent to which research data allowed it. Solid arguments of a historical nature concerning causal relationships, for example, take precedence over statistical analysis, given that quantitative methods are inapplicable outside of a well-defined theoretical framework. A case study is a difficult endeavour, but it is the only way to ensure objectivity of the proposed research. A field literature review was carried out, resulting in an extended use of the large numbers of relevant sources, interpretive methods, mainly descriptive, in order to obtain an in-depth objective knowledge of the research topic.

Notwithstanding the multiple perceived deficiencies, one of the important positive outcomes of the 1921 agrarian reform was the establishment of communal estates. The lack of such land

necessary for the provision of fodder for livestock as well as the increased costs directly imputed to the peasants by landowners or indirectly by the lessees of the farms were two of the main reasons that triggered the aggravated the degree of poverty of villagers, which in turn caused an increased dependency of villagers on the large agricultural holdings.

Finally, the major problem of the agrarian reform started in 1918 was the “smallness” of peasant-owned households and plots, an inconvenience further aggravated by the phenomena of succession divisions during the interwar period, of sale and renting, which were triggered by the unfavorable economic and financial conditions. A more in-depth knowledge of the evolution of the interwar rural space, organically linked to that of the urban environment, facilitated by the applied study and accurate analysis of the numerous historical sources at hand, albeit only fragmentary and inherently marked by the risk of subjectivity, which is fully understandable given the overwhelming quantity of information and the complexity of the topic approached, may prove to be a useful effort not only for those who take a particular interest in the subject. In this respect, it should be noted that by consulting the primary documents contained by the archival units that have survived the vicissitudes of time, it becomes obvious that an extended series did not benefit in from the attention and interest of an adequate number of researchers, despite their particularly valuable qualitative and quantitative content. Many archival units in Iași have remained for all intents and purposes in the same state they were in at the time of storage and preservation during the interwar period and then the Second World War. This can be determined, among other things, by mere consultation of the “List of readers” of the archived files, which, as is known, provides the signatures and full names of the various people who consulted them in the course of time. The documentary funds of the state archives of Iași were severely damaged following their 1944 eviction.

Potential research outcomes - new qualitative interpretations or quantitative assessments that can be obtained by further studying, without claiming to have a character of novelty or to substantially change the results achieved by former endeavors of authorities of the time involved in the implementation of the land reform, as well as the valuable research already undertaken by state authorities at time and scholars who have identified the general effects, trends, implications and relevant aspects of the agrarian reform of 1921 in Romania by means of analysis of collated local data can provide useful information not only for scholars of the academia or the general public, but maybe more importantly for present-day decision makers who play a part in the implementation ensuring the smooth running of the policies that govern the primary sector, given that a multitude of contemporary problems peculiar to the rural areas and especially to agriculture have proved to be an enduring historical feature.

BIBLIOGRAPHY

1. Garoflid, C. (1920). *Chestia agrară în România*. București: Editura „Tipografiei Gutenberg”
2. Șandru, D. (1975). *Reforma agrară din 1921 în România*. București: Editura Academiei R.S.R.
*** (1938). *Enciclopedia României*. București: Editura „Imprimeria Națională”, Vol. II
*** (1921). *Împroprietărirea Sătenilor – Legea agrară scrisă pe înțelesul tuturor*. București: Editura „Monitorul Oficial și Imprimeriile Statului” Archived Documents
3. Arhivele Naționale ale României – Filiala Iași, fond *Consilieratul Agricol Iași*, dosar. nr. 3/1927
4. Arhivele Naționale ale României - Filiala Iași, fond *Consilieratul Agricol Iași*, dosar nr. 6/1927
5. Arhivele Naționale ale României – Filiala Iași, fond *Prefectura județului Iași*, dosar nr. 26/1927

AUTOCORRELATION - PREVALENCE OF IDENTIFICATION OF COLLINEARITY CAUSE-

Merce E., C. C. Merce, Cristina B. Pocol*
*Corresponding author

Abstract: *The paper demonstrates that autocorrelation is an accidental statistical phenomenon, whose origin is the incomplete data base. It also shows that the attempts to redistribute factors interactions have focused on the development of methods of solving the effect rather than identifying the cause that generates collinearity. Three possible methods for collinearity removal are analysed comparatively. The premise for two of these methods is autocorrelation redistribution, and the third reveals the cause of collinearity and, implicitly, its cancellation. The three methods are named as follows:*

1. Classic method [1,7];
2. Method of Merce E., Merce C.C.[6];
3. Method of Merce E., Merce C.C.[5];

It is demonstrated that the first two methods are conventional approximations on the distribution of factors' interaction, with possible subjective consequences.

The ideal solution is the use of a complete data base. If this is not possible, as is often the case with databases of economic or sociological research, solving can be the completion of information with theoretical values, obtained by adjusting the causal relationship, in the hypothesis of a certain regression model, a procedure that represents, in fact and implicitly, a way of redistributing the interaction on the influence factors included in the causal model.

INTRODUCTION

Collinearity is an objective reality in the research of complex causal relationships, which externalises, as it will be demonstrated, whenever information about the causal complex is incomplete. The presence of collinearity alters the accuracy of numerical determinations between factors, on the one hand, and the studied effect, on the other. The phenomenon of collinearity cannot, however, always be avoided. This is primarily about research in economics, sociology, psychology. Therefore, it seems natural to evaluate the collinearity and then correct the determination relationship between factors and effect. For this purpose, methods of individualizing the influence of each factor have been outlined, respectively by calculating the partial correlation coefficients [1,6,7]. It will be emphasized that such attempts, although rigorous from a methodological point of view, are working conventions and that neither of these methods leads to the actual numerical determination ratios between factors and effects, ratios which can only be obtained in the case in which there are complete information on the causal complex. If the specificity of the researches necessary requires the use of an incomplete data base, then, in our opinion, the way of redistribution of the factors' interaction must be solved through the integration of the data base.

MATERIAL AND METHOD

We appreciate that, in the construction of methods of separating factors' influence, in cases of incomplete information, a principle mistake was made by which enthusiasm pushes us to combat or adjust the effects and not to explain the causes that produce them. This explains the presence in specialty literature of many methods which, with a higher or lower dose of conventionalism, offer the possibility of deciphering collinearity and collinearity redistribution by factors. All these methods, however, fall under the scope of conventional or, even more severely, of approximation of research results in violation of scientific rigor. That is, in the search for causality, according to these methods, the cause of collinearity was not identified. What is, therefore, the cause that generates collinearity (interdependence) among factors?

Studies, observations and concrete processing are the grounds that lead us to the conclusion that the source of collinearity is the incomplete information on the way of the exteriorization of the effect under the influence of the investigated factors. In such a case, the effect

of collinearity, respectively autocorrelation does not occur if all the states of the resultant variable (y_{ij}) are known for all possible combinations of states comprised of the factorial variables (x_{1j}, x_{2j}). Any deviation from this imperative generates collinearity. Compliance with this requirement means complete experimental plans, including all possible combinations of predetermined factors variants.

In the case of socio-economic phenomena, where the experiment is often impossible, the only alternative is to fill in the information with data adjusted in the hypothesis of a certain regression model, based on incomplete data in the experiment.

And in the case of agricultural experiments, it happens often to encounter situations that only contain some of the possible combinations of influence factors variants. In this regard, it was assumed the following experimental plan for corn crops, which is aimed at the evolution of average production according to NP doses (Table 1).

Table 1 The evolution of average corn production according to NP doses (conventional data)

Dose	Kg/ha	Dose	Kg/ha	Dose	Kg/ha	Dose	Kg/ha
N ₀ P ₀	4600	N ₅₀ P ₈₀	5865	N ₁₀₀ P ₁₂₀	7725	N ₁₅₀ P ₁₆₀	7920
N ₀ P ₄₀	4945	N ₁₀₀ P ₄₀	6095	N ₁₅₀ P ₈₀	7820	N ₂₀₀ P ₁₂₀	8050
N ₅₀ P ₄₀	5980	N ₁₀₀ P ₈₀	7590	N ₁₅₀ P ₁₂₀	7935	N ₂₀₀ P ₁₆₀	7915

RESULTS AND DISCUSSIONS

The picture of the possible combinations, respectively the corresponding average production, is shown in Table 2.

Table 2 The range of possible combinations of the five variants of each factor

X ₁ \ X ₂	0	50	100	150	200
0	4600	?	?	?	?
40	4945	5980	6095	?	?
80	?	5865	7590	7820	?
120	?	?	7725	7935	8050
160	?	?	?	7920	7915

This is a typical example of incomplete information, which generates collinearity and all shortcomings related to redistribution. Correspondences between the levels of factors allocated and the average production obtained for data processing are presented in Table 3.

Table 3

X ₁	X ₂	Y	X ₁	X ₂	Y	X ₁	X ₂	Y
0	0	4600	100	40	6095	150	120	7935
0	40	4945	100	80	7590	150	160	7920
50	40	5980	100	120	7725	200	120	8050
50	80	5865	150	80	7820	200	160	7915

In the case of the first two methods, from those mentioned, for autocorrelation redistribution, it is necessary to determine the correlation coefficients in the hypothesis of a certain theoretical regression model. To express the causal relation between the two factors and the average production, a linear bifactorial model was used. The bifactorial model is, at the same time, the starting point for calculating the adjusted values for completing the baseline data for the third method. Based on the hypothesis that the link could be expressed by a bifactorial, respectively a mono-factorial linear model, by processing the database, the following concrete forms of the models mentioned were obtained:

$$\bar{y}(x_1, x_2) = 4985,1 + 11,83x_1 + 8,56x_2; \quad R_{y, x_1, x_2} = 0,934; \quad D_{y, x_1, x_2} = 87,2\%$$

$$\bar{y}(x_1) = 5097,1 + 17,02x_1; \quad r_{y, x_1} = 0,914; \quad ;$$

$$\bar{y}(x_2) = 4978,9 + 21,82x_2; \quad r_{yx_2} = 0,862;$$

$$\bar{x}_1(x_2) = 7,02 + 1,12x_2; \quad r_{x_1x_2} = 0,824;$$

Taking into consideration the concrete form of the calculated regression models, it is possible to emphasize the methodological content of the three methods.

Method 1:

According to this method, the individualization of the influence of the two factors implies the redistribution of the interaction between them. For this purpose, it is recommended to calculate the coefficients of partial correlation, according to practices established in specialty literature [1,7].

$$r_{yx_1 \bullet x_2} = \frac{R_{yx_1x_2} \cdot r_{yx_1}}{\sqrt{r_{yx_1}^2 + r_{yx_2}^2}} = \frac{0,934 \cdot 0,914}{\sqrt{0,914^2 + 0,862^2}} = 0,680$$

$$d_{yx_1 \bullet x_2} = (0,680)^2 \cdot 100 = 46,2\% ;$$

$$r_{yx_2 \bullet x_1} = \frac{R_{yx_1x_2} \cdot r_{yx_2}}{\sqrt{r_{yx_1}^2 + r_{yx_2}^2}} = \frac{0,934 \cdot 0,862}{\sqrt{0,914^2 + 0,862^2}} = 0,641$$

$$d_{yx_2 \bullet x_1} = (0,641)^2 \cdot 100 = 41,0\%$$

Method 2:

Another method of distributing collinearity by influence factors recommended in specialty literature [6], namely the calculation of partial correlation coefficients and partial determinations is based on the illustration of how determinations are calculated in a specific causal complex in all successions possible. The illustration of the judgments underlying this method of calculation is shown in Figure 1.

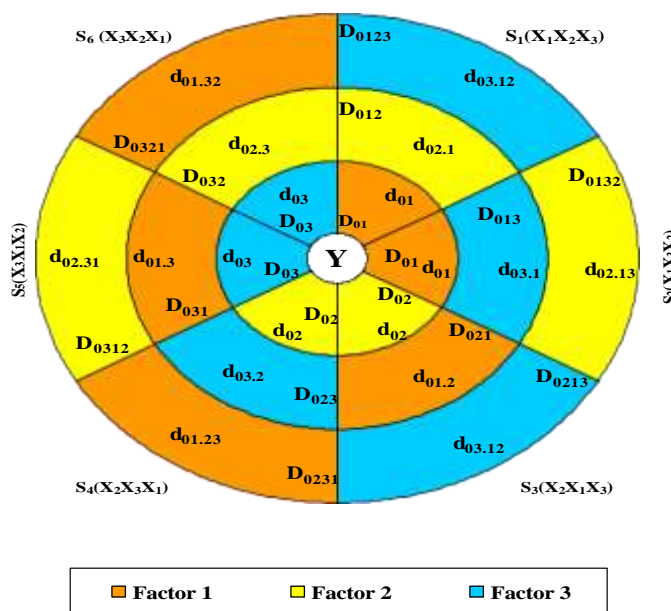


Fig.1 – Determinations in a causal complex of three partially autocorrelated factors

The calculation relations, respectively the calculations made according to the judgments presented in Figure 1, are as follows:

a. The general case:

The coefficient of partial correlation represents the square root of the average of determinations average explained step by step (iterative) in the context of a certain causal complex, in all possible successions, calculating according to the relationship:

$$r_{01 \bullet 23 \dots n} = \sqrt{\frac{A}{n}}$$

$$A = R_{01}^2 + \frac{(R_{012}^2 - R_{02}^2) + \dots + (R_{01n}^2 - R_{0n}^2)}{C_{n-1}^1} +$$

$$+ \frac{(R_{0123}^2 - R_{023}^2) + \dots + [R_{01(n-1)n}^2 - R_{0(n-1)n}^2]}{C_{n-1}^2} +$$

$$+ \frac{(R_{01234}^2 - R_{0234}^2) + \dots + [R_{01(n-2)(n-1)n}^2 - R_{0(n-2)(n-1)n}^2]}{C_{n-1}^3} + \dots$$

$$\dots + \frac{[R_{012 \dots (n-3)}^2 - R_{02 \dots (n-3)}^2] + \dots + [R_{015 \dots n}^2 - R_{05 \dots n}^2]}{C_{n-1}^{n-4}} +$$

$$+ \frac{[R_{012 \dots (n-2)}^2 - R_{02 \dots (n-2)}^2] + \dots + [R_{014 \dots n}^2 - R_{04 \dots n}^2]}{C_{n-1}^{n-3}} +$$

$$+ \frac{[R_{012 \dots (n-1)}^2 - R_{02 \dots (n-1)}^2] + \dots + [R_{013 \dots n}^2 - R_{03 \dots n}^2]}{C_{n-1}^{n-2}} +$$

$$+ \frac{[R_{012 \dots n}^2 - R_{02 \dots n}^2]}{C_{n-1}^{n-1}}$$

b. The three-factors case:

$$r_{01 \bullet 23} = \sqrt{\frac{R_{01}^2 + \frac{(R_{012}^2 - R_{01}^2) + (R_{013}^2 - R_{03}^2)}{2} + (R_{0123}^2 - R_{023}^2)}{3}}$$

$$r_{02 \bullet 13} = \sqrt{\frac{R_{02}^2 + \frac{(R_{012}^2 - R_{01}^2) + (R_{023}^2 - R_{03}^2)}{2} + (R_{0123}^2 - R_{013}^2)}{3}}$$

$$r_{03 \bullet 12} = \sqrt{\frac{R_{03}^2 + \frac{(R_{013}^2 - R_{01}^2) + (R_{023}^2 - R_{02}^2)}{2} + (R_{0123}^2 - R_{012}^2)}{3}}$$

c. The two-factors case and related processing:

$$r_{y_{x1} \bullet x_2} = \sqrt{\frac{r_{01}^2 + (R_{012}^2 - r_{02}^2)}{2}} = \sqrt{\frac{(0,914)^2 + [(0,934)^2 - (0,862)^2]}{2}} = 0,694$$

$$d_{y_{x1} \bullet x_2} = (0,694)^2 \cdot 100 = 48,2 \%$$

$$r_{y_{x_2} \cdot x_1} = \sqrt{\frac{r_{02}^2 + (R_{012}^2 - r_{01}^2)}{2}} = \sqrt{\frac{(0,862)^2 + [(0,934)^2 - (0,914)^2]}{2}} = 0,624$$

$$d_{y_{x_2} \cdot x_1} = (0,624) \cdot 100 = 39,00 \%$$

Method 3

As in many other areas, scientists remain stuck in efforts to combat the effects, neglecting the decipherment of causes that produce unwanted effects. This is the case with collinearity. As a result of many applications and statistical processing by authors, there was a suspicion that autocorrelation could be caused by the incomplete data base. Remaining in the field of scientific speculation, it has been shown that interaction distribution could be done by filling in the missing information with the adjusted values of the regression model used. By generating the adjusted values, using the elaborated bifactorial model, the complete database is as shown in Table 4.

Table 4

X ₂ \ X ₁	0	50	100	150	200
0	4600	5487	6078	6670	7261
40	4945	5919	6095	7012	7604
80	5580	6261	7590	7820	7946
120	5922	6514	7725	7935	8050
160	6265	6856	7448	7920	7915

Through data processing, the following concrete forms of the bifactorial model and of the mono-factorial models were obtained:

$$\bar{y}(x_1, x_2) = 4919,3 + 11,70x_1 + 8,59x_2; R_{y_{x_1}x_2} = 0,955; D_{y_{x_1}x_2} = 91,20 \%$$

$$\bar{y}(x_1) = 5606,8 + 11,70x_1; r_{y_{x_1}} = 0,823; d_{y_{x_1}} = 67,73 \%$$

$$\bar{y}(x_2) = 6089,1 + 8,59x_2; r_{y_{x_2}} = 0,4845; d_{y_{x_2}} = 23,47 \%$$

$$\bar{x}_1(x_2) = 100 + 0x_2; r_{y_{x_2}} = 0; d_{y_{x_2}} = 0 \%$$

It can be noticed that, for the third method, the interaction does not operate, and the coefficients of the simple correlation are at the same time coefficients of the partial correlation, respectively reflecting the pure influence of each factor.

Synthetically, the aggregate influence and the separate influences of the two factors for the three methods are presented in Table 5.

Table 5 The comparative situation of total determination and by factors (%)

Factor's influence	Incomplete data base		Complete data base
	Method 1	Method 2	Method 3
X ₁	46,2	48,2	67,73
X ₂	41,0	39,0	23,47
X ₁ , X ₂	87,2	87,2	91,20

For all three methods, the assignment of the total determination by factors is complete, but not unique. Moreover, the total determination is the same for the first two methods, but different for the third.

Method three confirms the truth that autocorrelation is generated by incomplete data bases, but, even in this case, it is assumed that total determination and true partial determinations can only be obtained in the case of the complete data base, obtained through the experimental plan.

BIBLIOGRAPHY

1. Merce E. – Statistică – aplicații practice, Babeș-Bolyai University, Faculty of Economics, Cluj-Napoca, 1986, p.92
2. Merce E. – Cu privire la calculul coeficientului corelației parțiale (I). Definiere, conținut. Studia 1/1989, Babeș-Bolyai University, Cluj-Napoca, pag. 51-60.
3. Merce E., V. Pârv – O nouă metodă de determinare a coeficientului corelației parțiale. Revista de Statistică nr. 3/1991, pag. 32-39.
4. Merce E., B. Pârv, Flavia Laun - Calculul coeficienților determinației parțiale. Metodă și program. Romanian Journal of Statistics no. 6, 1992, pag. 29-37.
5. Merce E., C. C. Merce (2003) – Eliminarea autocorelației dintre variabilele cauzale prin întregirea bazei de date, in the volume Specializare, dezvoltare și integrare; ISBN; 973-86547-4-2; pag,275-281, Babeș-Bolyai University, Faculty of Economics, Cluj-Napoca
6. Merce E., C. C. Merce – Statistică – paradigme consacrate și paradigme întregitoare, AcademicPres Publishing House, Cluj-Napoca, 2009, p.311;
7. Moineagu C. - Modelarea corelațiilor în economie, Scientific Publishing House, Bucharest, 1974.

AGRI-FOOD MANUFACTURING SECTOR IN ROMANIA – INTERNAL SIZES AND IN THE EUROPEAN CONTEXT

RUSALI MIRELA-ADRIANA¹

Abstract: *The sustainability of the food supply of the population in all Member States is a priority objective of the current CAP, with important implications both for ensuring food security and for developing the rural economy. In this context, the European sustainable development economic model promotes based on competitiveness, innovation and knowledge, where a key role lies with the small and medium-sized enterprise sector, due to its great flexibility in adapting the business to new market requirements.*

The research method used the comparison of the relevant economic and financial indicators for the activity of enterprises in the agro-food industry, in order to analyze the structure and level of development of the sector and to identify possible divergences between Romania and EU-28. The statistical material was provided mainly by Eurostat and NIS - The survey on the activity of the manufacturing enterprises data - NACE Rev.2 codes.

Keywords: *agri-food manufacturing, sustainable development; European Union.*

JEL Classification: L6, Q1, O5.

INTRODUCTION

One of the permanent, basic objectives of socio-economic policies for rural areas and a key theme for the current CAP is food security, for which a necessary premise is the efficient use of agricultural products. In this context, the agro-food industry is a major factor for the sustainability of the population's food supply and a reasonable level of income from activities undertaken in rural areas.

Together with the strategic actions of sustainable development, mobilized by international and European actions related to environmental protection and natural resources and the recent Europe 2020 Strategy, CAP objectives also aim at supporting the processing sector of agri-food products, according to the NRDP [3].

Among the most important recent strategic approaches taken at national level are the researches undertaken within the Romanian Academy, e.g. *National Strategic Framework for Sustainable Development of Rural Area 2014-2020-2030* [5] and the most recent major approach, *Romania's Development Strategy over the next 20 years* [6].

Various public information (e.g.: www.romalimenta.ro) on the development of the Romanian food industry draws attention to the difficulties it has to meet the quality standards demanded by the export market and the need for investments to modernize the sector, besides the fact that the domestic producers of raw materials are currently unable to compete with international suppliers, resulting in increased imports.

EU food legislation is harmonized, and the sector is significantly benefiting from the opportunities offered by the EU single market. However, the sector is facing certain challenges in both international and European markets, for which, the European Commission is focusing its policies on improving the competitiveness of the EU food sector and the functioning of the Single Food Market. At the same time, trade policy is geared to creating new opportunities for food and drink through various negotiations and dialogues with third countries [1].

A dedicated representative of the small and medium enterprises (SMEs) has been set up within the European Commission's General Directorate for Enterprise and Industry in order to better integrate the SMEs into the European Union policies, mainly e.g. promoting entrepreneurship and skills; improving access to markets; reducing bureaucracy; improving the growth potential of SMEs; strengthening the dialogue and consultation of stakeholders in the field.

¹ PhD, CSII, Institute of Agricultural Economics - Romanian Academy, E-mail: m.rusali@yahoo.com

MATERIALS AND METHODS

The research used the method of comparison of the relevant economic and financial indicators for the activity of enterprises in the agro-food industry, in order to analyze the structure and level of development of the sector and to identify possible divergences between the EU Member States and Romania.

The statistical material was provided mainly by Eurostat - *National Accounts aggregates by industry* and INS - *The survey on the activity of the manufacturing enterprises data* - NACE Rev.2 Codes.

Annual enterprise statistics, broken down by size classes, are the main source of data for SME analysis. The European Commission defines SMEs as enterprises with less than 250 employees and an annual turnover of up to € 50 million or a total balance sheet total of up to € 43 million (Commission Recommendation 2003/361 / EC) [1].

The Eurostat database provides a limited set of standard variables for the sub-sectors of the sector eg: number of enterprises, turnover, labour, value added, etc. mostly available up to the 3-digit level of the NACE activity group (NACE), based on criteria referring to the number of persons employed in each enterprise and depending on the economic activity of the subsector.

RESULTS AND DISCUSSIONS

The food and beverage industry is the largest manufacturing sector in the EU-28, in terms of labour (15%), turnover (15.6%) and value added (13%) (Eurostat, 2011-2014). The European Union is a net exporter in external food trade. Over the past 10 years, EU food and drink exports have doubled, reaching over € 90 billion and contributing to a positive balance of nearly € 30 billion.

In contrast, the external performance of Romanian agro-food products was deficient, the foreign trade balance being systematically negative, both for agro-food products with primary and secondary processing. The trade deficit in primary products was € -1.01 billion in 2015 and in secondary processed products, of € -0.4 billion in 2015.

Exports of processed products increased between 2007 and 2015, from € 512 million, to € 2.5 billion, but they had a smaller share (42%) in Romania's total exports compared to basic products.

Tobacco products were the single products of secondary processed group that achieved a positive trade balance, in 2015 (since 2008). As well, products from the vegetable & animal oils and fats chapter reached a recovery of the trade balance, from € -76 million in 2007 to € 42 million in 2015, being the only products of the primary processed with net exports [4].

Alike the EU countries, agro-food manufacturing industry (food industry & beverage and tobacco products) is the economic sector of Romania with major contributions to employment and value added in manufacturing, respectively 13.2% at employment and 26.2% in value added (average, 2004-2014) (Fig. 1).

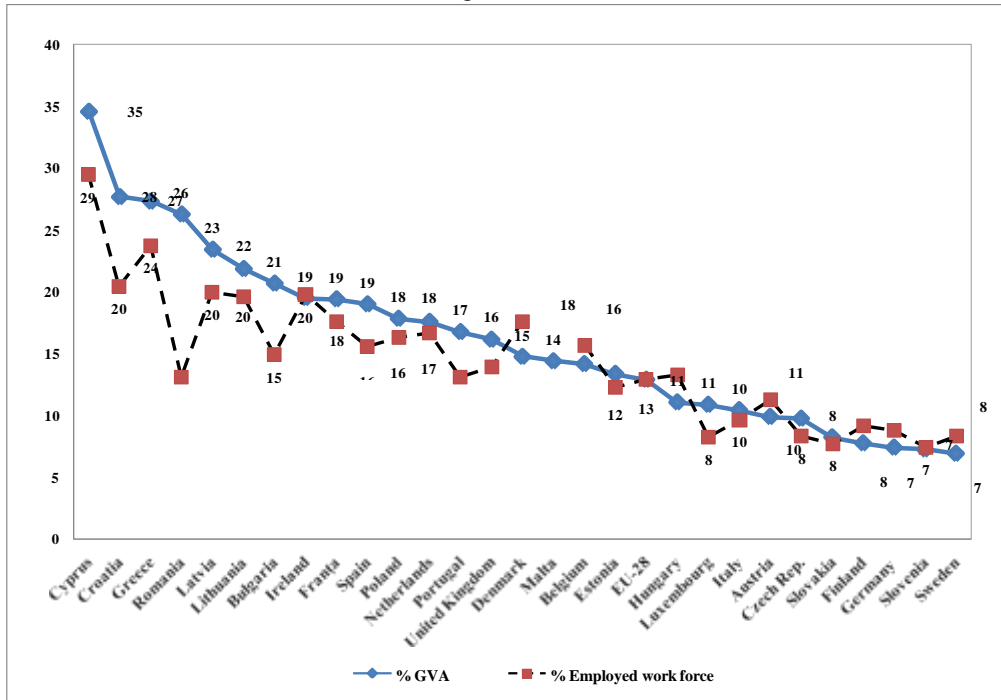
Romania ranks fourth, after Cyprus, Croatia and Greece, on the gross value added (GVA) contribution from the agro-food industry to the national manufacturing industry, according to the average of the period 2004-2014.

From Fig. 2 it can be noticed the downward trend of Romania's food industry over the last 10 years (2004-2014), during which time the GVA's contribution from agro-food industry to GDP was below the level of agriculture (except years 2007 and 2012).

Romania's agro-food industry contributed with 5.8% to the total GVA achieved in total national economic activity (GDP), on average in the period 2004-2014, ranking the first in the EU-28 states, of which average was 2.1%.

At the same time, Romania ranks below the European average, of 15% on the labour force, but above the European average of 12.9% on value added (7th after Greece, Cyprus, Croatia, Ireland, Lithuania and Bulgaria).

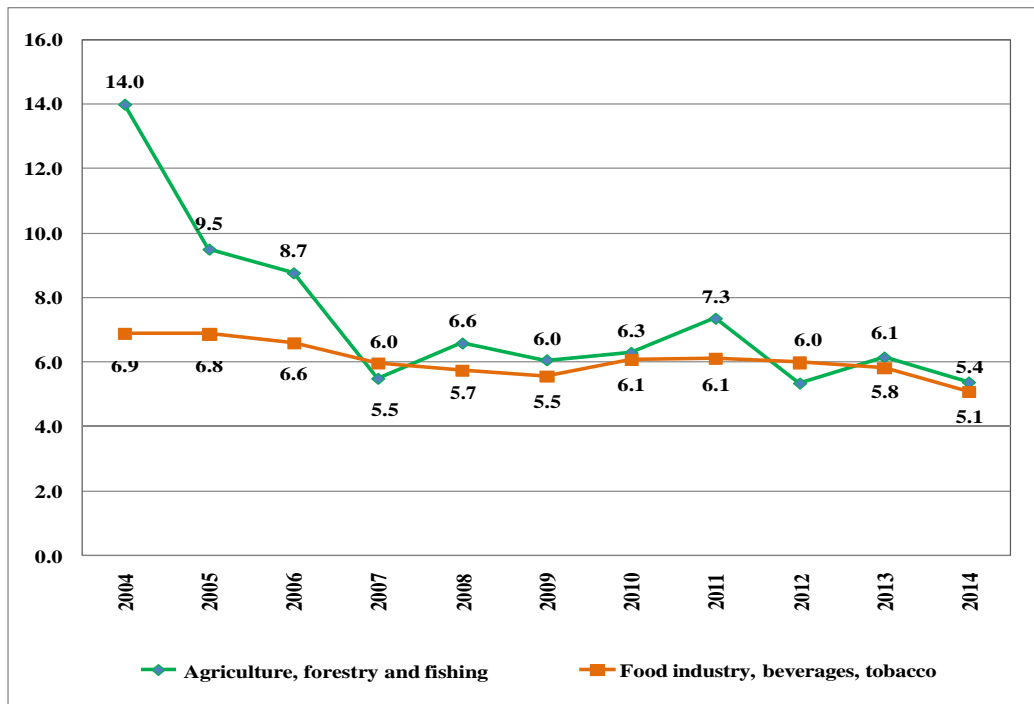
Figure 1. The contribution of agri-food industry from the EU-28 Member States in the national manufacturing industry (average, 2004-2014)



Source: processing of data from Eurostat - *National Accounts aggregates by industry*.

Romania achieved in the agro-food industry in 2014 a gross added value of € 6.7 billion in current prices, ranking 10th in comparison with the EU-28 member states, of which France, which made € 44, € 5 billion and Poland € 4.2 billion.

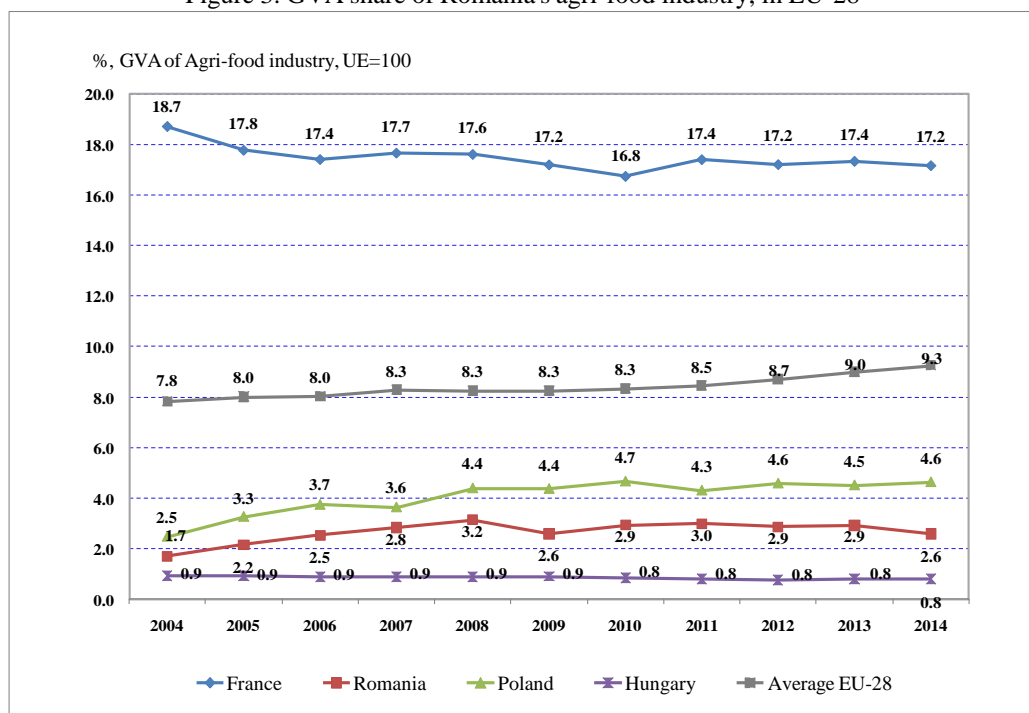
Figura 2. Share of GVA from agri-food industry and from agriculture in Romania's GDP - Evolution 2004-2014 -



Source: processing of data from Eurostat - *National Accounts aggregates by industry*.

However, the importance of Romania in the GVA achieved in the EU agro-food industry was 2.6% in 2014, below the level of most Member States, of which France, which held 17.2% and Poland, 4.2% (Fig. 3).

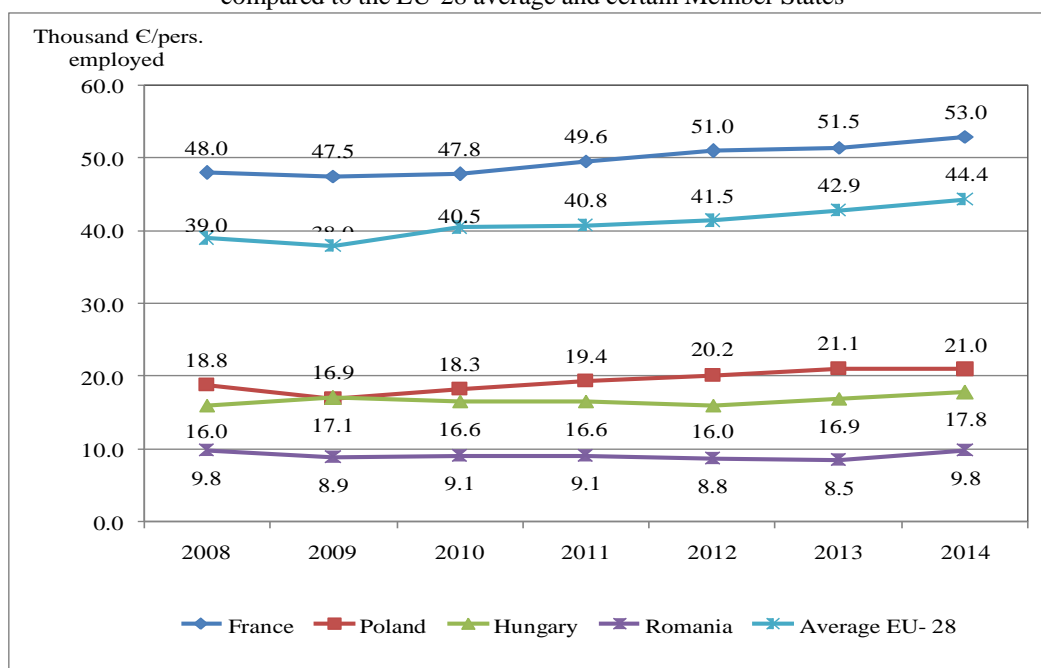
Figure 3. GVA share of Romania's agri-food industry, in EU-28



Source: processing of data from Eurostat - *National Accounts aggregates by industry*.

As a result, the apparent labour productivity in the food industry in Romania is at the lowest level compared to the EU-28 average and over 5 times lower than France. As can be seen in Fig. 4, in 2014, the productivity was € 9.8 thousand / person employed, at the same level in 2008, after a continuous decrease during that period.

Figure 4. The apparent labour productivity in the food industry in Romania, compared to the EU-28 average and certain Member States



Source: processing of data from Eurostat - *Annual enterprise statistics (NACE Rev. 2)*

In Romania, is active 3% of the enterprises from the food industry of EU-28, while 22% in France, 20% in Italy, and 11% in Germany, ranking on the first places in the EU-28, followed by Spain, 9%, Greece and Poland by 5% and Portugal, 4%.

Of the total number of 10.5 thousand enterprises in the agro-food industry of Romania registered in 2006, in 2014 the number was reduced to 8.8 thousand enterprises, of which, 89% activated in the food industry and 10% in the beverage industry.

Within the structure of the agri-food industry sector in Romania, the production value of almost 10.2 billion Euros (2014) was mostly made in the food industry, sharing 78%, while the beverage production, 20% and manufacture of tobacco products, 2%.

There were 163 thousand employees in this sector (compared to 175 thousand in 2006), the majority (92%) working in the food industry, while 8% in the beverages manufacturing.

Analysis by enterprise size class, by number of persons employed, according to NIS data for the year 2014, indicates that 3780 of 36% of the food industry enterprises were small enterprises (up to 50 employees) while 32% were medium-sized economic units (50-249 employees) and one third (31%) of enterprises had more than 250 employees.

Table 1. Average number of enterprises in the food industry (NACE C10), by size class (% in subsector, in 2014)

	Total	0 - 9 pers.	10 - 19 pers.	20 - 49 pers.	50 - 249 pers.	≥250 pers.
Production, processing and preserving of meat and products	817	452	95	96	129	45
Processed and conserv. of fish, crustaceans and molluscs	27	14	3	3	7	0
Processing and preserving of fruits and vegetables	319	258	25	19	13	4
Manufacture of vegetable and animal fats	141	112	10	8	7	4
Manufacture of dairy products	538	356	65	69	35	13
Manufacture of milling products	757	616	65	43	26	7
Manufacture of bakery and patry products	4734	3175	734	581	227	17
Manufacture of other food products	647	457	84	53	41	12
Manufacture of animal feed preparation	140	90	17	20	12	1

Source: Data processing from NIS, TEMPO-online - Main economic and financial indicators of enterprises with main activity in industry, construction, trade and market services CANE Rev.2 and size classes.

In the structure of the food industry sector, in 2014, most enterprises were in the subsector of manufacturing bakery and pastry products (58%), which absorbed more than 41% of all employees in the sector. On the other hand, activities in the fish processing and preserving industry (0.3%), oil and fat production and the manufacture of animal feed (by 1.7% each) had the highest concentration of economic units.

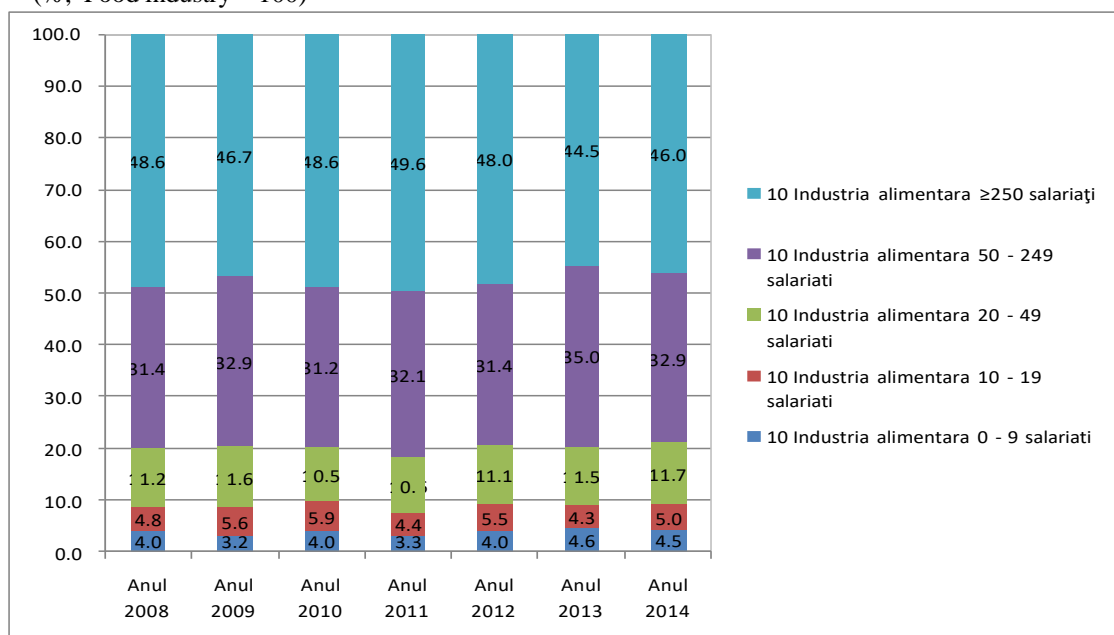
As can be seen from Table 1 dispersion by classes of activities, the major share (68%) was held by micro-enterprises (0-9 employees), being majority in all subsectors.

The activity with the largest share of microenterprises (over 81%) was the production of milling products, accounting for 9% of the food industry enterprises. Medium-sized enterprises dominated the baker's sub-sector (46%), while large enterprises dominated the meat processing subsector (44%), which also held an important share in the middle class (26%).

The distribution of value added (at factors cost) according to the share of the size class in the subsector, indicates that the largest share of the value added in the food industry of Romania (of 46%, in 2014), was produced in large enterprises, amounting to € 735 million, while 33 % in medium and 21% in small businesses with up to 50 employees. The major contributors were the enterprises from the production, processing and preserving of meat subsector, which made an added value of € 477 million (29.8%) and the production of bakery and pastry products with the added value amounting € 431 million (27%).

As Fig. 5 shows, the evolution of the added value share in the food industry of Romania, by enterprise size classes, between 2008-2014, had a tendency to maintain the proportions for the whole period.

Figure 5. Value added in the food industry, by size class of the enterprise (2008-2014)
(%; Food industry = 100)



Source: Data processing from NIS, TEMPO-online - Main economic and financial indicators of enterprises with main activity in industry, construction, trade and market services CANE Rev.2 and size classes.

However, in large enterprises (≥ 250 employees), there was a decrease of 2.6 percent in 2014, compared to 2008. During the same period, the small enterprises (0-49 employees) were slightly increasing, while added value made by medium-sized businesses had a higher growth trend of 1.5 percent.

CONCLUSIONS

The potential for capitalizing on Romanian agro-food products is important given the major share of the agro-food processing industry in the gross value added (GVA) and the labour force in the manufacturing industry. However, the contribution of the agri-food industry in GDP (GVA share) has been below that of the agricultural sector for most of the last 10 years.

Compared to EU-28, Romania's agro-food industry accounts for a major share of the GVA achieved in the manufacturing sector, ranking among the top five. Nevertheless, the gaps with the Member States concerning the employment in the sector and the apparent labour productivity, place it below the European average.

The external market performance of Romanian agro-food products is deficient, the balance of foreign trade being systematically negative both for agro-food products with primary and secondary processing.

In the structure of the food industry by activity, the largest number of enterprises is in the subsector of bakery and pastry products. At the same time, two-thirds were small and medium-sized enterprises. Large businesses dominate in the meat processing subsector, accounting together with the middle sizes class for 70% of the food industry. The milling industry had the highest degree of fragmentation, being the sector that dominates with the largest number of microenterprises.

The major contribution to the added value in the food industry of Romania was cumulatively achieved by the small and medium-sized enterprises (54% in 2014). The subsectors of meat industry and manufacturing of bakery products have made a major contribution to the added value of the sector (57%, cumulated).

Small and medium-sized enterprises (SMEs) characterized by a high degree of fragmentation (comprising more than 270 thousand companies), the majority of which are small and medium sized (99.1%), represent the backbone of the European economy, a potential source of jobs and growth.

BIBLIOGRAPHY

1. European Commission, (2016), *Food and drink industry*. (<http://ec.europa.eu/food/>).
2. INS, (2016), Anuarul Statistic al României, Institutul Național de Statistică, București.
3. MADR, (2016), Programului Național de Dezvoltare Rurală 2014-2020 (PNDR).
4. Rusali Mirela-Adriana, (2017), *Dimensiuni și tendințe principale privind sectorul de prelucrare a produselor agroalimentare*, în Volumul „Economie agrară și dezvoltare rurală într-o perspectivă regională”, Cecilia Alexandri et.al (coord.), Editura Academiei Române.
5. Steriu, V., Otiman, P.I. -coord., (2013), *Cadrul strategic național pentru dezvoltarea durabilă a spațiului rural în perioada 2014 – 2020 – 2030*, Comisia Prezidențială pentru Strategia Agricolă a României, Editura Academiei Române, 2013, 161-170.
6. Vlad, I.V., - coord., (2016), *Strategia de dezvoltare a României în următorii 20 de ani*, Vol. II, Editura Academiei Române.

ROMANIAN AGRIFOOD TRADE WITH THE MEDITERRANEAN COUNTRIES – FROM THE BARCELONA DECLARATION TO THE EURO-MEDITERRANEAN PARTNERSHIP

GAVRILESCU CAMELIA¹, MATEOC-SÎRB NICOLETA², MATEOC TEODOR³

Abstract: *Romania had important trade relations with the Mediterranean countries since before 1990. Subsequently, in both the pre-accession and post-accession period, this group of countries took together about 47% of the extra-EU Romanian agri-food exports and 16% of the extra-EU imports (averages 2002-2016). On the other hand, the imports of vegetables from the Mediterranean area are severely competing the Romanian domestic production (which is rather large, but is very poorly organized all along the supply chains), while the imports of fruit are competing the EU domestic production and intra-EU trade. The present paper is analyzing the dynamics and changes in competitiveness of the Romanian agri-food trade with the Mediterranean countries, in terms of value and volume, composition by products and partners. The results show a significant increase in the Romanian exports to the Mediterranean countries (which lead to the shift of the country's regional trade balance from negative to positive since 2010), as well as competitiveness gains on the main destinations markets in the region.*

Key words: *agri-food trade, Romania, Euro-Mediterranean Partnership, competitiveness*

JEL classification: F14, Q17

INTRODUCTION

In the broad context of sustainable development, a general trend of gradual transition to an open market in the global agri-food trade is a desirable process, although not easy achievable. The recent economic crisis, with its dramatic rise in food prices and contraction in agri-food trade highlighted the risks of excessive concentration of exports as well as of overdependence on imports for the food security and for keeping the balance and position on the regional and global markets. Drastic political measures such as the embargo on imports enforced by the Russian Federation against EU [2] and more recently against Turkey put even more pressure on the regional and world agri-food markets.

Although the EU gradually opened its markets to agri-food products originating from the partner Mediterranean countries, these still have to meet severe quality requirements, as well as other issues related to rules of origin, product labelling, geographical indications etc. (Gavrilescu, 2014).

Romania had important trade relations with the Mediterranean countries since before 1990. Subsequently, in both the pre-accession and post-accession period, this group of countries took together about 47% of the extra-EU Romanian agri-food exports and 16% of the extra-EU imports (averages 2002-2016). By far, Turkey is the main trading partner in the region, followed by Egypt and Jordan. The range of products is rather narrow: Romania is exporting mainly cereals, oilseeds and live animals and is importing mostly fresh and processed vegetables and fruits.

These exports are important for Romania, since for the last few years they contributed essentially to the reversal of the Romanian agri-food trade balance from negative to positive.

On the other hand, the imports of vegetables from the Mediterranean area are severely competing the Romanian domestic production (which is rather large, but is very poorly organized all along the supply chains), while the imports of fruit are competing the EU domestic production and intra-EU trade. The most affected products are tomatoes and citrus fruit, which are listed by the

¹ Dr. Camelia Gavrilăscu, senior researcher, Institute of Agricultural Economics, Romanian Academy; email: cami_gavrilescu@yahoo.com

² Prof. dr. Nicoleta Mateoc-Sîrb, Banat University of Agronomical Sciences and Veterinary Medicine "King Michael I of Romania", Timișoara, Romania, e-mail: mateocnicol@yahoo.com

³ Assistant Prof. dr. Teodor Mateoc, Banat University of Agronomical Sciences and Veterinary Medicine "King Michael I of Romania", Timișoara, Romania, e-mail: teomateoc@yahoo.com

EU as “sensitive”, and thus partially excepted from the Association Agreements in the Mediterranean area.

The present paper is analyzing the dynamics of the Romanian agri-food trade with the Mediterranean countries, in terms of value and volume, composition by products and partners, as well as the changes in the competitiveness shown by the detailed trade balance.

MATERIAL AND METHODS

In the present paper, calculations were made using Eurostat data (HS classification) and UN-Comtrade data. Agri-food products are included in the HS chapters 01 to 24. The analysis concerned the agri-food trade flows between EU and Romania as reporting countries and the Mediterranean countries (MED) as partner countries: Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey.

RESULTS AND DISCUSSIONS

The founding act of the Euro-Mediterranean Partnership is the Barcelona Declaration of 1995 [3], aiming at promoting the emergence of a common area of peace and stability in the Mediterranean through multilateral political dialogue, in addition to the bilateral dialogues provided for by the Euro-Mediterranean Association Agreements. The three main established objectives of the Partnership were achieving a common area of: peace and stability (“the Political and Security Basket”), of shared prosperity through economic and financial partnership and gradual establishment of a free trade area (“the Economic and Financial Basket”), and improved exchanges between cultures and civil societies (“the Social, Cultural and Human Basket”).

The free trade area in the Mediterranean region and in the Middle East was expected to come into force by 2010, but successive political crises, various conflicts and even wars prevented it to be established. The initial idea was to create a matrix of free trade agreements between each of the partners and the others, the resulting network becoming the single free trade area. It is still not yet completely achieved; nevertheless, the basis has been set by the enforcement after 1998 of bilateral Association Agreements between EU and the partner countries (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia). Euro-Mediterranean Association Agreements are presently in force with most of the partners (with the exception of Syria and Libya). Another EU association agreement is under negotiation with Syria (currently suspended due to war), and EU has a customs union with Turkey (since 1996). Most of these partners are also part of GAFTA (Greater Arab Free Trade Area, established in 1997), which includes Libya as well. The liberalization process for agri-food trade among the 17 GAFTA Member States was completed since 1995; agri-food products are the third important traded product group, after fuel and manufactured products (Abedini & Peridi, 2008).

The key objective of the trade partnership is the creation of a deep Euro-Mediterranean Free Trade Area, which aims at removing barriers to trade and investment between both the EU and Southern Mediterranean countries and between the Southern Mediterranean countries themselves.

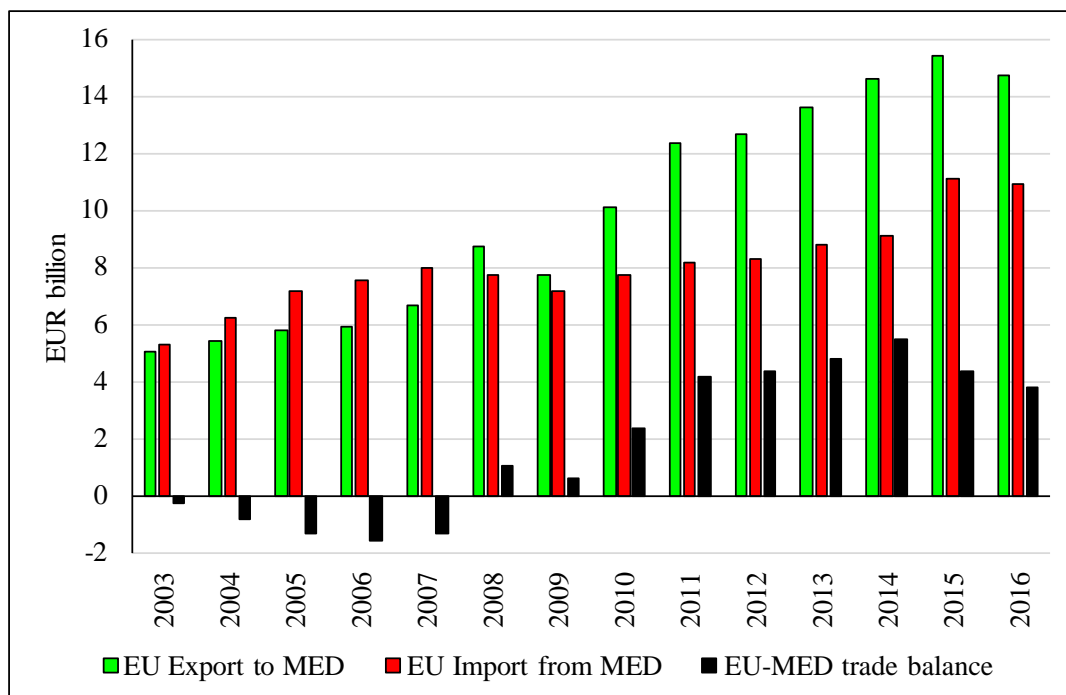
The successive enforcements of the bilateral association agreements between the EU and the Mediterranean countries (MED) allowed for increased agri-food imports originating from MED to enter the EU Single Market, resulting in negative trade balance until 2007 (figure 1).

On the other hand, the successive enlargements of the EU (and mainly with Romania and Bulgaria) boosted the exports to the MED countries, shifting the agri-food trade balance from negative to positive since 2008. Over the last 15 years (2003-2017), the value of EU exports to MED countries almost tripled (from EUR 5 billion to 14.7 billion), while the value of imports doubled only (from EUR 5.3 billion to 10.9 billion).

In 2003-2016, the average share of the MED countries was 11% in EU agri-food exports and 8% in imports, but the flows were not balanced at all: the main destinations for EU agri-food exports to MED countries were Algeria (22%), Turkey (19%), Egypt (12%) and Morocco (11%),

while imports were far more concentrated: almost half were originating from Turkey (45%), a quarter (26%) from Morocco and 13% from Israel.

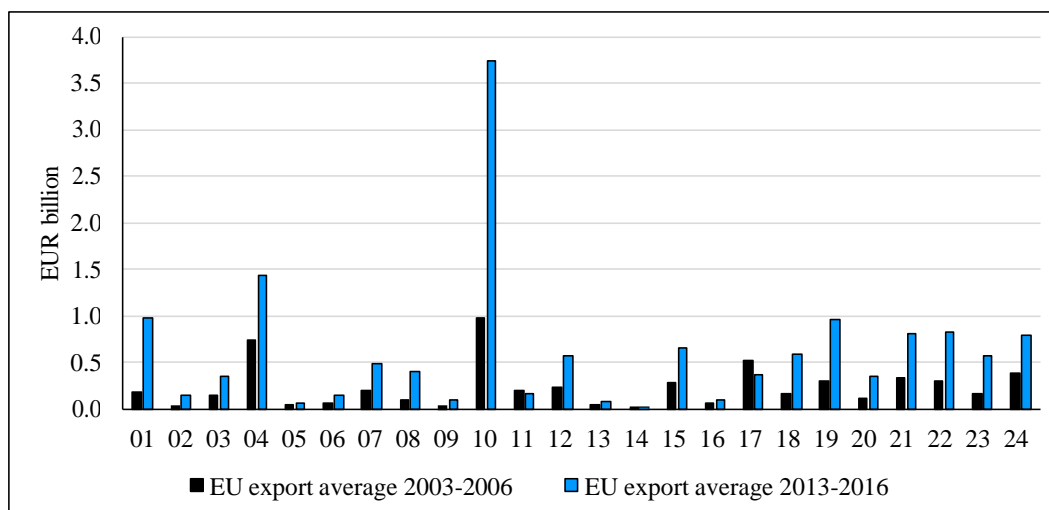
Figure 1 – Agri-food trade between EU and the Mediterranean countries



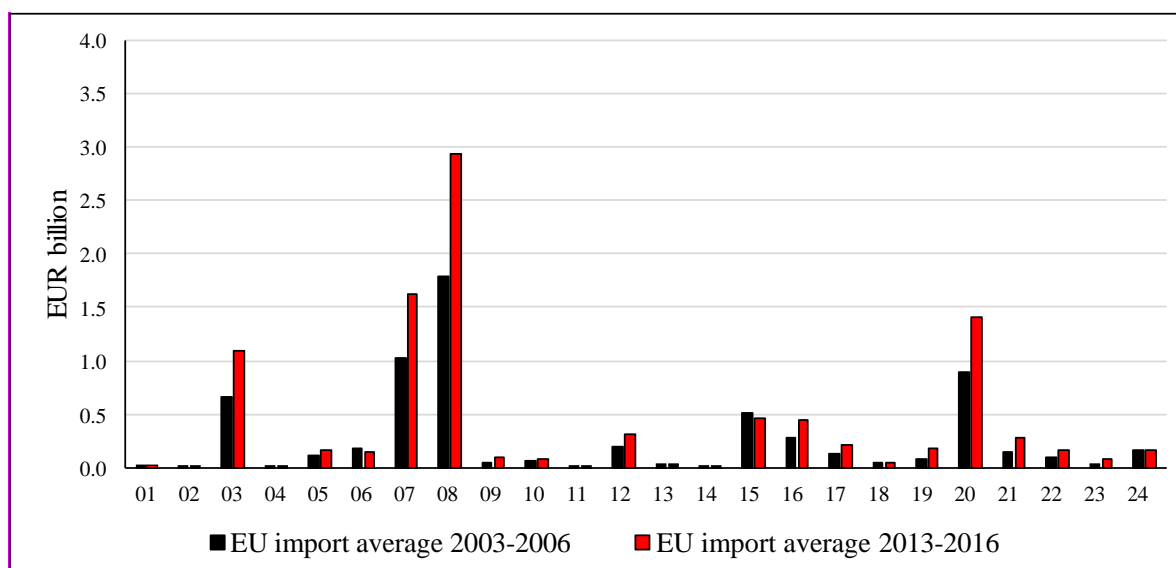
Source: calculations using Eurostat data [4]

The product composition of exports and imports is significantly different. The EU is exporting to MED countries mostly cereals, milk and dairy products, live animals, and processed food (sugar and confectionery, bakery and pastry products, miscellaneous edible preparations, beverages, tobacco products). In the last decade, the EU exports to MED countries increased significantly in value and became more concentrated: the first three product groups (HS 10-cereals, HS 04-milk and dairy products, and HS 01-live animals) accounting together for 34% of the exports, and worth EUR 1.9 billion in 2003-2006, increased to 42% of exports, worth EUR 6.1 billion in the period 2013-2016 (figure 2).

Figure 2 – Agri-food trade between EU and the Mediterranean countries:
2a – change in the product composition of agri-food exports



2b – change in the product composition of agri-food imports



Notes: chapters HS (Harmonized System) 01-24, which are covering all agri-food products: 01-live animals; 02-meat; 03-fish and seafood; 04-dairy products, eggs and honey; 05-other animal products; 06-live plants; 07-vegetables; 08-fruit; 09-coffee, tea and spices; 10-cereals; 11-products of the milling industry; 12-oilseeds; 13-lacs, gums and resins; 14-other vegetable products; 15-oils and fats; 16-meat and fish preparations; 17-sugar and confectionery; 18-cocoa and cocoa products; 19-cereal baking and pastry products; 20-vegetable and fruit preparations; 21-miscellaneous edible preparations; 22-beverages; 23-animal feed; 24-tobacco and tobacco products.

Source: calculations using Eurostat data [4]

EU main imports from the MED countries are fruit (HS-08), vegetables (HS-07), preparations of fruit and vegetables (HS-20), and fish (HS-03). These four product groups accounted together for 67% of the EU imports, worth EUR 4.4 billion in 2003-2006; their increase was far less spectacular: in 2013-2016 they accounted for 71% of exports and EUR 7.0 billion.

The EU employs large numbers of temporary workers from the region, mainly from the Maghreb countries and Turkey; therefore, the overseas workers' remittances contribute significantly to the foreign earnings in many of the MED countries [7].

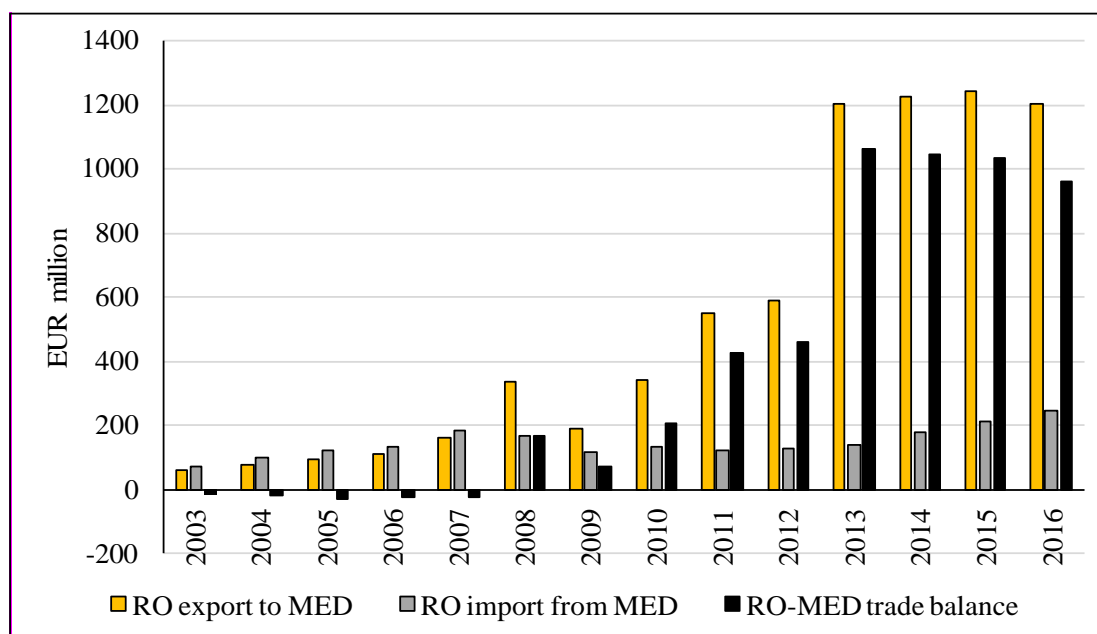
Since before 1990, Romania had important trade relations with the Mediterranean countries. In the pre-accession period, both agri-food exports and imports from MED countries were rather modest (less than EUR 140 million), showing also a small trade deficit (figure 3).

After EU accession, Romanian exports to MED countries showed a rather high growth rate: as compared to 2006 (the last pre-accession year), their value was 3 times higher in 2010, 5.4 times higher in 2012, and 11 times higher in 2016. The EUR 1 billion threshold in export value was exceeded since 2013. This spectacular evolution is due mainly to the country's entry on the Middle East cereals market. Imports from the MED countries diminished in the early post-accession years, but the upward trend resumed since 2011 although at a small pace, such that in 2016, imports were only 1.8 times higher than in 2006. These combined trends resulted in a large surplus of the Romanian – MED trade balance, which pushed the total Romanian extra-EU agri-food trade balance in the positive area.

The MED countries are the main export destinations for the Romanian extra-EU agri-food products: they accounted together for more than half of the country's exports to non-EU destinations (54%, average 2003-2016), but only 17% of the imports.

The exports directions changed in share between the two analyzed periods: in the first period, the top three destinations were Turkey (which absorbed 51% of the Romanian exports value to MED countries), Syria (15%) and Egypt (7%).

Figure 3 – Agri-food trade between Romania and the Mediterranean countries



Source: calculations using Eurostat data [4]

In the second period (2013-2016), the ranking of the exports destinations and shares changed (table 1): Egypt became the first destination (26%), followed by Turkey (17%) and Jordan (16.8%).

Table 1 - Value of Romanian agri-food exports to Mediterranean countries: change between average 2003-2016 and average 2013-2016

Partner country	Change in export value (average 2013-2016 vs. average 2003-2006)		Change in average 2003-2006 vs. average 2013-2016	
	± EUR million	Ratio (2013-2016) / (2003-2006)	Change in share of exports (%) in total exports to MED countries	Change in rank
Turkey	+164.0	x 4.8	50.8 ↘ 17.0	1 ↘ 2
Syrian Arab Republic	+ 27.6	x 3.1	15.3 ↘ 3.3	2 ↘ 8
Egypt	+ 309.9	x 51.4	7.2 ↗ 25.9	3 ↗ 1
Israel	+ 110.2	x 19.2	7.1 ↗ 9.5	4 ↘ 5
Morocco	+ 28.5	x 7.1	5.5 ↘ 2.7	5 ↘ 9
Libyan Arab Jamahiriya	+ 174.0	x 49.0	4.3 ↗ 14.5	6 ↗ 4
Lebanon	+ 53.0	x 20.0	3.3 ↗ 4.6	7 ↗ 6
Tunisia	+ 49.2	x 24.7	2.4 ↗ 4.2	8 ↗ 7
Jordan	+ 203.7	x 105.4	2.3 ↗ 16.8	9 ↗ 3
Algeria	+ 15.7	x 11.3	1.8 ↘ 1.4	10 → 10
Palestinian Territory Occupied	+ 0.4	x 156.5	0.003 ↗ 0.4	11 → 11
Total Mediterranean countries	+1136.1	x 14.4	-	-

Source: calculations using Eurostat data [4]

The range of products is very narrow: cereals, live animals, oilseeds and animal feed: in 2003-2006 they accounted together for 68% of the exported products value; in 2013-2016 their cumulated share went up to 95%.

More than 2/3 of the total Romanian exports of live animals, animal feed and cereals go to non-EU destinations (Gavrilescu & Voicilas, 2014), of which the Mediterranean countries take the largest part: 92% for live animals, 82% for animal feed and 64% for cereals (table 2).

Table 2 – Romanian main products exported to the Mediterranean countries – an overview (average 2013-2016)

Product group	Total export (million tons)	Share (%)			Mediterranean countries destinations			
		Non-EU/ total	MED/ total	MED/ Non-EU	Quantity (thou tons)	Destination country	Quantity (thou tons)	Share in Mediterranean countries (%)
Cereals (HS 10)	10.35	70.4	45.0	63.9	4656.61	Egypt	1716.50	36.9
						Jordan	736.96	15.8
						Libya	546.76	11.7
Oilseeds (HS 12)	2.26	26.7	11.7	43.9	264.61	Turkey	224.2	84.7
						Morocco	13.87	5.2
						Israel	12.13	4.6
Animal feed (HS 23)	0.79	44.8	36.7	81.8	291.46	Turkey	126.57	43.4
						Israel	120.52	41.3
						Morocco	32.98	11.3
Live animals (HS 01)	0.15	52.7	48.5	91.9	72.86	Libya	30.34	41.6
						Jordan	27.97	37.0
						Israel	10.40	14.3

Source: calculations using Eurostat data [4]

These large Romanian cereals exports to the Mediterranean countries represent an important part (25%) of the total EU cereal exports to the same destination. Similarly, Romania is the source for 34% of the total EU oilseeds exports to the MED countries, 23% of the live animals and 23% of the animal feed.

A measure of competitiveness in trade is the sign and value of the trade balance, and its analysis in breakdown by product groups can provide more detailed information about the structure of the trade flows, while the analysis by 4-year averages provides a better overview of the trends and diminishes the influence of yearly fluctuations due to conjunctural events on the international markets. Romania shows the largest trade surplus for cereals, live animals, oilseeds and animal feed, similarly to the EU (table 3).

Table 3 – Value of the EU and Romanian agri-food trade balance with Mediterranean countries by groups of products (chapters HS 01-24): change between average 2003-2016 and average 2013-2016

Product group (HS chapter)	EU agri-food trade balance value (EUR million)		Romanian agri-food trade balance value (EUR million)	
	Average 2003-2006	Average 2013-2016	Average 2013-2006	Average 2013-2016
01-live animals	162.8	959.6	14.4	168.1
02-meat	16.1	140.8	0.1	8.0
03-fish and seafood	-508.1	-738.6	0.0	-7.6
04-dairy products, eggs and honey	723.4	1,412.8	0.6	2.0
05-other animal products	-78.5	-106.9	0.0	-1.3
06-live plants	-121.4	-0.6	-1.7	-2.0
07-vegetables	-830.1	-1,138.0	-15.5	-39.5
08-fruit	-1,705.7	-2,545.1	-19.6	-46.5
09-coffee, tea and spices	-23.3	-2.7	-1.6	-0.6
10-cereals	908.0	3,666.6	1.9	837.6
11-products of the milling industry	181.1	142.5	-0.1	5.6
12-oilseeds	34.6	255.5	18.3	83.6
13-lacs, gums and resins	11.9	40.1	0.0	-0.4
14-other vegetable products	-10.0	-4.8	0.0	0.0
15-oils and fats	-233.8	190.5	12.4	8.5

Product group (HS chapter)	EU agri-food trade balance value (EUR million)		Romanian agri-food trade balance value (EUR million)	
	Average 2003-2006	Average 2013-2016	Average 2013-2006	Average 2013-2016
16-meat and fish preparations	-220.9	-363.0	-0.1	-1.1
17-sugar and confectionery	399.2	145.2	-1.5	-6.2
18-cocoa and cocoa products	115.4	542.4	-3.1	-2.8
19-cereal baking and pastry products	219.9	777.1	-2.3	-7.5
20-vegetable and fruit preparations	-782.8	-1,063.2	-11.8	-23.9
21-miscellaneous edible preparations	184.2	523.1	-10.3	-4.2
22-beverages	200.4	660.0	0.6	3.2
23-animal feed	131.0	480.9	6.2	60.8
24-tobacco and tobacco products	223.8	638.0	-8.3	-6.5
Total agri-food products (HS 01-24)	-1,002.9	4,612.4	-21.5	1,027.3

Note: cells highlighted in yellow show negative trade balance

Source: calculations using Eurostat data [4]

On the other hand, there are several product groups for which Romania shows a negative trade balance, while the EU is very competitive (large positive balance): milk and dairy products (HS-04), cereal baking and pastry products (HS-19), miscellaneous edible preparations (HS-21) (table 3).

The product groups showing the largest and increasing deficit in the trade of both EU and Romania with the Mediterranean countries are: fruit and vegetables, both fresh and processed (HS 08, 07, 20). For each of these three product groups, the deficit increased 1.4 times in the case of the EU and 2.4 times in the case of Romania, between the two periods of time studied. The deficit increased as well for fish and seafood (HS-03) and fish and meat preparations (HS-16).

CONCLUSIONS

The key objective of the Euro-Mediterranean Free Trade Area (within the Euro-Mediterranean Partnership) is removing barriers to investment and trade in North-South relations (that is between the EU and Southern Mediterranean countries), and in South-South relations (that is between the Southern Mediterranean countries themselves).

Although it has not been fully achieved yet, the trade volume in the Mediterranean area increased significantly in the last two decades; this is true also for the volume of agri-food products trade, which is subject to the largest number and forms of trade barriers (as compared to trade of non-food, industrial products and services).

In the last decade and a half, the Euro-Mediterranean Partnership resulted in an important intensification and diversification of the commercial flows in the region.

Romania is competitive on the Mediterranean markets for a rather narrow range of basic agricultural products (thus contributing to their EU positive trade balance), such as cereals, live animals, oilseeds and animal feed, but lacks competitiveness for processed products which made the EU a top player on international markets such as dairy products, beverages, edible oils, cereal baking and pastry products, miscellaneous edible preparations, tobacco products, etc. The developing food industry is increasingly contributing to the increase of processed products exports; at the same time, it is expected on the medium term a better there use of basic agricultural products as inputs for higher value products (cereals for meat, oilseeds for processed oils, etc.).

The main vulnerability of Romania and of the EU as well in the regional trade remains the lower competitiveness of fresh and processed fruit and vegetables (mainly tomatoes and citrus fruit), with Turkey and Morocco as main competitors and suppliers for imports.

For Romania, since its EU accession a decade ago, but mostly in the latest years, the Euro-Mediterranean Partnership allowed for entering new markets, for a significant increase of exports to the Mediterranean countries (which lead to the shift of the country's regional trade balance from

negative to positive since 2008), as well as to competitiveness gains on the main destinations markets in the region for certain products.

BIBLIOGRAPHY

1. Abedini, J. & Peridi, N. (2008). *The Greater Arab Free Trade Area (GAFTA): an Estimation of Its Trade Effects*. Journal of Economic Integration, 23(4), Dec. 2008, 848-872. Retrieved August 03, 2017, from <http://ejei.org/upload/75X37849QW54K612.pdf>
2. EU Commission (2016). *Monitoring EU Agri-Food Trade: Development until December 2015*. Available at http://ec.europa.eu/agriculture/trade-analysis/monitoring-agri-food-trade/2015-12_en.pdf
3. Eur-Lex (1995). *Barcelona Declaration and Euro-Mediterranean Partnership*. Available on-line at <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV:r15001>
4. Eurostat (2017). *Agriculture Trade Statistics*. Available on-line at <http://ec.europa.eu/trade>.
5. Gavrilesu, C. (2014) - *Agricultural commodities and processed products in the Romanian international agri-food trade*, Proceedings of the 5th International Symposium „Agrarian Economy and Rural Development”, Ed. ASE, Bucharest, ISSN 2285-6893, p. 86-93.
6. Gavrilesu, C. & Voicilaş, D.M. (2014). - *Changes in the Romanian agri-food trade competitiveness in the post-accession period*. Management theory and studies for rural business and infrastructure development, 36(4), p. 823-834. Available on-line at <http://mts.asu.lt/mtsrbid/article/view/886>.
7. *** (2007). *Sustainability Impact Assessment of the Euro-Mediterranean Free Trade Area*, Final Report of the SIA-EMFTA Project, Impact Assessment Research Centre Institute for Development Policy and Management, University of Manchester, November 2007; pp.10. Retrieved July 03, 2017 from http://trade.ec.europa.eu/doclib/docs/2008/february/tradoc_137777.pdf

THE EFFECT OF MAIZE PRODUCTION AND CONSUMPTION ON PRICES IN ROMANIA

PETRE IONUȚ LAURENȚIU¹

Abstract: *The present study seeks to answer the question: how does corn price influence production, consumption and foreign trade? In order to answer this question we will analyse the areas cultivated with corn, the total production and implicitly the average yield per hectare in the last years. These data, together with the average annual consumption of grain maize and the volume of imports and exports, will lead to the determination of supply and demand for maize on the market. With the help of price data collected on the website of the Ministry of Agriculture and Rural Development, which can be found in geographical areas and calendar months, we can observe the monthly differences in prices. Using these data and calculating the correlation coefficient, it will be possible to determine at the end of the project the effects of the demand and the supply on the price of this product.*

Keywords: *maize price, consumption, production, demand, supply.*

JEL classification: Q11

INTRODUCTION

In Romania, cereal production has grown in the last years to 21 million tons (grain cereals), of which on average (2013-2016), more than half (51.1%) is grain maize, with an average total production in the analysed period of 10.7 million tonnes, which again reveals the importance of this crop.

This agricultural product, along with wheat and rice, forms the food base of the vast majority of the world's population, either directly or by transforming it into food preparations.

Worldwide, maize is grown on extensive areas of over 185 million hectares, with a worldwide harvest of just over 1 billion tonnes. The largest areas cultivated with corn are in America and Asia, and among the first countries with the largest areas we can list: China, USA, Brazil, India and Mexico; Romania ranks 15th in the world, according to the area cultivated with maize (in 2014), with just over 2.5 million hectares and the first place in Europe.

The total production of maize has a decisive role in the livestock sector, especially in its development and modernization, especially in the meat producing sector. In this branch, the chemical composition of the product is particularly important, thus, by cumulating more maize hybrids from different areas, we can assume that the nutrients in the maize grain composition are arranged as follows: "protein 9.07-13.64%, starch 60-70%, fat 4.05-5.51%"².

This cereal product is used in animal feed as a very valuable but also in human food, not directly but in the form of cooked corn, bacon, popcorn, popcorn, corn flakes, etc. With regard to its industrialization, starch, alcohol, glucose and oil can be obtained, and as secondary products, borhot, bran, cakes.

Among the technical elements contributing to the importance of this crop can be mentioned: high and safe yields, corn is a good precursor, low harvest loss, low sowing, contribute to soil fertilization by harvesting chemical fertilizers.

¹ Asistent de Cercetare – Institutul de Cercetare pentru Economia Agriculturii și Dezvoltare Rurală – Proiect ADER 13.1.2, email: petre.ionut@iceadr.ro

² Bran Mariana, „Agrofitotehnie – Cereale”, cursuri în format digital, biblioteca digitală - ASE

MATERIALS AND METHODS

In this study, we will analyse data on the maize market, with the help of statistical sites (INS, Eurostat, FAO State) will analyse Romania's total production, average, consumption and trade with this product. Corn prices will be collected from the website of the Minister of Agriculture and Rural Development, where prices are given for 2013-2016 on three areas of Romania (Banat, Muntenia and Oltenia).

These data will also be analysed from the point of view of the correlation and the link between them, by means of the correlation coefficient, which is thus determined:

$$r_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

RESULTS AND DISCUSSIONS

Carrying out a brief analysis of the maize market, the cultivated areas, total production, average production, consumption and based on them were aggregated demand and supply.

This market analysis was carried out for the period 2013-2016, the main reason being the availability of corn price data taken from the MADR.

Referring to the areas cultivated with maize during the period mentioned above and the total yields of the same period can also result in the average yields of this crop, they are summarized in the following table:

Table 1 Evolution of areas, total production and average production of maize

Specifications	2013	2014	2015	2016
Areas cultivated with maize (ha)	2518268	2512809	2605165	2580975
Production of grain corn (million t)	11305095	11988553	9021403	10746387
Average output (t/ha)	4,49	4,77	3,46	4,16

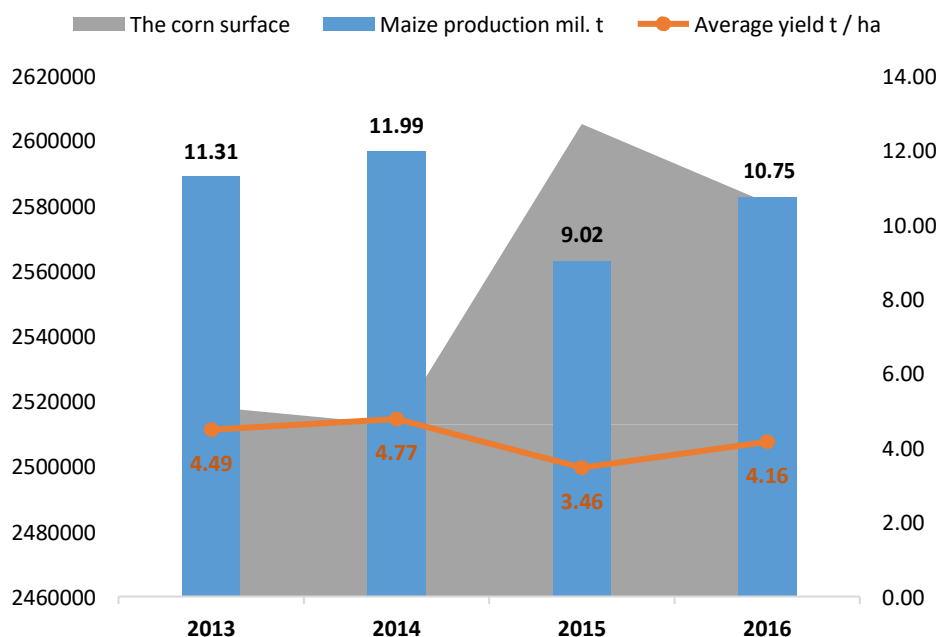
Source: <http://statistici.insse.ro>

As far as the area cultivated with maize is concerned, in the period 2013-2016 it grew very little on average by 0.84%, in 2015 the maximum of 2.6 million hectares cultivated with maize was reached and the minimum (in the last four years) of 2.51 million hectares a year earlier. On average, the area for maize crops was about 2.55 million hectares.

From these areas, on average, in the four years, 10.76 million tons of grain maize. In 2014, the largest quantity was harvested, of 11.98 million tonnes, and the next year the smallest harvested quantity of 9 million tonnes, inversely proportional to the situation of the areas.

On average, during the reference period, production increased insignificantly by 0.13%, but in 2016 it was lower than in the first years of the period, amounting to 10.74 million tonnes of maize. The decrease in 2015 compared to 2014 was 24.77%, the main cause being the drought in the year.

Figure 1. The evolution of the surface and the production of maize



Source: <http://statistici.insse.ro>

Figure 1 shows the previous table showing the surface and production evolutions, implicitly the average outputs, or in other words, the production yield. As can be seen from Figure 1, average production has decreased, on average, by 0.3%. Starting from an average yield of 4.49 tonnes per hectare (2013), the highest yield of 4.77 tonnes per hectare was recorded in the following year, due to the lowest level of the cultivated area, at the same time as the highest level high total production. In the following year, the situation was exactly the opposite, with the largest area of maize in the period under review and the lowest national production, therefore the average yield per hectare was the lowest in the whole period of only 3.46 tons /hectare. In the last year, the situation recovered, so the areas were lower and the production was higher than the previous year, recording an average yield per hectare of 4.16 tons.

Analysing consumption and external trade, aggregate demand and supply can be determined, and consumption and export and import data are presented in the following table. These were analysed for the period 2013-2015, not identifying data for 2016.

Table 2 Maize consumption and external trade

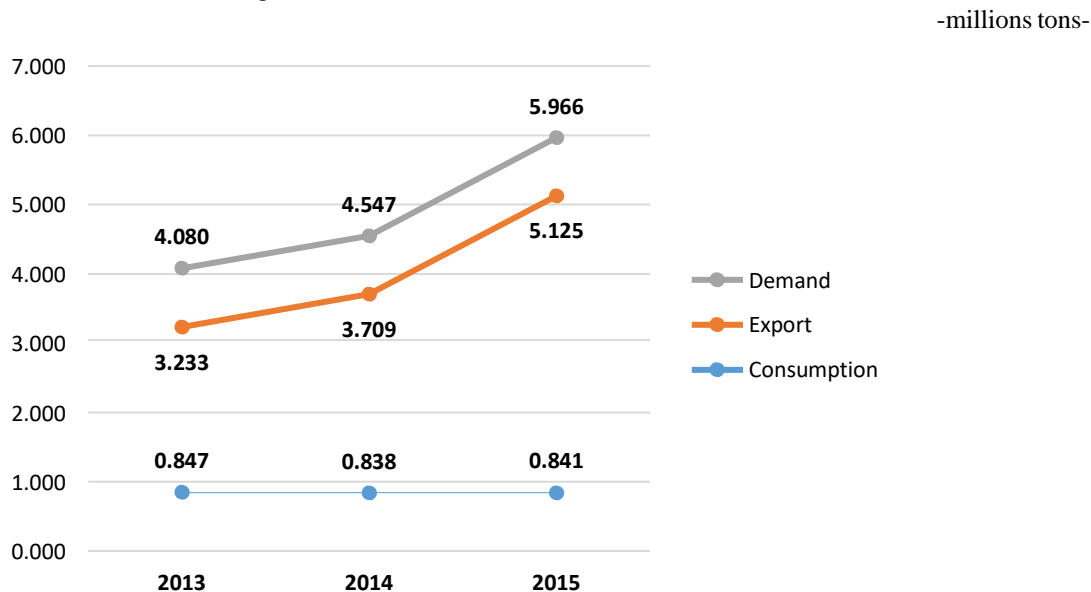
Specifications	2013	2014	2015
Annual per capita consumption of corn equivalent grain (kg / site / year)	42,3	42,0	42,3
Import (mil. t.)	0,284	0,471	1,622
Export (mil. t.)	3,233	3,709	5,125
Consumption of grain corn equivalent (mil. t)	0,847	0,838	0,841

Source: <http://statistici.insse.ro>, trademap.org

According to the NIS, the average annual per capita consumption of grain maize was on average (2013-2015) of 42.2 kilograms per capita. By reporting this value to the total population, each year, it was possible to calculate the total grain maize consumption, expressed in millions of tonnes, averaging 0.842 million tonnes.

Both imports and exports increased during the reference period, from 0.284 million tonnes imported in 2013, to 5.7 times more imports and 1.6 million tonnes in 2015. In the first year, the export was 3.233 million tonnes, and in two years it increased to 5.125 million tonnes and 58.52% respectively. Throughout the period, the trade balance was surplus; on average, the export of maize was higher than the import of 5.07 times.

Figure 2. Demand of corn on the market

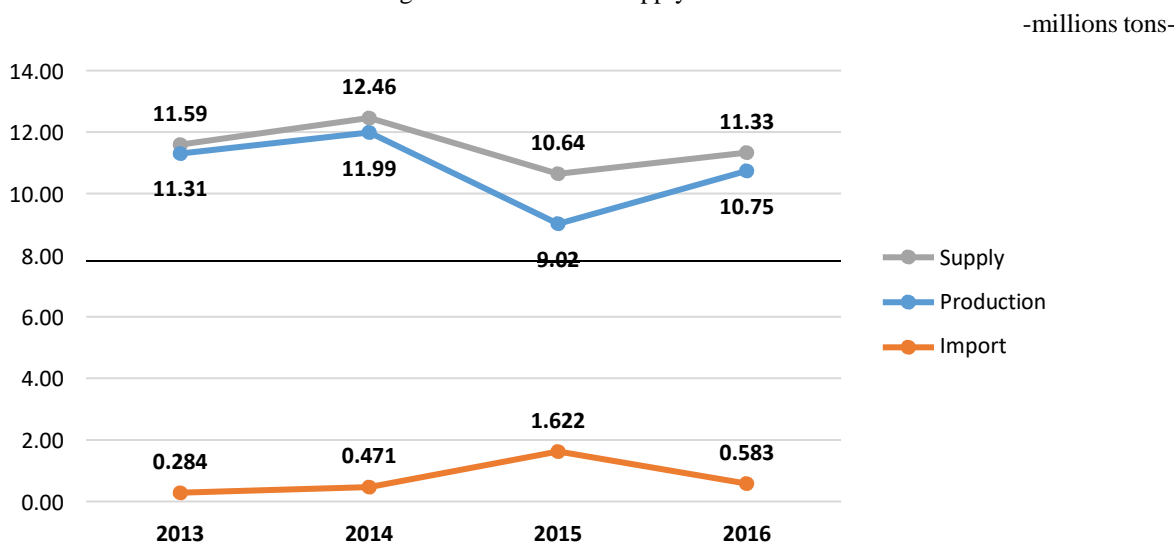


Source: own calculations

As defined as aggregate demand, as a sum between consumption and export, figure 2 was presented as a sum for the period 2013-2015. As can be seen, domestic consumption has a rather low contribution to demand, at a somewhat constant level of 842 thousand tons on average. In addition, the volume of exports made by Romania in this period, respectively, averages 4 million tons.

Romania's demand for grain maize amounts to an average of 4.864 million tonnes. During the analysed period, its trend was increasing, following the same trend as exports due to their high volume. In 2015, total demand grew by 46.22% compared to the first year, reaching 5,966 million tonnes.

Figure 3. Corn market supply



Source: own calculations

The aggregate offer is presented in the literature as an amount of two components, namely production and import. Analysing these data for the period 2013-2016, it was calculated and presented in Figure 3, the offer of corn grain product. As can be seen in the figure, the evolution of imports shows an increasing trend, with an average volume of 0.74 million tonnes, this average being "encouraged" by the import volume of maize from 2015, when it was highest of 1.622 million tonnes, amid a low production in that year.

Average production for the reference period was 10.77 million tonnes, its trend over the four-year period oscillated, with a significant decline in 2015.

Cumulatively, the two indicators set the level of corn supply on the Romanian market, so in the period 2013-2016, the supply level averaged 11.51 million tons of corn, 2.36 times higher than demand level. The tendency of supply evolution, experienced slight fluctuations, following the trend of production, and where the latter underwent drastic changes (2015), was neutralized by the volume of imports that tried to cover the production deficit.

Table 3 Corn prices by geographical area

-lei/tonne-

Luna	Banat				Muntenia				Oltenia			
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Jan.	980.06	586.88	492.11	606.89	1003.91	647.97	601.22	658.46	1017.81	588.94	502.60	574.23
Feb.	960.27	563.57	511.89	604.53	985.47	632.43	637.32	653.24	1001.29	560.24	600.00	609.72
Mar.	914.82	576.30	531.26	598.24	976.89	673.12	607.82	644.68	966.09	663.15	598.93	598.74
Apr.	897.25	591.98	537.66	590.15	978.70	723.18	647.42	598.42	987.49	693.86	649.12	618.31
Mai	868.90	654.58	558.75	603.44	998.58	683.48	661.56	648.17	936.88	710.00	627.82	634.55
Jun.	987.37	692.46	560.36	665.56	985.84	656.89	663.80	704.67	933.18	723.23	596.15	637.04
Jul.	890.00	683.26	631.73	661.00	917.90	658.56	651.33	739.61	915.69	689.49	-	626.30
Aug.	658.61	691.86	765.50	690.19	686.50	655.00	725.76	677.59	503.22	766.00	554.26	578.91
Sep.	-	571.91	565.44	564.70	-	549.29	629.08	594.37	-	581.66	592.02	601.75
Oct.	505.13	441.77	554.32	535.19	628.97	537.35	600.27	592.74	515.77	522.46	578.26	611.78
Nov.	520.48	426.04	556.73	550.55	594.34	547.36	610.74	597.53	527.77	509.78	605.56	603.01
Dec.	537.98	438.81	598.29	565.71	631.69	545.13	618.94	587.21	537.17	503.87	632.32	639.02

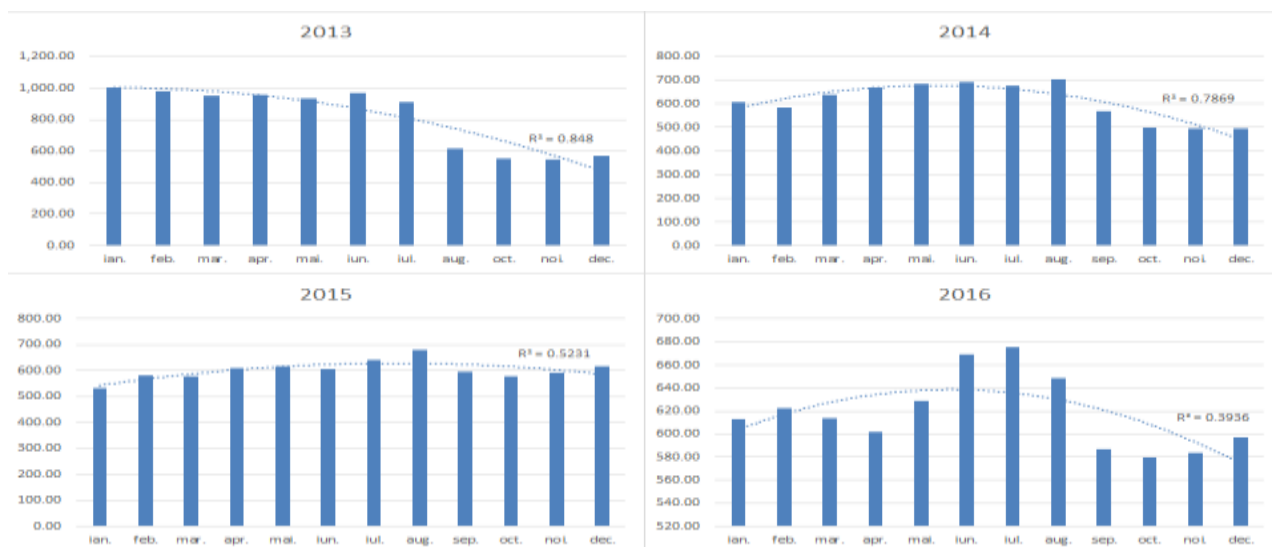
Source: *madr.ro*

In Table 3 are presented the prices recorded in different regions (Banat, Muntenia and Oltenia), maize, per calendar month. Thus, it can be noticed that the lowest prices were recorded in the Banat area for 9 out of the 12 months of the year, and the highest prices are found in the Muntenia area, with maximum values for 6 of the 12 months. However, the highest price of a ton of corn was recorded in 2013, in the Oltenia region being 1017.81 lei. From the same table it can be noticed that in 2013 the highest prices of one tons of corn oscillating between 505.13 lei and 1017.81 lei were recorded, and in the year 2015 the lowest they oscillated between 492.11 lei and 765.5 lei.

Achieving a price average for each year, regardless of the region, so a national average, but taking into account each month we can see the trend and price changes from month to month. These values are shown in Figure 4.

As mentioned above, the highest corn price was recorded in 2013, on average at 816.73 lei per tonne. As can be seen from the previous figure, in the winter months the price was high, as expected, due to the low (current) market supply combined with the low stock of farmers and the costs of producers or sellers with storage and storage, so these prices remain high until the summer, close to the new harvest period. In the post-harvest months, corn prices fall in October with the lowest price of 549.95 lei per tonne as the offer is generous and the demand lower.

Figure 4 National average monthly calendar prices



Source: *madr.ro*

The average price in 2014 was 609.5 lei per ton of grain corn. Even if the average annual price is lower than in the previous year, the trend of the month-to-month trend is similar in the months and again the price has increased, it has grown even more in the months before harvest, amid a stock of the lowest farmer and a high demand, respectively, reaching the peak in August, the last before the new production, the price of a tons of corn being 704.29 lei.

In 2015 the lowest price per tonne of corn was recorded, on average, of 602.72 lei, in contradiction with the offer (ie production) of the reference year. However, two aspects have to be mentioned: the first refers to the import made by Romania during that period, which was very high compared to the other years (three times higher) to "support" the supply of corn, thus neutralizing the price, and the second aspect relates to the fact that, although the offer was small, it was dispersed to a greater extent because the area cultivated in that year was the largest, in other words, there were several farmers who had maize production in 2015. These aspects can also be seen from the evolution of prices on Monday, as there are no such big differences from one month to the next, it is observed that in the critical period (August) the price of one ton was the highest of 681.84 lei, and the cheapest ton of corn could have been bought in January with 531.98 lei.

In 2016, the average price per ton of corn was 618.51 lei. This year due to higher production than in the previous year, but also due to the relatively high imports, prices were not very high in the winter months, but they increased in the pre-harvest months to a maximum of 675.64 lei in July.

Table 4 Coefficients of price correlation

Coefficientul de corelație	Suprafața cultivată	Producția totală	Producția medie	Consumul anual	Import	Export
Preț	-0.5317	0.3137	0.3435	0.9454	-0.5466	-0.5493

Source: *own calculations*

In order to be able to determine exactly which indicator influences most the price setting on the maize market, we have determined the correlation coefficient among the average annual price for the period 2013-2016 and the eight indicators previously analysed, so we can see the close links (as close as possible to 1 or -1) or the weakest (close to 0) in Table 4.

CONCLUSIONS

Analysing the correlation between the price and the cultivated area, it can be seen that it is a close relationship, but inversely proportional, as could be expected, when the area cultivated with maize grows, its price decreases due to the increasing supply (the degree of access of farmers), and when the surface is reduced, the corn supply is reduced and therefore the prices increase.

The price is not greatly influenced by production, either the total or the average, the correlation coefficients being 0.31 and 0.34.

Between the price and the annual consumption there is, as can be seen from Table 4, the strongest link with a coefficient of 0.9454, this consumption determines the demand so when it is high the prices rise, and vice versa.

As can be seen, both the link between price and import and between price and export is inversely proportional, so when one of the components of the trade balance grows, the price decreases, and vice versa. Import has the supply characteristic, so it has a correlation coefficient in relation to the price of -0.5466, but surprising is that the export has a similar coefficient of -0.5493.

BIBLIOGRAPHY

1. Bran Mariana, „*Agrofitotehnie – Cereale*”, cursuri în format digital, biblioteca digitală – ASE
2. Andrei J. V., Ion Raluca Andreea, Gheorghe H. P., Nica Elvira, Zagaria M. (2016), „*Implications of agricultural bioenergy crop production and prices in changing the land use paradigm – The case of Romania*”, Journals Elsevier-Land Use Policy 50
3. Dobre Iuliana, Soare Elena, (2015), „*Optimal resource allocation in Romania farms – analysis of the mathematical correlation between nitrogen-based chemical land corn*” Agriculture and Agricultural Science Procedia 6
4. *** <http://statistici.insse.ro>
5. *** <http://trademap.org>
6. *** <http://madr.ro>

SECTION 2

ECONOMY, MANAGEMENT AND AGRICULTURAL MARKETING

AGRICULTURE IN THE DANUBE DELTA

Aurel LUP¹, Indira DENIZ ALIM², Liliana MIRON³

Abstract: *This paper addresses the evolving nature of agriculture in the Danube Delta, since the 1950s and to the present day. The paper makes the inventory of the studies and programs aimed at increasing the share of the agricultural activities in the Delta, of the attempts to transform the Danube Delta into a significant segment of the Romanian agricultural economy. Over time, there has been a great competition between agriculture and the main Delta resources; in this regard, fishing has always been a key component of the Delta's economy. Between 1955 and 1965, particular importance was given to the industrial exploitation of the reed, as raw material for cellulose and paper. To this end, the Delta was divided and embanked, and a special machine system was implemented in order to harvest the reed. By destroying the reed's biological bases (the rhizomes), the reed yield decreased; thus, by late 1960s, reed cultivation became unprofitable. Then, it was considered that the embanked areas could be drained and turned into agricultural polders. Successive programs assigned to agriculture larger and larger areas, ranging from 100,000 ha to over 200,000 ha; however, these were not materialized. In fact, agriculture was practiced on areas ranging from 60,000 to 70,000 ha, with a tendency to specialize in a biological system according to the requirements for the environmental protection of the reserve.*

Keywords: *delta, agriculture, reservation, program, use*

JEL Classification: *Q19*

INTRODUCTION

The Danube Delta, part of the Danube Delta Biosphere Reserve - RBDD - is the geographical area located between the three Danube branches, i.e. Chilia, Sulina and St. George. The Delta stretches on 430 thousand ha, unlike the reserve, which includes a much larger area, i.e. about 580 thousand ha. Besides the floral and fauna diversity, the Danube Delta has, above all, an economic and social vocation. Fish and agricultural products provide food to the Delta inhabitants; moreover, these represent exchange assets, both locally and nationally.

Taking into account the topic of this paper, we will limit ourselves to the assessment of the agriculture which, along with fishing, has been a basic preoccupation of the Delta inhabitants, since immemorial times. If we are to believe the legend (*The Argonautics of Apollonius of Rhodes*), the first travelers to Pontus Euxinus were the Argonauts who, when returning from Colchis through the Delta, saw sheep flocks and shepherds, whom they scarred.

For centuries, the economy of the Danube Delta has been a natural one; the main traditionally exploited resources were fish and livestock, especially sheep. Since the second half of the 20th century, the Danube Delta had been subject to the planned economy system and, periodically, it represented the focus of various economic programs, where its main resources, i.e. reed, fish and agriculture, alternatively took priority, according to the context of the respective plans within the national economy. For example, since the second half of the 50s, the main economic activity in the Delta was reed cultivation; reed was used as raw material for cellulose and paper. For this purpose, the Delta was divided, embanked and provided with pumping stations for water level regulation. A real system of harvesting and transport machines was also implemented for this purpose. By the late 1960s, reed exploitation was stopped because the reed biological bases had deteriorated, the yield declined, and the reed became a precious raw material. Since the 1950s, the Communist regime started to be interested in the agricultural potential of the Danube Delta. The evolution of programs and their achievement status represent the subject of this paper.

¹ Academy of Romanian Scientists

² OVIDIUS" University of Constanta

³ OVIDIUS" University of Constanta

MATERIAL AND METHOD

The material used is mostly a bibliographic and research retrospection of the agriculture from the Danube Delta, where Professor Lup conducted studies on the results obtained in the Delta, in terms of agriculture. There are also presented the latest agricultural development programs in the Danube Delta and their achievement stages. The research method is specific to economic research, i.e. material collection and selection, processing, synthesis, conclusion and proposals.

RESULTS AND DISCUSSIONS

1. The Danube Delta and agriculture. Agricultural activities have been associated with fish farming since ancient times, because the numerous levees were first of all rich in pastures, which allowed the breeding of a large number of animals, such as sheep, pigs and cattle (some of them in a half-breeding system). On higher lands, the Delta inhabitants grew grain and food plants. It is hard to assess the value ratio between fish and agricultural yield; although fish farming ranked first, agriculture followed it closely. The idea of agriculture in the Delta was not new. As early as the nineteenth century, geographer Ernst von Sylow (1857) predicted the transformation of the Danube Delta into a grain provider through extensive hydro-ameliorative works. In 1895, the first embankment works on St. George's branch, in Mahmudia – called “the Dutch Garden” by engineers Hangeveldt (Netherlands) and Dithmer (Denmark) (1) – were also performed.

During the command economy, after the bankruptcy of reed exploitation, the agricultural vocation of the Delta was rediscovered; this would become, among other things, the last source of arable land growth, i.e. one of the agricultural obsessions of the totalitarian regime. To this end, the former embankments performed in order to grow reed were well suited to becoming polders, where intensive agriculture could be practiced. Some of these were to be drained (the reed was to be plucked) and then equipped for irrigation. The drained areas were to become large state-owned agricultural enterprises producing grain and industrial plants, but also raising livestock (cattle and sheep). Not less than 218.3 thousand ha were planned to enter the agricultural circuit, of which over 50% were already embanked. The first and ultimately the only drained area was Pardina, with a total area of 28,970 ha.

It is noteworthy that the programs and equipments for agricultural use in the Danube Delta only dealt with the actual Delta area, i.e. 430 thousand ha (fig. 1), and not with the Danube Delta Biosphere Reserve, with an area of 580 thousand ha (fig.2).

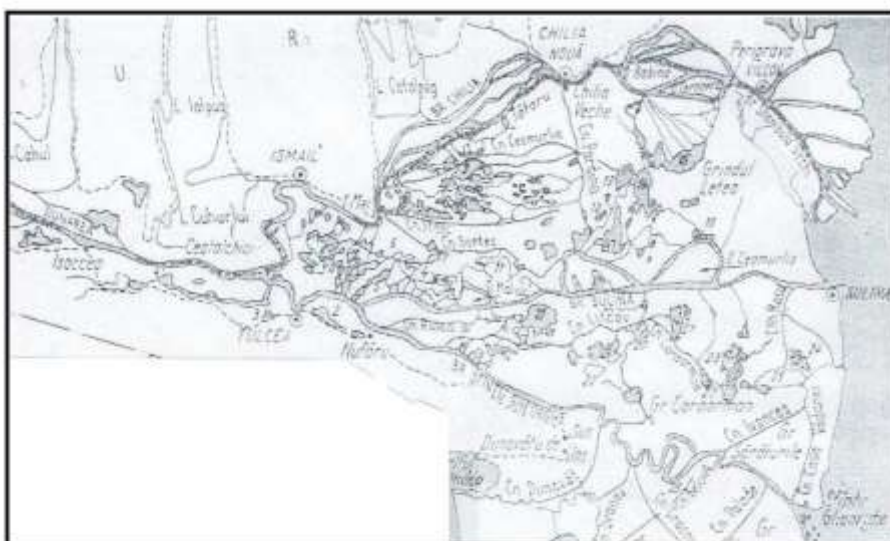


Figure 1. The Danube Delta (Source: M. Botzan et al., 1991)

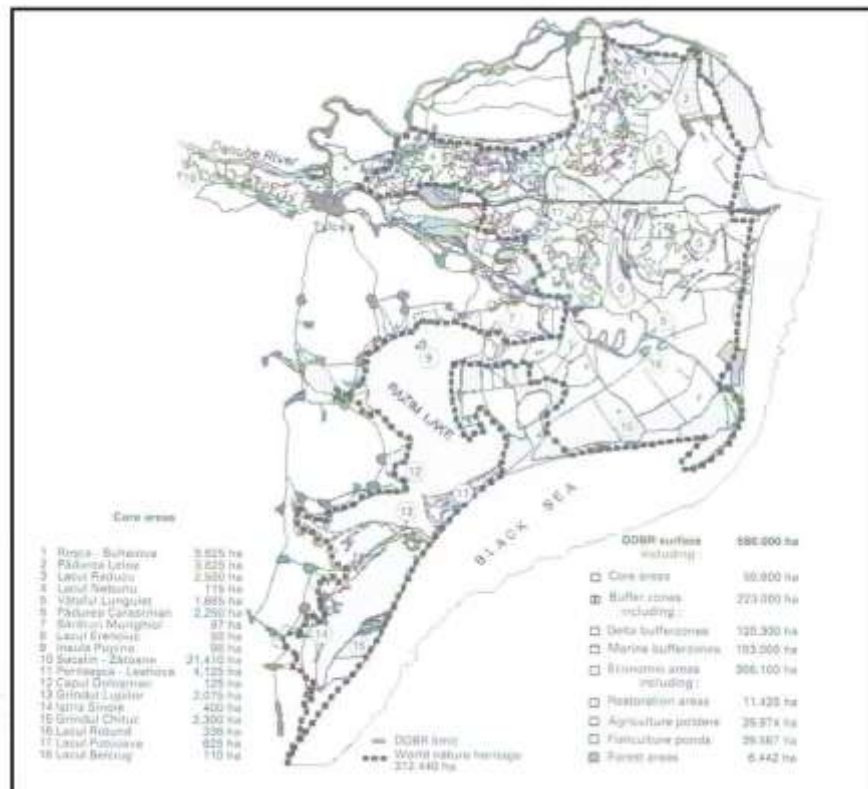


Figure 2. The Danube Delta Biosphere Reserve (Source: ICPDD, 2010)

Along with fishing and reed cultivation, the interest in agriculture had been manifested since the early 1950s. Thus, in 1953, upon the request of the Council of Ministers, the *General Study for the Integral Equipping of the Danube Delta* was elaborated; it addressed the main activities of the Danube Delta: fish farming, agriculture, reed cultivation and forestry, trying to find a balance between them, since, implicitly, there was a competition among these activities. Logically, over time, each sector had tried to prove its own benefits.

In the following year, i.e. 1954, a group of researchers and specialists from different fields went to the Delta. In 1956, a first synthesis of knowledge emerged, and in 1958, the Academy developed a synthetic study on the delimitation of various Delta uses. Finally, in 1960, the Institute for Agricultural Studies and Design elaborated a *Technical-Economic Memorandum on the Improvement Measures for the Agricultural Land in the Danube Delta*. According to this document, 126 thousand ha were assigned to agriculture. At that time, 11,300 ha were embanked, 400 ha - drained and 803 ha - irrigated (1).

2. The program for the development and full operation of the Danube Delta (1982). The last adjustment regarding the economic use of the Delta's resources during the totalitarian regime was performed in 1983 through a special program that ranked priorities as follows:

- fish farming was to remain the main activity branch, developing both the equipped areas and the fishing in natural lakes, in free flood regime;
- agriculture was to be practiced with complex equipments, ensuring the necessary feed for fish and animal farming, for the consumption needs of the inhabitants, as well as some availability for delivery to the state fund;
- forestry would be mainly represented by the plantations of species growing rapidly in the shore-dike area;
- reed would be grown only in natural regime areas, ensuring raw materials for the production of cellulose;
- tourism would become an important economic branch;

- the systematization of the area and of its villages/towns, provision of facilities in order to improve the lives of the Delta inhabitants and their numerical growth (4).

In terms of agriculture, the program still included very ambitious objectives:

- increasing the agricultural area to 144 thousand ha. Of these 144,000 ha (assigned to agriculture), 93,635 ha were to benefit from land reclamation works (85,000 ha embanked, drained and irrigated; the remaining 50,365 ha would become grass lands by fixing and improving the sands) (1);

- the livestock was planned to reach 20 thousand cattle; 350 thousand sheep; 120 thousand pigs and 350 thousand poultry.

Table 1
Land use in the Danube Delta in 1982

Use	Area ha
Fishing and fish and reed growing, nature reserves	315000
Forestry	20335
Agricultural (equipped and under natural regime)	66185
Constructions and land within build-up areas	4450
Danube branches	7820
Other areas (dunes, islets)	28510
<i>Total</i>	442300

Source: ISPIF

The program was approved by the Decree of the State Council no. 92/1983.

Prior to the elaboration of the last program (where the area assigned to agriculture was 144,000 ha), in the Danube Delta, agriculture was performed on only 66,185 ha (Table 1).

Moreover, in this case also, the media, including the cultural one, watched so that nothing would negatively influence *the party and state leadership's decision* to turn the Danube Delta into a granary.

Tomis Magazine no. 3.

The document entitled "A Paradise Lost" was postponed. The material discusses the problem of defending the fauna and flora in the Delta and makes very serious assessments of some measures taken in order to exploit the Delta's resources. It turns out that until long ago human activity had integrated into the life of the Delta, without disturbing it too much until the moment when the human being has become aware of the value of the Delta's resources; then, evolution acquired a hallucinating, suffocating pace. All sorts of specialists and forecasters, who had studied, assigned and planned everything, emerged. The author then countered the idea that agriculture could be performed in the center of the Delta, because it would damage the nature and balance of the Delta. The author further argues that the sad, sometimes millenary experience of some countries shows us that drainage and intensive irrigation led to secondary salinity, and that is why we need to proceed with attention and caution. Or, the material emerged when the national plan for the development of agriculture based on irrigation was debated upon. The conclusion

of the material was quite unconceivable, raising the question: What will we leave to the next generation? Only cultivated fields? It is not enough.



Source: IEA

Figure 3. The facsimile of the project for organizing the yield from Pardina, in the Danube Delta

In 1980-1981, a multidisciplinary collective of researchers from the Institute of Agrarian Economy of the Academy of Agricultural and Forestry Sciences elaborated the project of organizing Pardina area as a state-owned agricultural enterprise. The author of this paper took part in this project. The conclusions of the study included the following (fig. 3):

- In the irrigated phase, 11,0000 tones of grain and soybeans are obtained, with an increase by 82%, compared to the non-irrigated period. The value of the agricultural yield doubles (116% increase). The physical and value yield increase is due to irrigation, but also to the increase in the area cultivated with 2,200 ha (i.e. an increase by 10%).

- Expenditures are growing at a faster pace than the yield growth (an increase by 159%). The yield increases 1.2 times and the expenses increase 1.6 times.

- The net income in the irrigated phase does not increase in the same way as the yield pace. While the latter increases 1.2 times, the net income increases only 0.3 times, i.e. four times slower, due to expenditures. The net income mass increases by 30% compared to the non-irrigated phase.

- The incremental investments made between the non-irrigated phase and the irrigated phase, amounting to 528,820 thousand lei (i.e. 68%), lead to a corresponding physical and value yield increase; however, this does not lead to the increase in the net income in the same proportion. The investment efficiency index decreases from 5.3% to 4.2%, and the recovery period increases from 18.7 to 24.2 years.

Subsequently, the author carried out some studies on the agricultural exploitation of the drained area from Pardina. However, the results obtained through the agricultural operation of Pardina were very modest and inefficient. Even in the areas with some agricultural traditions (Chilia Veche), the yields per unit area did not exceed 2,500 kg/ha in wheat and maize, 1,200 kg/ha in sunflower, below 800 kg/ha in soybeans. In terms of economic efficiency, profit was recorded only in wheat and barley, the other crops being more or less unprofitable (4). It was only after 1990 that the irrigation systems manufacturers on drained lands started studying the effects of the agricultural operation of the drained areas from the Danube Delta, as well as from the Danube Floodplain. A particular reference to Pardina is made: *Subsequent to a hydro-ameliorative operation conducted for a few years, the secondary salinity and other phenomena (such as changes in the levels and chemistry of surface and ground waters, ground compaction), which contributed to the sharp reduction of agricultural yields, started to emerge more obviously (...). After draining, all soil types from the area present a relic gleization. The lowering of the groundwater level and, thus, the removal of the underground water resulted in the phenomenon of compaction, salinization, physical maturation and rapid mineralization of the organic matter (2).*

UNESCO reacted to the 1982 Danube Delta Integrated Planning and Operation Program, approved by the Decree of the State Council in 1983. Thus, in 1990 the entire Delta, including the southern coastal lake complex, was declared a biosphere reserve.

3. Resuming the old agricultural land use programs of the Danube Delta. Taking advantage of an earlier study (from 1973), at the National Debate entitled *The Danube, the Floodplain and the Danube Delta. Agriculture and Environment. Present and Future*, (8th-9th May 2008), which took place under the auspices of the ASAS, the ISPIF representatives resumed and even amplified the role of the agriculture in the Danube Delta:

Regarding the agricultural equipping of some areas from the Danube Delta, these were based on the following studies and documents:

- *Preliminary study on the proposals made in order to enhance the use of natural resources from the Danube Delta, elaborated by ISPIFGA, in December 1973, in collaboration with specialists from the Department of State Agriculture, Danube Delta Plant and People's Council of Tulcea County. This study predicted the following evolution of the agricultural land from the Danube Delta:*

Area -ha-	The status of works (1975)	Final stage provisions 1995
<i>Equipped</i>	6440	100540
Agricultural Natural regime	52720	24260
<i>T o t a l</i>	59160	124800

Thus, it was proposed to increase the agricultural land area from 6,440 ha to 100,540 ha, i.e. an increase by 94,1000 ha.

• *Study on the complex capitalization of the important resources from the Danube Delta. The study addresses the development of all economic activities that can make the most of the Danube Delta's resources: agriculture, fish farming, reed growing, extractive industries, transport and telecommunication, manufacturing, tourism, etc. The study was conducted in collaboration with experts from countries that had performed such works. Until the approval of the study, the measures proposed in the preliminary study presented by the MAAA at that time were considered to be minimal.*

In determining the development of economic activities, agriculture was considered to be one of the main economic activities, by maximizing the agricultural area (200,000-250,000 ha, so that the Delta would have become an important area proving corn, vegetables and sunflower; all agricultural work would be mechanized).

The agricultural lands had to be protected against floods; the proposed land reclamation systems had to be used for both drainage and irrigation. In terms of natural reserves, approx. 10,000 ha were maintained under this status, the rest of the areas being transferred to other uses.

The main research and design institutes wherewith the ISPIF collaborated in the elaboration of the study on the complex capitalization of the important resources from the Danube Delta were:

- *ICPA (Institute of Pedological Research on Agriculture; in Romanian: Institutul de Cercetări Pedologice pentru Agricultură);*
- *IEA (Institute of Agrarian Economy; in Romanian: Institutul de Economie Agrară);*
- *IPTANA (Naval and Air Carrier Design Institute; in Romanian: Institutul de Proiectări Transporturi Auto Navale și Aeriene);*
- *SLGC;*
- *IGFCOT;*
- *ISPCAIA;*
- *IRE Constanta;*
- *ICPDD;*
- *Ministry of Tourism;*
- *Institute for Social Issues within the Academy;*
- *I.C.A.S. (forestry) (3)*

4. Agriculture in the Danube Delta. Programs and facts. In the paper entitled *Monograph of Reed in the Danube Delta*, published in 1965, the structure of the Delta uses was the following: fish farming - 323.6 thousand ha; reed growing and fish farming - 213.9 thousand ha; agriculture - 62.3 thousand ha; forestry - 18,800 ha; land within build-up areas, embankment-seashore areas, coastline - 17,8 thousand ha (4). Towards the end of the reed-growing period, which had begun 10 years earlier, the Delta was subdivided into 11 embanked areas equipped with pumping stations and locks for the introduction and removal of water inside the enclosures during reed harvesting. Until 1979, the whole activity was abandoned due to the yield decrease, which in turn, was due to the destruction of reed rhizomes. The enclosures with dikes, dams, works of art remained; thus, the state government of that time thought that the respective drained land could become agricultural polders.

In fact, as we have already mentioned, in 1960, there was a program showing that agriculture could benefit from a much larger area, i.e. about 126 thousand ha (1). The next project would be drafted in 1975, confirming the 1960 proposals, namely 124,800 ha assigned to agriculture, out of which 100,540 ha would be equipped. However, in 1982, when the last program on the structure of uses in the Danube Delta was developed, assigning 144,000 ha to agriculture, the project authors found that agriculture was performed only on 66,185 ha, i.e. with 3,885 ha more than the area mentioned in *Monograph of the reed* (1965), i.e. 62,300 ha. Neither this program approved by state decree in 1983 was implemented; this fact is revealed by the Report on the Management Project of the Danube Delta Biosphere Reserve (1993), which mentions that agriculture was performed on about 62,000 ha (6).

In 2010, the Danube Delta Research Institute (Tulcea) recorded agricultural use on approx. 40,000 ha, except the strictly protected areas. We can say that over a half-century there was practically no increase in agricultural use, this area being around 60,000 ha, i.e. 2.4 times smaller than the most ambitious totalitarian plan whose appetite for increasing the agricultural area to 15 million ha is well known.

Why did not the authorities act forcefully in the Danube Delta, as happened in the Danube Floodplain? The answer to this question remains an enigma. Despite the warnings that the land taken out from under the water would degrade (swamp formation, secondary salinity, aridization), hundreds of thousands of hectares *were assigned to agriculture*. This could be explained by the tacit acknowledgment that in the Delta the negative phenomena would have been much more difficult and more expensive to control. Moreover, we should not forget the failed attempts to embank, drain and use as permanent dry land some land areas from Mahmudia (undertaken by the Dutchman Hangeveldt) and from St. George branch (undertaken by the Danish Digtmer) (1895).



Figure 4. Civilized tourism could become one of the important economic resources in the Danube Delta
(Photo A. Lup)

Even more surprising is the recent proposal (2008) of the Institute for Studies and Design for Land Reclamation, i.e. that agriculture should be practiced in the Danube Delta not on 144 thousand ha, as the totalitarian regime wanted, but on 200,000-250,000 ha, so that the Delta would become an important area for the yield of corn, vegetables and sunflower. Considering that the Danube branches and forests amount to about 75,000 ha (out of 430 thousand ha), 70% of the remaining area, i.e. 355 thousand ha, would be drained and transformed into agricultural land. Let us hope, however, that these proposals will not materialize and that agriculture will continue to be performed on 60,000-70,000 ha, subject to the restrictions imposed by the Delta's reservation status.

CONCLUSIONS

The Danube Delta is primarily a biosphere reserve, whose main resources (flora and fauna) can be economically assessed only by admiring it. Attempts to turn the Delta into a barn have failed at least until now. With a declining population of 14,000-15,000 inhabitants, the Delta provides the main products needed for the subsistence of this population and, at the same time, it produces, or could produce, commodities such as fish, reed, and wood.

The agricultural vocation of the Delta has been limited until recently to a system of self-supply with most agricultural products, except for bread.

Upon the presentation of the Reservation Management Project (1993), 19,000 cattle, 60,000 sheep and 45,000 pigs were declared as livestock. In fact, nobody will ever know the real size of the livestock grown in the Delta; moreover, it is not known how much fish it has and how much it is fished. The shift to aquaculture has not been successful, at least until now.

At present, there is a tendency to capitalize the Danube Delta's touristic potential; however, we are also faced with the leaders' tendency to capitalize it for purposes other than the touristic ones.

REFERENCES

1. **Botzan M.**, și colab., 1991: *Valorificarea hidroameliorativă a Luncii Dunării românești și a Deltei*. Redacția de propagandă agricolă București.
2. Cristea Maria și colab., 1992: *Studiul tehnic privind adaptarea și echiparea unor incinte din Lunca Dunării în vederea exploatarea în condiții ecologice. Impactul lucrărilor de îmbunătățiri funciare asupra mediului înconjurător*. ISPIF-SA București.
3. **Hâncu S.**, Jeleu I., Codreanu M.M. (coord.), 2009: *Dunărea, Lunca și Delta Dunării. Agricultură și mediu. Prezent și perspectivă*. Editura BREN, București.
4. Lup A., 2012: *40 de ani de agricultură socialistă în Dobrogea*. Editura Ex Ponto. Constanța.
5. Rădulescu I., Niculescu C., Chiru S.C., 1965: *Monografia stufului în Delta Dunării*. Editura Academiei Republicii Populare Române, București.
6. x x x 1993: *Programul de management al mediului privind Rezervația Biosferei Delta Dunării Tulcea*.

ANALYSIS REGARDING THE FLEET AND THE FARM EQUIPMENT IN ROMANIA COMPARED TO THE EUROPEAN UNION

BĂDAN DANIELA NICOLETA¹

Abstract: Taking under consideration the fact that the main factor of increasing work productivity, and increasing agricultural production is mechanization, in the present work, I want to analyze the evolution of the farm equipment fleet in Romania and the E.U. during 2010-2016, highlighting the upgrading trend of this sector compared to the demands from the Romanian farmers who buy these equipments from abroad. There are discussions regarding the decreasing of the number of workers in the agricultural sector due to the modernization and the invasion of the market with new models of tractors and equipments that ease the farmer's work by reducing the work hours by half for the same surface compared to the European average.

Key words: farm equipments, agricultural flee, share, arable

JEL Classification: Q16

INTRODUCTION

Romania is ranked 6th in the top largest agricultural surfaces used in the European Union countries and it's among the first 10 global exporters of corn and wheat. According to the statistics from the National Institute of Statistics in Romania there are 3,9 million agricultural exploitations which represents a third of total agricultural exploitations on an European level.

Despite all these achievements, Romania is not mechanized enough, an important cause being the lack of funds, of irrigation systems, the fragmentation of the agrarian property as well as the lack of professional education of the people who work in this sector.

The modern agriculture has developed due to the mechanization, the optimization of production, the soil fertilization and the use of fito-technical protection by improving the formulas against the pests that have gained a certain resistance in time to used substances.

The main factor of increasing work productivity and increasing the agricultural production is mechanization. For all the technological phases of every crop, the mechanical workmanships (preparing the soil, planting/seeding, pest control and harvesting) have improved in time, the agricultural machines and equipments eased the agriculturalists work reducing the labour time by using one farm equipment for a larger area, for the same amount of time.

The farm equipment national market bore changes once Romania has adhered to the E.U.

The farmers had certain advantages, by disposing of funds and grants from the European/national programs they started buying machines and farm equipments from the foreign market, from Italy, Germany, USA, due to the lack of local producers.

MATERIALS AND METHODS

The data used to draft the present study have been supplied from the professional sites: INSSE (National Institute of Statistics), TRADE MAP, EUROSTAT and MADR (Ministry of Agriculture and Rural Development) as we are analyzing the situation of the farm machines and equipment fleet; the import and export of farm equipment; the enterprises who produce farm equipments as well as the manpower in the agricultural sector.

The research methods that are being used in this study are the quantitative, comparative analysis and the explanation of the statistical data along with own calculation, thus achieving a concise characterisation of this sector.

¹ Asistent Cercetător Științific , ICEADR, badan.daniela@yahoo.com

RESULTS AND DISCUSSIONS

Approximately half of the surface used in agriculture in the E.U. (178,5 million ha) is owed by France (15,9%), Spain (13,4%) and Germany (9,6%), Romania being ranked 6th after Poland with a 7,6% share. Out of the total agricultural area, the E.U. owns a share of 59,8%, while the permanent crops surface spreads on 11,7 million ha.

Romania's territorial fond consists in 23839.071 thousand ha. The agricultural areas surface being 14622,58 thousands hectares in 2015, owning a share of 61% of total surface.

During the analyzed period 2010-2015 there have been no significant changes, the arable surfaces remaining relatively constant.

Table 1. The surface of the territorial fund by usage (thousand hectares)

Territorial fund usage	Years					2015
	2010	2011	2012	2013	2014	
Agrarian from which :	14634.44	14621.43	14615.06	14611.88	14630.07	14622.58**
Arable	9404.	9379.49	9392.26	9389.25	9395.30	9392.06**
Pasture	3288.73	3279.25	3270.61	3273.96	3272.16	3276.94**
Hayfields	1529.56	1554.70	1544.96	1541.85	1556.25	1545.46**
Vineyards and winegrowing seminary	213.57	211.35	210.48	210.27	209.42	211.01**
Orchards and fruit-growing nursery gardens	198.57	196.66	196.75	196.54	196.94	197.094**

Source: INSSE

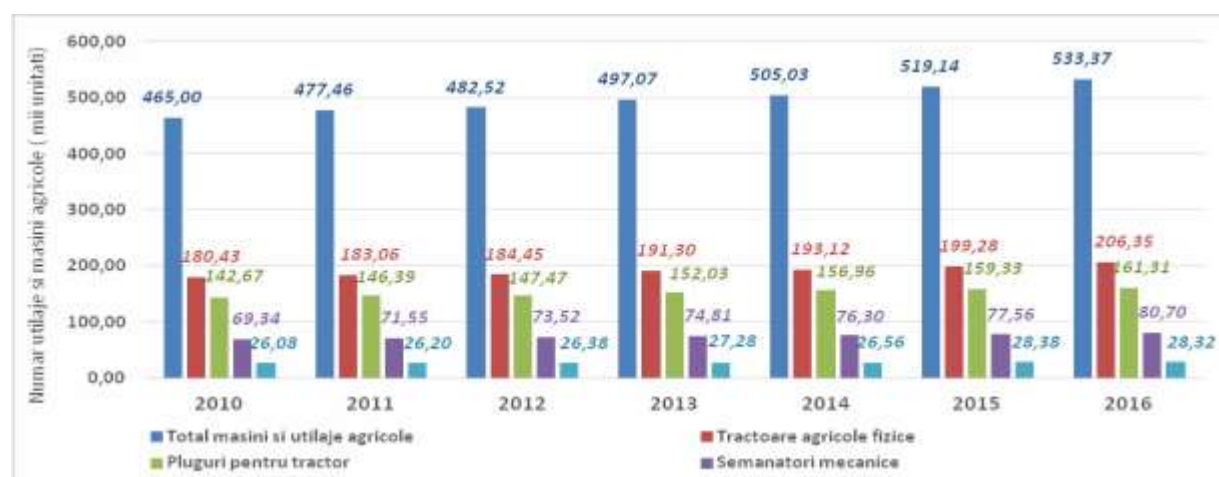
**assessments

The national fleet of tractors and farm equipments during 2010-2016 (diagram nr.1) has registered an increase of 14.7% in 2016 compared to 2010, representing 55,97 thousand ha.

The agricultural tractors had an ascending trend, with significant increasing after 2010, when Romania owned 180.43 thousand tractors and in 2016 the number of tractors has increased by 14,7% compared to the reference year 2010.

The number of tractor plows had the same rate as the tractors, so that if in 2010 there were 142.47 thousands, in 2016 their number has increased by 13,06% compared to 2010.

Diagram 1. Evolution of the fleet of tractors and main farm equipments in agriculture (thousand units)



Source: INSSE, MADR

According to the last data from Eurostat (table 2), in 2013 Poland owned a percent of 17,5% of total existing tractors in the E.U. and 75,14% of the harvesters. Compared to the first ranked European countries when it comes to the number of owned machines and farm equipments,

Romania registered smaller rates in farm equipment units, their share in Europe being 2,4% of total tractors, 9,8% of total seeders and 1,5% of total harvesters.

Table 2. Number of machines and farm equipments in U.E. in 2013 (thousand units)

Specification	Tractors	Seeders	Harvesters
E.U. (28)	7928.94	2074.11	1780.48
Poland	1388.31	114.2	1337.87
France	1065.12	52.68	59.18
Germany	778.58	44.5	62.75
Italy	1164.5	548.64	32.91
Romania	190.16	203.46	26.41

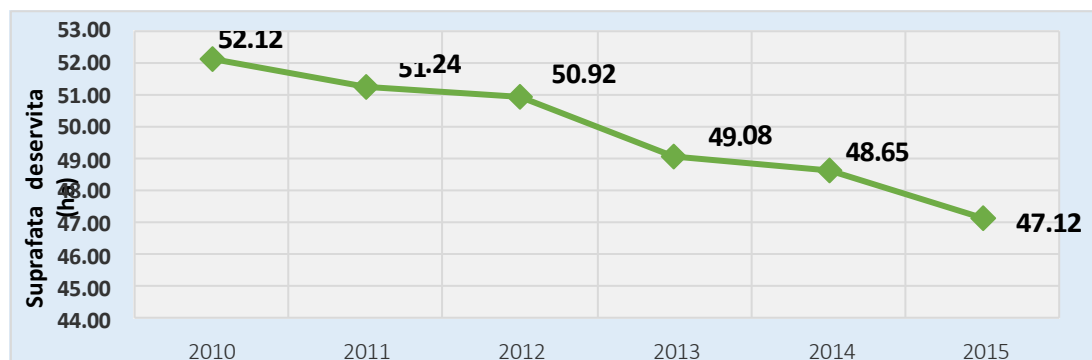
Source: Eurostat

According to MADR over two thirds of farm equipments have an outdated lifetime, so, a Romanian farmer uses a tractor for an average of 100 thousand hours compared to the European average of 3000-4000 hours.

According to diagram 2 where we can see the evolution of the surface operated by a tractor, there is a decreasing trend so that in 2010 a tractor cultivated a surface of 52.12 ha. Along with the mincing of the arable surface and the increase by 7% of the number of tractors, the surface operated by a tractor has reached 48.65 ha, 6,65 % less, although the European average is 1 tractor for every 13 cultivated hectares.

The tractors from Romania are overstrained compared to the equipments from other European countries. In 2015, the theoretical average loading per tractor has been of 47,12 arable hectare / tractor, meaning approximate three times more than France and approximate nine times more than Austria. Here, we can realize that there is a need of sustained and performant investments in order to become more efficient from this point of view. Hence the necessity to replace the old machines and farm equipments which means high costs of maintenance and usage for some models that have the advantage of increasing the production performance and a bigger coverage of the cultivated surface.

Diagram 2. Evolution of the surface operated by a tractor (ha)



Source: Operated data from INSSE

According to statistical data from The National Institute of Statistics the country's total working population had an ascending trend, reaching the maximum number of workers in the analyzed period in 2012 of 8,6 millions, followed by 2014 and 2015 when their number has decreased compared to 2012 by 1.61%, respectively 2,67%.

Approximate 2,4 million Romanians were working in agriculture in 2010, respective 29.15% of Romania's working population in 2007, 4,1% more than in 2015 when it's recorded the smallest share of agriculture workers out of active population.

The main influence which led to the decrease of manpower in agriculture has been given by the continuous mechanization of the agricultural sector, the population migration, the massing of the exploitable agrarian surfaces, getting to the point where a small number of people are administering larger surfaces.

Table 2. The working population in the agricultural domain, forestry and fishing (thousand persons)

Specification \ Years	2010	2011	2012	2013	2014	2015
Total working population	8371.3	8365.5	8569.6	8530.6	8431.7	8340.6
Population working in the agricultural sector, forestry and fishing	2439.9	2442	2510	2380.1	2304.1	2003.1
The share of workers from agricultural sector (%)	29.15	29.19	29.29	27.90	27.33	24.02

Source: INSSE, own calculations

The country ranked first in the in the classification of the population working in agriculture from Europe is Poland who registered in 2015 - 1937,1 thousand persons working in the agriculture sector, followed by Romania with a percent of 13,56% of total working population , Italy and Spain. The population working in agriculture in the E.U. has followed a decreasing trend so that in 2015, their number decreased by 7,87% compared to the first analyzed year.

Table 3. Population working in the agricultural sector in E.U. (thousand persons)

Specification \ Years	2010	2013	2014	2015
E.U.-28	10 344.8	9 918.2	9 739.3	9 530.4
Romania	1 639.0	1564.0	1433	1293
Poland	1914.8	1937.1	1937.1	1937.1
Italy	1164	1077.5	1094.9	1119.8
Spain	963.8	841.7	824.3	818.7

Source: Eurostat

If in 1990 there were 27 inland enterprises that produced machines and farm equipment, in the last 25 years the number has decreased due to the fragmentation of the arable areas and the farmer's incapability to cultivate and administer these areas due to the lack of funding, that leading to the decreasing of investments in farm equipments so that in 2015, the number of inland farm tractors and equipments has been reduced to 8 (MAT-Craiova, RURIS Craiova, Maschio Gaspardo-Arad, IRUM- Reghin, Mecanica Ceahlau- Piatra Neamt, HOYO-Raşnov, TEHNOSTAR-Campineanca).

Diagram 3. Import and export of tractors and farm equipments (units)



Source: TRADE MAP

During the analyzed period 2012-2016, the number of imports and exports of tractors and farm equipment units has been increasing.

The import of farm equipment has increased in 2016 by 8.62 % compared to 2012. A part in this situation comes from the decreasing of the number of enterprises in Romania, which made farmers buy from abroad.

From a value point of view, Romania imported tractors of approximate 645 million euro in 2016, 25 % more than in 2015. The import of farm equipments, horticultural, of preparing and cultivating the soil registered almost 130 million Euro in 2016, increasing by 15 % compared to last year.

The value of the export of tractors in 2016 has been 52 million Euro, dropping 14 % comparative to 2015, and the export value of the farm equipment was in 2016 of 30 million Euro, 14 % more than the last year.

CONCLUSIONS

The agricultural sector in Romania has a significant growing potential but it's insufficiently exploited. The restructuring of agriculture and the rejuvenation of the rural economy represent two important keys in the future economic development of the country.

The first opportunity for the tractors and farm equipment market in Romania is the fact that the farm equipments market needs to be upgraded because the mechanization technology available in our country is very low and insufficient.

In the last years, the farm equipments market in Romania has registered an increase of investments in this sector, the influencing factors being the European funds, the special credits for agriculture or the use of second-hand equipments.

The main challenges of the farm equipments market in Romania are: the internal structure of the farms (reduced dimension and large fragmentation), the large number of subsistence farms, the insufficient drawing of European funds, the deficient infrastructure and farmer's restricted access to information.

The investments for updating the agricultural fleet or for purchasing farm equipment required in a farm can be made by accessing European funds PNDR 2014-2020 through the following measures:

Sub measure 4.1 „Investments in agricultural activity”

Sub measure 4.2 „Support for investments in manufacturing/merchandising and/or developing agricultural products”

Sub measure 4.3 „Investments for developing, updating or adapting the agrarian and forestry infrastructure – The AGRICOLĂ access infrastructure”

Sub measure 4.3 „Investments for developing, updating or adapting the agrarian and forestry infrastructure - The IRIGAȚII component”

Sub measure 6.1 „Support for the settlement of young farmers”

Sub measure 6.3 „Support for the development of small farms”

Sub measure 7.2 „Investments in creating and updating the main infrastructure on a small scale”

Sub measure 7.6 „Investments associated with protecting the cultural heritage”

BIBLIOGRAPHY

1. Agriculture Machinery, Economic Report 2015, VDMA, www.lt.vdma.org, Retrieved 20 April 2017
2. Barbu, C.M., 2011, The Romanian agriculture-between myth and reality, *Annales Universitatis Apulensis Series Oeconomica*, 13(2), 2011, 485-496
3. The Agricultural Machinery Market & Industry in Europe: An analysis of the most important structural trends & why EU regulation of the sector needs to change . october 2016
4. <http://www.insse.ro>

COMPARATIVE ANALYSIS OF THE PRODUCTION-AVERAGE CONSUMPTION PROPORTION OF THE MAIN FRUITS IN ROMANIA AND THE EUROPEAN UNION

DANIELA NICOLETA BĂDAN¹
PETRUȚA ANTONETA TUREK-RAHOVEANU²

Abstract: *Taking under consideration the importance of fruits in human food, this article aims to follow the evolution of surfaces, productions, annual average fruit consumption, the import and export in Romania compared to the E.U. with the purpose of evaluating the sector as well as their necessity in human food. The increasing predisposition of the annual average consumption starting 2011 is due to the people's orientation towards a healthy food based on fresh fruits and vegetables, which makes one of the elements necessary for a balanced life. Human consumption represented the main destination of the inland consumption (97%) in 2014/2015 as well as in the previous years. The import value has reached a maximum level of 2,14 times (2016) compared to reference year (2010). The fruit imports increase year by year, exceeding exports, because the fruit productions in the last years have been of low quality which is why they have been sent to the food industry in order to be processed.*

Keywords: *average consumption, import value, export value*

JEL Classification: *Q13, L11*

INTRODUCTION

Through its economic and social dimensions and through its ecological functions the horticultural sector represents an important national treasure of Romania.

Economy wise, the horticultural sector represents an important income for the state budget and offers the possibility of completing the country's currency reserves through export activities. On the other hand it offers the raw material needed in order to develop a processing and harnessing activity that can be achieved in small and medium units that are easily integrated in the rural communities.

Fruits represent the food category with the highest degree of surveillance regarding food safety in the European Union due to the traceability in the interstate commerce.

The importance of the vegetables and fruits consumption is replenished by their participation with an important share in creating ready-to-eat and ready cooked culinary recipes: we can say that there is no menu in which vegetables and fruits don't cut in, in a proportion that's pretty high sometimes.

MATERIALS AND METHODS

The research method used in the present article is the qualitative and comparative analysis with the most powerful states in the E.U., by studying and analyzing the data provided by the Ministry of Agriculture and Rural Development, National Institute of Statistics, Eurostat and FAOSTAT. We will highlight, with help from the research methods and the specific literature, the potential of the surfaces that are cultivated with fruit trees that insure the consumption demand.

¹Assistant Research Scientist Bădan Daniela Nicoleta, The Research Institute for the Agricultural Economy and Rural Development, badan.daniela@iceadr.ro

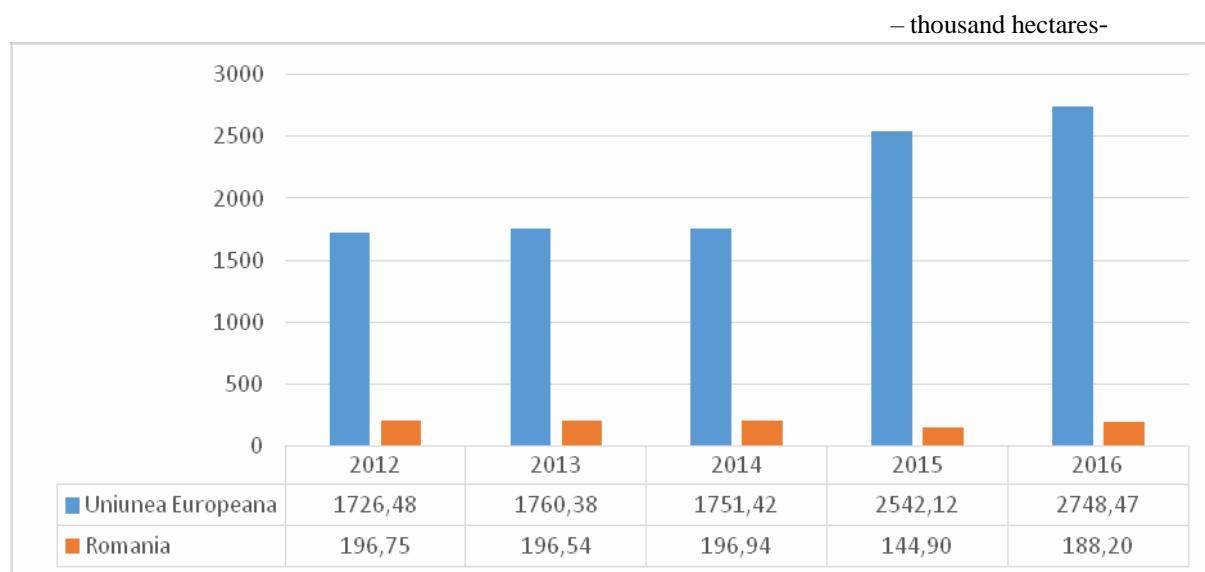
²Research Scientist III degree Turek-Rahoveanu Petruța, The Research Institute for the Agricultural Economy and Rural Development, turek.petruta@iceadr.ro

RESULTS AND DISCUSSIONS

The European Union allocated in 2016 a surface of approximate 2,7 million hectares for fruit production from which 6,2% (188.2 hectares) in Romania. (Diagram nr.1)

The fruit cultivated surface has been relatively constant until 2014, the variations being small from year to year, in Romania as well as in the European Union countries. In the following years (2015, 2016) the surface increases surprisingly in the European Union compared to Romania where it registered a substantial decrease according to the data published by INS and EUROSTAT.

Diagram nr. 1.Fruit tree cultivated surface on a European level



Source: Eurostat

In the analyzed period, the situation of the cultivated surfaces with the six categories of fruit trees is not very hopeful, especially starting 2013 when it registers a downfall, followed by a straightening with little increases until 2016

Table nr. 1. The status of the surfaces cultivated with fruit trees in Romania and the E.U.

– thousand hectares -

Specification	2012		2013		2014		2015		2016	
	Romania	E.U.	Romania	E.U.	Romania	E.U.	Romania	E.U.	Romania	E.U.
Apples	55.37	1726.48	60.28	1760.38	56.13	524.50	55.88	537.91	55.68	519.94
Pears	3.90	558.62	3.91	536.75	3.46	120.38	2.91	117.01	3.15	117.07
Plums	68.48	129.42	68.01	124.66	66.55	157.36	65.67	154.18	65.56	150.96
Cherries	6.83	166.39	7.08	162.01	6.45	170.13	6.31	173.35	6.10	170.75
Peaches	1.95	173.21	1.93	1358.82	1.68	162.40	1.69	157.55	1.69	157.52
Apricots	2.50	166.04	2.84	163.50	2.98	69.14	2.62	69.25	2.21	70.35

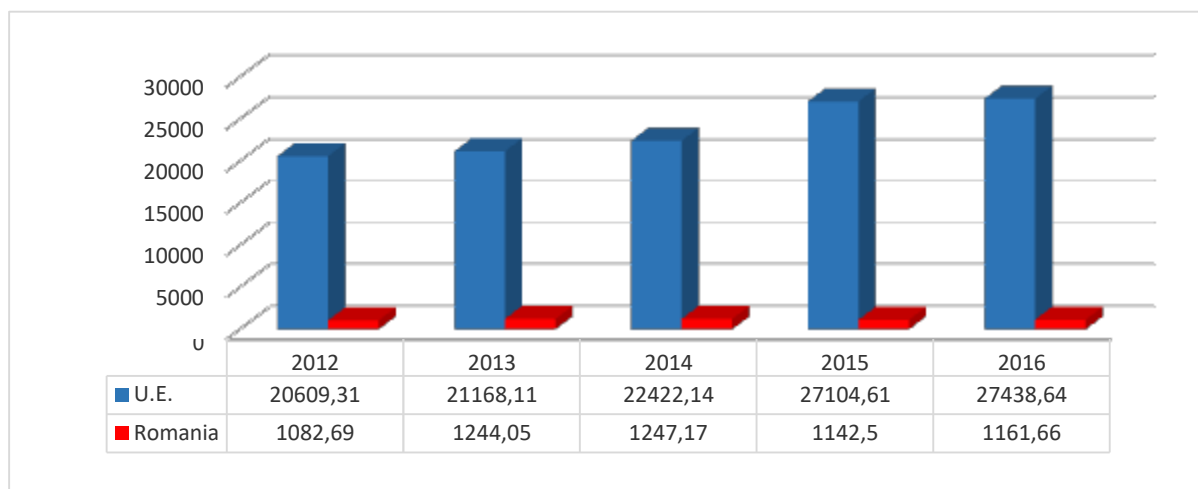
Source: Eurostat

The six species of fruits covered in 2016 a surface of 1,18 million hectares in E.U. that is 6,1% less than in 2012 (77,06 thousand hectares).

The apple orchards are more frequently cultivated in E.U. and cover 19% of total surface in 2016, 13,4% less than in 2012.(Table nr.2).

Diagram nr. 2. The status of the fruit productions on a European level

- thousand hectares -



Source: Eurostat

Romania's share in the European Union regarding fruit production is of 5,25% in 2012 decreasing in 2016 up to 4,23%.

The first place in the fruit ranking is occupied by apples, with a production of 12,7 million tons in 2015 (approximate 25 kg/per capita in UE).(Table nr.2)

Table nr. 2. The status of the fruit productions in E.U.

- thousand hectares -

Specification	2012		2013		2014		2015		2016	
	E.U.	Romania	E.U.	Romania	E.U.	Romania	E.U.	Romania	E.U.	Romania
Apples	11098.09	453.78	12075.76	502.95	12893.90	502.44	12757.70	459.05	12081.90	450.38
Pears	2099.08	51.74	2534.69	64.04	2566.24	58.51	2512.98	41.77	2323.59	49.96
Plums	1288.90	412.97	1405.31	501.03	1462.50	484.34	1,381.21	467.29	1431.56	485.43
Cherries	736.94	67.93	870.80	77.36	909.18	79.72	890.86	71.11	843.09	69.88
Peaches	2577.50	16.43	2,452.73	17.99	2878.94	23.34	2787.99	20.50	2690.55	22.32
Apricots	699.16	27.82	657.97	27.01	747.57	42.29	701.05	29.48	651.91	29.26

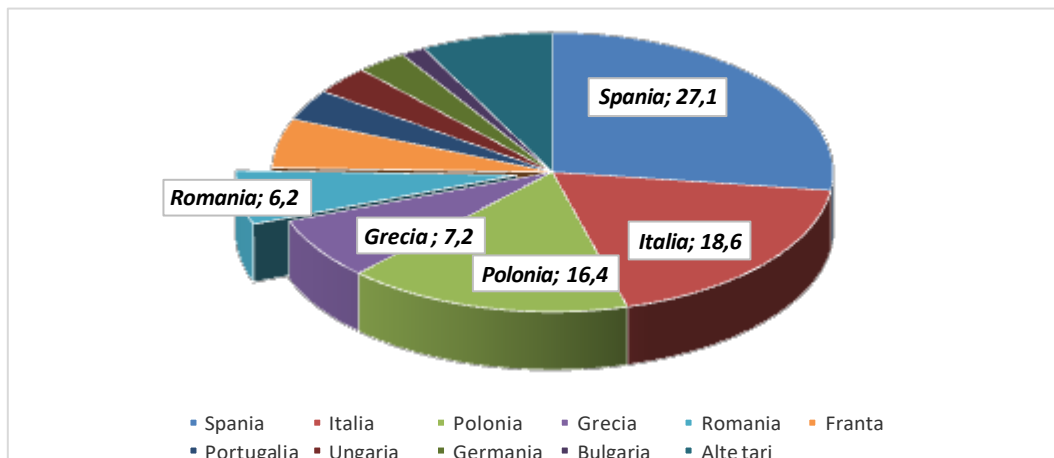
Source: Eurostat

Regarding the apples production, the main producers in the E.U. are Poland with a percentage of 25% of production total, followed by Italy with 19,2% and France with 15,5%. Regarding apple production Romania ranked 7, with a percentage of 3,6 % of production total (459,6 thousand tons).

Regarding the cherries, the main producer from the European Union in 2015 has been Poland (25,8%), then Italy with 12,6 %, Spain with 10,7% and Greece with 10%. With a percentage of 7,7% of total fruits produced in E.U., Romania placed 6th in the top of European countries who produce cherries.

In the peaches production's case, Spain is the main producer in the E.U. with 34,4%, followed by Italy with 32,9% and Greece with 23,3% of total fruit production, producing together approximate 90% of the peaches from the E.U. (Table nr.1)

Diagram nr. 3. Fruits production top in E.U. by country of origin, 2015
(% of total production in the E.U.)



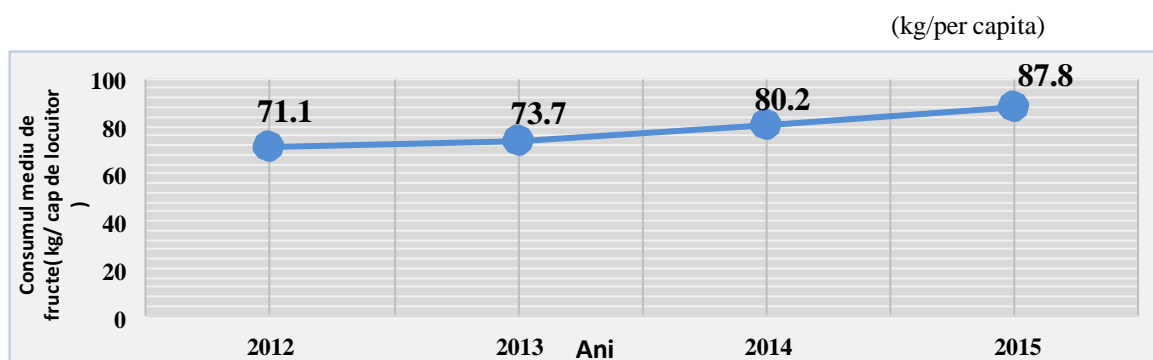
Source: Self calculations according to Eurostat data

Poland has been the main apple producer in the E.U. in 2016, having a percentage of 28,7% of total fruit production in the E.U., being followed by Italy with 19,6% and France with 14,5%. Poland has also been the main producer of cherries with 29,3% of total, followed by Spain 11,9% and Italy 11,2%.

Romanians are placed last in the European Union ranking regarding fruit consumption, it being 10 kilograms below the E.U. average.

The increasing predisposition of the annual average consumption starting with 2012 (Diagram nr.4) is due to people's orientation towards healthy food based on fresh fruits and vegetables, which makes one of the necessary elements of a balanced life. The highest average consumption of fruits and fruit products has been of 87.8 kg/per capita in 2015, that being 19 % higher than the one from the reference year 2012 .

Diagram nr. 4. The evolution of the annual fruit consumption in Romania



Source: INSSE

The annual average fruits and fruit products consumption per capita has increased with 7,6 kg in 2015, compared to previous year, mainly due to the increase of the annual average consumption per capita.

The vegetal origin lipids input in the making of the daily average lipids consumption has been higher by 0,5 percentage points compared to 2014, mainly due to the increase of the daily average consumption share of lipids derived from fruits and fruit products by 0,5 percentage points and daily average consumption share of lipids derived from vegetal fats by 0,2 percentage points.

Table nr. 3. The annual average fruit consumption in Romania

Specification	(kg/per capita)				
	2012	2013	2014	2015	2015/2014 %
Fruits and fruit products equivalent to fresh fruits	71.1	73.7	80.2	87.8	109.5
Apples	24.3	23.5	25.2	25.9	102.8
Plums	4.3	4.5	4.7	4.6	97.9
Apricots and Mirabelle plums	1.6	1.6	2.2	1.9	86.4
Sweet Cherries - Cherries	3.3	4	4	3.8	95.0
Peaches - Nectarines	3.4	3.1	4.1	5.9	143.9
Southerner and exotic fruits	20.6	23.1	25.7	29.8	116.0
Other fruits	7.3	7.2	8.1	9	111.1

Source: INSSE

The largest share in the average fruit consumption total is held by apples with a percentage of 34,1 % (2012) and 29,49 % (2015), closely followed by the southerner and exotic fruits with a percentage of 29 % (2012) and 33,94 % (2015). The lowest average consumption of fruits and fruit products per capita is registered for apricots and mirabelle plums in 2012 of 1,3 kg, staying low throughout the whole analyzed period.

In the southerner and exotic fruits category there have been registered increases of the annual average consumption per capita in 2015 compared to 2012 by 9,2 kg.

In the European Union, more than a third of the population (34,4%) doesn't eat vegetables and fruits every day, while less than 15% (14,1%) eat at least five portions every day.

Table nr. 4. Daily average fruit consumption in the European Union -2014

-%-

	0 portions	From 1 to 4 portions	5 portions or more
European Union (28 countries)	34.4	51.4	14.3
Belgium	16.1	71.3	12.6
Bulgaria	58.6	37.0	4.4
Germany	45.2	44.9	9.9
Greece	30.1	62.1	7.8
Spain	25.0	62.6	12.4
France	34.7	50.4	14.9
Croatia	27.5	65.5	7.0
Italy	23.0	65.1	11.8
Cyprus	32.6	51.3	16.1
Hungary	33.1	56.8	10.1
Poland	33.2	56.8	10.1
Portugal	20.7	61.1	18.2
Romania	65.1	31.4	3.5

Source: Eurostat

According to data provided by Eurostat in 2014 (Table nr.4), approximate 65,1% of Romania's population doesn't eat fruits and vegetables every day, being placed last in the European Union in this section. At a small distance from Romania is placed Bulgaria also with 58,6% of

population declaring that they don't eat fruits and vegetables every day. The biggest fruits and vegetables daily consumption was registered in Portugal with a percentage of 79,3 % of population that eats fruits and vegetables every day, followed by Spain with 75 % and Croatia with 72,5%.

According to data provided by INSSE, the import value for the fruit group – apples, pears and quinces has reached a maximum in 2016 of 63328 thousand euro, due to the fact that consumption demand couldn't be met from inland production only. It is important to highlight the fact that the import value for this fruit group surpassed by 2,25 times the one from the reference year. (Table nr. 5).

Table nr. 5. Import and export value by fruit groups in Romania

-thousand Euro-

Fruit groups	2012		2013		2014		2015		2016	
	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
Fresh apples, pears and quinces	28094	4131	30547	5667	34057	2751	51601	3731	63328	1513
Fresh apricots, sweet cherries, cherries, peaches, plums and sloe	18387	3506	18761	3389	20482	1850	32494	2198	38604	1254
Other fresh fruits	9556	2951	14070	2794	15359	3422	21966	2723	29244	5875
Fruits, boiled or not, in water or steamed, frozen, even with added sugar or other sweeteners	2526	15180	2828	15230	2999	16919	3513	13029	6004	8038
Provisional canned fruits	1113	2992	616	3237	846	3138	1441	4454	1824	4694
Dried fruits, other mixes of dried fruits or hard-shelled fruits in this section	7909	392	7816	390	9001	587	14018	492	16937	652

Source:INSSE

Fruit imports increase year by year, in 2013 reaching the point where they surpassed the exports because the fruit productions from some years have been of low quality and so, they have been sent to the food industry in order to be processed.

In 2015 Romania has reached many records regarding the increase of imports for different vegetables and fruit categories, so that 40% of the apple quantity, 60% of the pear or 86% of the peach in the local market has been brought from abroad.

2016 has registered the lowest export value in the last 5 years for apples, pears and quinces, being by 85,35% more diminished compared to the one from 2011.

The export value for apricots, sweet cherries, cherries, peaches and plums in the analyzed period 2012 – 2016 is fluctuant, reaching a minimum in 2016 (1254 thousand euro) and a maximum in 2012 (3350 thousand euro).

The most profitable group is the processed fruits group (boiled and frozen), the export value reaching 16919 thousand euro in 2014, but it continues to drop, reaching a decrease of almost 50% in the last year of the analysis (8038 thousand euro).

Romania got to insure almost 40% of consumption with fruits from abroad so that 60% of the pears eaten by Romanians, 86% of peaches and 66% of the grapes come from import.

CONCLUSIONS

Even though Romania is cultivating with fruits and vegetables an area that is larger than other countries that are European Union members, the harvested quantity is smaller due to scarce agricultural infrastructure, lack of funds and the low degree of mechanization.

The imports have reached the maximum level of the analyzed period in 2016, with an increase of 55,6% compared to the minimum level (2012).

The vegetables and fruits supply in the Romanian market can be structured in two categories: inland production and imports. In the fruit supply's case there are registered two peak period: summer and autumn season. Because the inland fruit supply doesn't cover the whole year, importing is necessary and the peak periods are: winter and spring.

The Romanian market has the tendency to direct the consumption of inland fruits that are considered to have a natural taste.

The inland consumption of fresh fruits from Romania has registered an increase of 19,02% compared to the minimum level (2012). The main destination of inland consumption has been represented by human food (approximate 97%) in 2015 as well as in the previous years.

Compared to the European Union countries Romania has an average consumption market for fruits and vegetables with a share of approximate de 4,8%.

European Union is a traditional importer of fruits and vegetables of some assortments for which Romania is well-established. The situation of the food sector in our country needs support through operational projects emphasizing on pre-production and production.

BIBLIOGRAPHY

1. Bilanțuri alimentare, INS România, 2012 -2016
2. Bilanțuri de aprovizionare pentru principalele produse agroalimentare, INS România , 2015
3. Agricultural Commodity Markets - Fruits and Vegetables, An analysis of consumption, production and trade based on statistics from the Food and Agriculture Organisation (FAO)

Estimative analysis of breakeven point of marigold crops for seeds in conventional and organic farming system - forecast 2017/2018

BEREVOIANU ROZI LILIANA¹

Abstract: *Marigold (Tagetes) is of importance both as a decorative plant and plant used in the cosmetic and pharmaceutical industry, with recognized medicinal properties. This paper presents a scientific approach to the methods required for the analysis of the economic efficiency of marigold seed culture in conventional and organic farming system - forecast 2017/2018. Thus, theoretical and methodological measurement of technical - economic processes and phenomena needed for the determination of the costs of production, market price and the level of profitability per unit of product was achieved using a system of specific indicators. These indicators may be classified into specific indicators, result indicators and profitability indicators (profit, return rates, breakeven point, etc.). The results of scientific research can have positive influence over the decisions necessary for the future production cycle for cultivating marigold for seeds in conventional and organic farming system.*

Keywords: *economic efficiency, profitability threshold, marigold seed culture*

JEL Classification: O12, Q14, Q57

INTRODUCTION

Marigold, with the scientific name of *Tagetes* sp., Family Compositae, is an annual plant, herbaceous, which was quickly acclimatised to conditions in Romania. It features a wide range of uses: decorative plant, to allelopathic plant (planted next to cabbage acts as flies repellent, and next to tomatoes as pest repellent). Cultivation of this crop is economically advantageous because of the possibility to cultivate small areas or heavy soils without special requirements to the soil fertility. Marigold culture can ensure a high yield, which can lead to a rapid income for the growers of this plant by capitalizing on the production obtained both on the domestic and external markets.

MATERIAL AND METHODS

To achieve estimates of breakeven point analysis for field crop of marigold for seeds, the input data started from cultivation technology for conventional and organic farming system.

A. Precursor-cultures

	Conventional system	Ecological system
Very good	- legumes for beans, vetch, hay	
Good	- autumn cereals, pruning crops	
Contraindicated	- must not return to the same land until after a minimum period of 4-5 years	

B. Application of fertilizers

	Conventional system	Ecological system
Basic fertilization	Organic fertilizers: 30 - 40 t / ha	
	- Reacts very well with the application of nitrogen fertilizers: 40-60 kg/ha and phosphorus: 30-50 kg/ha; - Potassium fertilizers in doses of 20 -30 kg/ha K ₂ O;	- organic fertilizers can be used as starter fertilizers at the rates recommended by the technical research
Application	- is carried out with the tractor 55-75 cp in aggregate with the fertilizer machine - autumn, below the base ploughing: phosphorus, potassium, organic fertilizers - spring, in the preparation of the germinating bed: nitrogen, organic fertilizers	

¹ Dr.-ing. CSII-Research Institute for Agricultural Economics and rural development, berevoianu.rozi@iceadr.ro

C. Soil works

	Conventional system	Ecological system
Works executed in the autumn		
Discarding previous crop	<ul style="list-style-type: none"> - has the purpose of clearing the land from the vegetal debris of the previous crop - is carried out with the tractor 55-75 hp, in the aggregate with the disc harrow and the adjustable angle harrow 	
Maintenance leveling	<ul style="list-style-type: none"> - has the role of leveling the soil after the previous work - is carried out with a tractor of 55 - 75 hp in aggregate with the grader 	
Deep soil mobilization (ploughing)	<ul style="list-style-type: none"> - is to be used for the incorporation of fertilizers into the soil, as well as for loosening and shredding the soil - is performed with the 55 - 75 hp tractor in the aggregate with the plough and adjustable angle harrow 	
Works executed in the spring		
Harrowing	<ul style="list-style-type: none"> - is done to destroy the upper crust formed and to level the soil in the spring; - is carried out with the tractor 55-75 cp in aggregate with adjustable tiller 	
Preparing the germinative bed	<ul style="list-style-type: none"> - has the role of mowing, loosening and leveling the soil for planting - is carried out with the 55 - 75 hp tractor in aggregate with the combine 	
Furrow marking	<ul style="list-style-type: none"> - is carried out with the 55 - 75 hp tractor in aggregate with the furrowing tool 	
Modeling the soil in furrows	<ul style="list-style-type: none"> - is carried out with the tractor 55-75 cp in aggregate with the modeling machine for furrow soil 	

D. The establishment of culture

	Conventional system	Ecological system
Establishment of crop by seeds		
Physical Purity of Seed	70%	75%
Germination	60%	65%
The optimal sowing time in the field	Spring (April)	
Seed norm	(4-5 kg/ha seed) 50-60 pl/mp	
The distance between rows	50 cm	
Depth of sowing	2-2.5 cm	
Establishment of seedling culture		
The optimal period for planting	May	April
Density	approx. 48,000 seedlings / ha(4.5-5.5 yards /square meter)	
The distance between rows	50-60 cm	

E. Crop maintenance

	Conventional system	Ecological system
Watering	<ul style="list-style-type: none"> - immediately after the planting of the seedlings and throughout the vegetation period of the crop - dripping is recommended, consistently ensuring the water needs of the plant 	

Completing possible gaps	- approx. 5-7 days after planting	
Weed control through agrotechnical works	<ul style="list-style-type: none"> - mechanical hoeing, weeding: whenever needed - observance of preventive measures (rotation, cultivation hygiene) 	
Biological purification	- for the removal of atypical and poorly developed plants	
Additional fertilization	- to ensure the plant need for nutrients	
	- the products recommended by the technical research are used	- use recommended products for organic farming
Diseases and pests control	is carried out with a tractor of 40-45 hp in aggregate with the machine for applying phytosanitary treatments	
	chemical control can be done with approved fungicides and insecticides at the recommended dose	- it is recommended to observe the preventive measures (rotation, cultivation hygiene); - using environmentally-friendly products applied during the periods and doses recommended by the technical research

F. Harvesting

	Conventional system	Organically grown
The optimal harvesting time	- at the full opening of the ligulated flowers when the inflorescences have a diameter of 2 to 2.5 cm (from June to September)	- at the opening of over 70% of the ligulate flowers
Harvesting for seed production	<ul style="list-style-type: none"> - at full maturity - manually, with the sickle, after which the plant will be treshed and the impurities removed 	
Production of ligulate flowers	4,000-5,000 kg/ha	3,000-4,000 kg/ha
Seed production	250-350 kg/ha	200-300 kg/ha

RESULTS AND DISCUSSION

I. Structure and analysis of production costs - estimates for the production year 2017/2018

Table 1: Structure of crop production costs for seed crops - estimates for cultivation year 2017/2018

		Conventional (275kg / ha)	Ecological (230 kg / ha)
Total agro-technical expenditure	EUR / ha	15230	16128
	%	100	100
Mechanized work	EUR / ha	270	266
	%	1.8	1.6
Hand works	EUR / ha	7188	6136
	%	47.2	38.1
Raw materials and materials	EUR / ha	7773	9726
	%	51.0	60.3

Source: Own calculations

From the data presented in Table 1, it is noticed that the estimated crop yield in the open field for organic seed is about 16% lower than the estimated production for conventional crops. To achieve these productions, agrofitechnical expenditures amounting to 15230 euro/ha were made in the conventional system, being exceeded by 5.9% in the ecological system. Expenditure on mechanized works has an insignificant share in both systems of cultivation, 1.8% in the conventional system, and 1.6% in the ecological system. The higher percentage is the raw material costs, namely 51% in the conventional system and 60.3% respectively in the ecological system. Expenditures for manual works in the ecological system amount to 6136 euro/ha, being 17.1% lower than the total value obtained in conventional system.

II. Comparative analysis (organic and conventional) income and expense budgets for the cultivation of marigold for seeds in open field - the production estimates for the year 2017/2018

Analysis of budget income and expenditure framework is based on production technology, prices for production inputs authorities unfinished production of the plan.

Table 2: Income and expenditure budget for seed crops, conventional and organic system - estimates for the cultivation year 2017/2018

Indicators	U.M.	Conventional 275 kg/ha	Ecological 230 kg / ha
A. Value of production	Euro	22050	25405
B (+). Subsidies	Euro	130	130
C (=) Gross product	Euro	22180	25535
D (-) Total Expenses	Euro	16962	18146
I. Variable costs	Euro	9043	11200
II. Fixed costs	Euro	7919	6947
E (=) Taxable income	Euro	5089	7258
F (=) Net income + subsidies	Euro	4404	6227
G. Rate taxable income	%	30	40
H. Rate of net income + subsidies	%	26	34
Cost of production	Euro/kg	62	79
Predictable domestic price	Euro/kg	80	110

Source: Own calculations

- Marigold for seeds, open field - conventional system

At an estimated average production of 275 kg / ha of seed, a production value of 22050 euro / ha is achieved, and a subsidy of 130 euro / ha is obtained to produce a gross product of 22180 euro / ha.

Variable expenses are 53,3% of the total agrophytotechnical expenditure. Of these, the consumption value of raw materials and materials represent 75.4%. With a proportion of 46.6% of total expenditures, assets are represented in percentage by 90, 7% of consumption value for permanent labor. By the total production value deduction, taxable income results for 5089 EUR / ha, finally yielding a net income of 4404 euro / ha and a ratio of net income of 26%.

As suggestive synthetic indicator for the degree of economic efficiency that will be obtained from cultivation of marigold in open field - conventional system, the production cost of 62 euro / kg is calculated by dividing total expenditure to estimated average production.

Obtaining profitability of marigold for seed crop becomes profitable by establishing a predictable domestic market price of 80 Euro / kg, calculated by multiplying the cost of production by a factor of 1.30

- Marigold for seeds, open field - ecological system

For an estimated average production of 230 kg/ha of seeds corresponds to a production value of 25405 euro / ha and by adding a subsidy of 130 euro/ha a gross product of 25535 euro/ha is achieved.

Variable expenditures, accounting for 61.7% of total expenditures, account for 77.5% of the raw materials and materials consumption. Consisting of 38.2% of total expenditures, fixed expenditures are formed by 88.3% of the permanent labor force consumption value.

By deducting total costs from production value, a taxable income of 7258 euro/ha is achieved, resulting in a net income and a net income rate of 6227 euro/ha and 34%, respectively.

Being a synthetic indicator representative of the level of economic efficiency for marigold for seed cultivation in open field, in an ecological system, the production cost of 79 euro / kg results from the reporting of total expenditures on the expected production to be obtained.

The profitability of the crop is achievable by establishing the predictable domestic market price of 110 euro/kg, calculated by applying a coefficient of 1.40.

CONCLUSIONS

The data presented in Table 3 highlights the fact that the output value obtained exceeds 30% of the costs incurred in the conventional system, and 39.9% in the ecological system. Variable expenditure accounts for 53.3% of total expenditures in the conventional system and 61.7% in the ecological system, the difference being fixed expenditures.

Raw materials and materials have a ratio of 75% and 77%, respectively of the total resources consumed and permanent labor costs up 90.7% and 88.3% of fixed costs. Representative synthetic indicator for the economic efficiency of expenditure items, the production cost is 62 euro / kg in the conventional system and 27% higher in ecological system, especially due to lower average yields by 16.4%.

Table 3: Synthesis of economic indicators for the cultivation of marigold for seeds in open field, organic and conventional system - the estimates for cultivation year 2017/2018

No. crt.	Synthesis economic indicators	U.M.	Conventional system	Ecological system
1	Average production at ha	kg/ha	275	230
2	Production value at ha	Euro/ha	22050	25404
3	Production costs per hectare	Euro/ha	16961	18146
4	Variable costs	Euro	9043	11199
5	Raw materials and materials	Euro	6822	8676
6	Expenditure on permanent labor	Euro	7188	6136
7	Fixed costs	Euro	7919	6946
8	Production cost	Euro/kg	62	79
9	Cost of capitalization	Euro/kg	80	110
10	Profit or loss per unit of production	Euro/ha	5088	7258
11	Profit or loss per unit of product	Euro/kg	18504	31558
12	Profitability rate	%	30	40
13	The threshold of return in units of value	Euro	13424	12423
14	Revenue threshold in physical units	to	167	112
15	The risk rate of exploitation	%	61	49
16	Security index (Is)		0.4	0.5

Source: Own calculation

The average price per unit of product is 80 euro / kg in the conventional system, and in the ecological system higher by 37.5%. Regarding labor productivity, it can be observed that 1 kg of product in the conventional system requires a consumption of 13.9 hours, of which 0.10 hours / kg for mechanical work and 13.8 hours / kg for manual work, while in the ecological system 1 kg of seeds obtained with 14.2 hours, of which 0.12 hours / kg of mechanical work and 14.08 hours / kg to manual work.

The rate of return has been 30% for the conventional system and 40% for ecological production of marigold for seed culture in open field, being economically viable. Breakeven point refers to the physical level or value of production for which the costs incurred are fully covered by revenues by capitalizing production, ie the level where the crop begins to be profitable. Thus, the cultivation of marigold for seeds in open field is considered cost-effective in conventional systems since the average production of 167 kg / ha corresponding value in the amount of 13424 euro, while for ecological system this threshold is lower with 33% in physical units, corresponding to 7.5%.

The operational risk rate is a synthetic indicator that estimates the risk in the event of not realizing the expected output. For the crop of marigold for seed in open field the indicator is 61% in the conventional system, and 49% in the ecological system.

The security index expresses the existing security margin through the respective culture, increasing in the same way as the value of the security index. This synthetic indicator for marigold for seeds crop in open field is 0.4 , respectively 0.5

BIBLIOGRAPHY

- Berevoianu Rozi Liliana, Necula Diana Maria et al. Conventional and Organic Agriculture in Vegetable Growing Floriculture and Mental Plant Culture- Conceptual Approaches, ASE Publishing House, 2015
- Berevoianu Rozi Liliana, Necula Diana Maria et al, economic-technical Guide flowers and herbs - forecasts 2016 - 2017, ASE, 2016
- Guido Sirtori, 2014, Plant Multiplication, Casa Publishing House;
- Elena Şelaru, 2007, Garden Flower Culture, Ceres Publishing House;
- Militiu, A., 1962 Flo ricultură Publishing Agro-forestry.

ESTABLISHING A VEGETABLES CROP WITH PROFESSIONAL GREENHOUSE

BRĂTULESCU ALEXANDRA-MARINA¹

Abstract: *Due to the changes that have taken place over the last period of time, at the level of the macromedium and micro-environment factors of an agricultural enterprise, the agricultural producer is challenged to have an activity characterized by performance and competitiveness. In order to support the needs of consumers of agri-food products, which suffer from many changes, it is important for the agricultural entity to obtain agricultural production at a higher quality level. This paper presents the stages of the establishment of a vegetable farm with professional solariums and greenhouses, having as main activity the tomato, pumpkin and spinach crops. During the paper, the elements of the micro-society (objectives, risks, market strategies), as well as elements of the macromedi (economic, technological, politico-legislative, natural) will be presented. It is also attempted to briefly present the aforementioned crop technology of vegetables. As a method of analysis, a feasibility study on setting up a vegetable farm will be presented in this paper, taking into account annual expenditure, estimated revenue, including estimated production costs. After analyzing all the elements presented, the section "Results and Discussions" presents the financial result and the recovery of the investment, taking a five-year horizon.*

Keywords: *farm, feasibility study, spinach, pumpkin, tomatoes, solarium and greenhouses, vegetables*

JEL Classification: L6, Q1, O5.

INTRODUCTION

Suncare or greenhouse farms offer the following services:

- Production of autumn tomato crops in greenhouses and solariums
- Early culture of pumpkins through seedlings
- Winter spinach culture, using BIKINI F1 spinach, this is an early spinach type of spinach.

In order for a farm / company to develop on the market, it must meet the following main characteristics

- Acquiring know-how adapted to high performance technologies
- Equipping with advanced equipment and technologies
- Retail expansion and export to the market

These objectives aim at increasing competitiveness on the agricultural services market. In this way we aim to offer solutions to the farms clients, characterized by quality and efficiency at European standards, through the following objectives:

1. Valuing export and retail products to the market
2. Reduce work time

3. Conclusion of partnerships with potential customers outside our country with food units
4. Increase of greenhouse area and solariums from year to year, but also increase of percentage profit with each year.

Equipping with state-of-the-art equipment and technology lies at the heart of the expansion plan for the coming years. This is because it provides real-time accuracy, which means saving time for the company and customers, as well as reducing the cost of providing services.

Risk factors must also be taken into account: Macroeconomic factors are the influence that the general economic parameters, the business environment and the legislation can have on this business.

From the economic projections for 2015 and 2016, although low economic growth, oscillations of inflation and the tax regime are expected, it will not negatively affect the business. The market is a relatively low risk starting from the premise that the company will cover other suppliers with premium quality vegetables. The demand is high and the low offer especially in low-temperature periods, and its risk is close to 0.

¹ ASC Brătulescu Alexandra, ICEADR Bucharest, bratulescu.alexandra@icea

Technology may pose a risk to the extent that the firm will not keep up with global innovation in products and technology launched on the market.

However, we believe that this risk is low due to the fact that the company pays special attention to innovation and has imposed itself on the market with products with a high degree of international innovation and certification.

The risk of internal factors is mainly related to staff and the managerial capacity of the company's initiators. The low number of people scheduled for business management and development, ease of use of the technology, and the low learning curve show a reduced staffing risk and a high capacity adaptation to crisis situations and its timely replacement in order not to interfere with customer service.

MATERIAL AND METHOD

As a method of analysis, a feasibility study on setting up a vegetable farm will be presented in this paper, taking into account annual expenditure, estimated revenue, including estimated production costs. After analyzing all the elements presented, the section "Results and Discussions" presents the financial result and the recovery of the investment, taking a five-year horizon.

The feasibility study of an investment project is a documentation that contains the main characteristics and technical and economic indicators of the investment, which ensures the rational and efficient use of material expenditures, in order to satisfy the economic and social requirements in the respective field.

Performing a feasibility study involves conducting a complex economic, financial, marketing, commercial, technical, investment management analysis to obtain information on the future benefits and risks involved in implementing a project investment.

The primary objective of the feasibility study is to present the estimate of the financial result and the recovery of the investment, taking a 5-year period.

RESULTS AND DISCUSSIONS

Expenditure is estimated by the degree of production (tomatoes, courgettes, spinach) and generally includes the following categories:

Table no.1 Estimation of financial result over 5 years of production

CULTURE	Total production (to)	Selling price (ron / kg)	Income (RON)	Production Expenses (RON)	Advantage
YEAR I					
Tomatoes	600	3	1800000	141400	1658600
Pumpkins	600	4	2400000	107100	2292900
Spinach	100	5	500000	31400	496860
YEAR II					
Tomatoes	700	3	2100000	164967	1935033
Pumpkins	700	4	2800000	124950	2675050
Spinach	100	5	500000	31400	468600
YEAR III					
Tomatoes	700	3.5	2450000	164967	2285033
Pumpkins	700	5	3500000	124950	3375050
Spinach	100	4	400000	31400	368600
YEAR IV					
Tomatoes	700	3	2100000	164967	1935033
Pumpkins	700	5	3500000	124950	3375050
Spinach	100	6	600000	31400	568600
YEAR V					
Tomatoes	700	3	2100000	164967	1935033
Pumpkins	700	5	3500000	124950	3375050
Spinach	100	5	500000	31400	468600

Source: www.insse.ro, own calculations

In table no. 1, the revenues and expenditures made on the basis of production are approximated, resulting in profit for a period of 5 years, this analysis was made for tomato, courgette, spinach. We can see that the most profitable crop is that of pumpkins, with the sale being the highest profit, this is also due to the production quantity of large pumpkins (700 tons).

The sales prices of tomatoes, courgettes and spinach were established on the basis of the average price recorded on the agri-food market of the crops analyzed.

Table no.2 Profit on the 5-year forecast

Culture	Year I	Year II	Year III	Year IV	Year V	Total	Weight %
Tomatoes	1658600	1935033	2285033	1935033	1935033	9748732	30
Pumpkins	2292900	2675050	3375050	3375050	3375050	15093100	45
Spinach	496860	468600	368600	568600	468600	2371260	25
Total	4448360	5078683	6028683	5878683	5778683	167524832	100

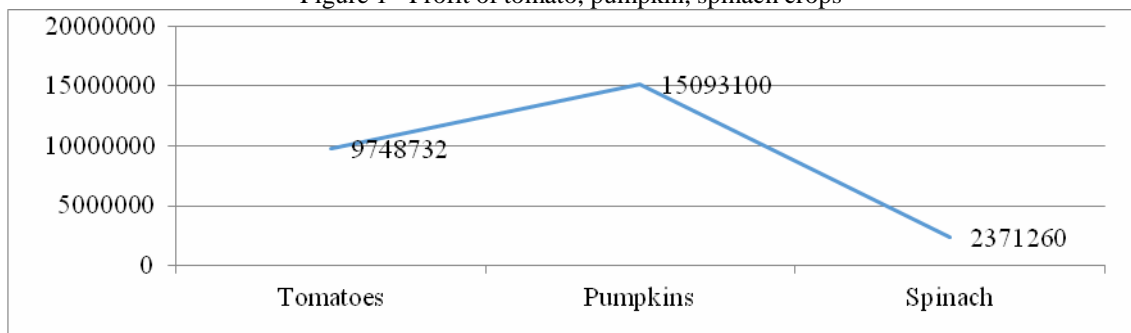
Source: www.insse.ro, own calculations

As mentioned in table no. 1, the highest value of the profit was recorded in the pumpkin crop, accounting for a total of 45% of the total profit.

Second place is tomatoes with a weight of 30%, and the last place is the spinach culture after the profits obtained with a weight of 25%, due to the fact that the spinach is a seasonal product, being obtained at certain times of the year and harvested from early spring or late autumn.

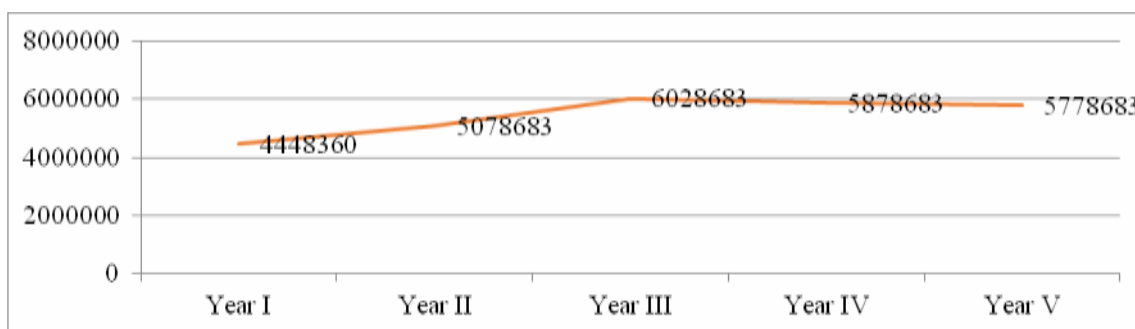
That is why the amount of spinach that is expected to be obtained is 100 tons compared to the quantity of tomatoes and courgettes (600 - 700 tons).

Figure 1 - Profit of tomato, pumpkin, spinach crops



For a more detailed picture we present the crops' profit in figure no. 1 for the 5 years analyzed. Here we can see that the profit of the pumpkin culture followed by the tomato culture was recorded first and the last place is the profit of the spinach culture.

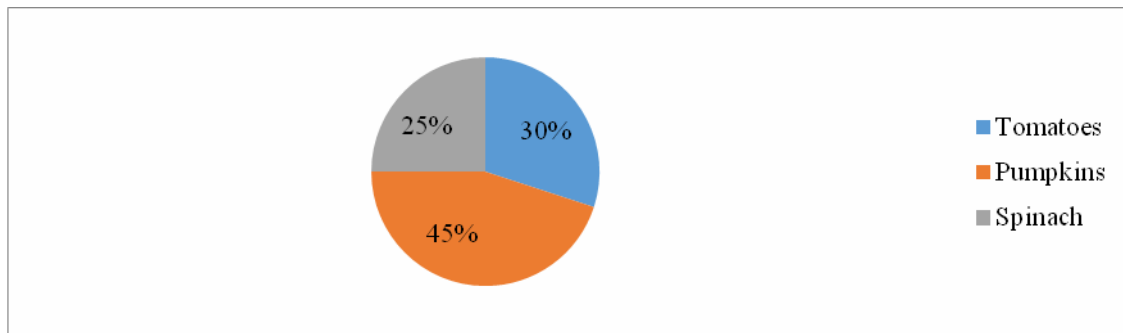
Figure no. 2 - Total profit per year



In figure no. 2, the three analyzed crops observed the fluctuations of the profit, which was increasing during the first 4 years, starting from the level of 4448360 ron in year I, reaching in the

fourth year to 5878683 ron, which represents a 32% increase in the year In the financial year there is a slight decrease of about 1%, this decrease is due to the lower price of spinach (5 ron versus 6 ron).

Figure no. 3 - Share of tomato, pumpkin, spinach



In figure no. 3, we notice that we can find the largest share in the pumpkin culture (45%) with a slight decrease we find the tomato culture (30%) and the smallest share was recorded in tomato crops (25%)

CONCLUSIONS AND RECOMMENDATIONS

Following the presentation of the feasibility study in the present paper, with a view to setting up a vegetable farm with greenhouses and professional solariums, which has as its object the cultivation of tomatoes, courgettes and spinach to briefly state the information:

– Before starting the agricultural business, producers must take into account the market elements belonging to the economic, technological, political - legislative field, but also to the natural environment;

□ At the managerial level of the vegetable farm it is important to define the objectives pursued by it:

1. Valuing export and retail products to the market
2. Conclusion of partnerships with potential customers outside our country with food units
3. Increase the area with greenhouses and solariums from one year to the next, and increase the percentage profit with each year.
4. Reduce work time.

Cultures in solariums are among the most profitable for a vegetable grower, but also extremely useful for self-consumption. Current concepts of rational human nutrition give vegetable products a priority position because they provide the human body with a wide range of vitamins, mineral salts and vital water.

They should also be defined according to established objectives and short, medium and long time strategies:

- Equipment with high performance technology
- Low cost service strategy
- Cover the largest market segment
- The equipment related to the culture space significantly improves the productions obtained both quantitatively and qualitatively
- Personnel strategies.

In this paper the financial result obtained for 5 years of production in the analyzed crops (tomatoes, courgettes, spinach) was estimated.

It was observed that the highest profit was recorded in the pumpkin culture, followed by the tomato.

The whole work confirms the hypothesis from which we started, namely that such a farm is profitable, the profit constantly increasing throughout the analyzed period, even more after analyzing the legislative framework, we have identified several opportunities for the Romanian farmers (NRDP, aids Natural transitions, APIA subsidies).

BIBLIOGRAPHY

1. www.insse.ro
2. www.europa.eu
3. www.agrointel.ro
4. www.gazetadeagricultura.info
5. www.madr.ro
6. <http://www.finantare.ro/ajutoare-nationale-tranzitorii-si-scheme-de-sprijin>

DEFINING ASPECTS CONCERNING THE RURAL HOUSEHOLD AND THE SUSTAINABLE SOCIO-ECONOMIC DEVELOPMENT IN ROMANIA

Lorena Florentina CHIȚEA ¹, Ion DONA ²

Abstract: *Rural development has as main subject the rural space as a system in which the main components (natural resources, people) interfere and have a specific (economic, social, cultural, political, institutional) behaviour. The rural household is the main actor in the rural space, owner of the main (natural, human, economic, cultural) resources, which it uses at its own discretion and whose behavior is very important for the society where it belongs. The need for this study stems from the necessity of the Romanian rural household to get adapted to the new Romanian and European socio-economic development realities. Even though the modernization paradigm has been replaced by the rural development paradigm, the Romanian rural communities and agriculture must continue their modernization process, which had a sinuous evolution rather than a continuous constant evolution as in the case of the developed countries from Europe, taking into consideration the new orientations of the current rural development.*

Keywords: *rural area, rural household, sustainable development*

JEL Classification: R20, Q 01, O2

INTRODUCTION

In order to investigate the rural household's role in the sustainable socio-economic development of the rural area, we must have in view the classification of some basic concepts ("rural space", "rural household", "sustainable socio-economic rural development"), as well as of the linkage between these in the context of the new rural development paradigm.

The need for this research study originates in the need for the Romanian rural household to get adapted to the new Romanian and European socio-economic development realities. For the Romanian rural area, the small rural household has provided the necessary stability and security in the face of the major economic and social changes brought about by economy restructuring.

The evolution of the Romanian rural household was closely linked to the evolution of rural space, which throughout time suffered a series of major transformations, i.e. change of the political regime with social, economic, institutional, cultural, etc. repercussions. This generated a lack of continuity, of stability in the normal evolution of the national agricultural system.

MATERIAL AND METHODS

In the present paper, the working methodology is represented by the review of recent literature with regard to the classification of three defining concepts (rural household, rural space, sustainable rural development) for the clarification of different aspects concerning the household role in the Romanian rural area from sustainable rural development perspective.

RESULTS AND DISCUSSIONS

Rural space

There is no unanimously accepted definition of the rural space, as it is an extremely complex concept, with a great diversity of opinions on its definition, scope and components (Dona 2015). There are a series of differences from country to country depending on the particularities of each state. However, there are a series of defining characteristics for the rural space: low population density, small and medium-sized human settlements, the main economic activities being agriculture, forestry, fisheries, and the primary processing of raw products from the agricultural, forestry and fisheries sector.

¹ Scientific researcher, IEA - INCE, E-mail: chitu_lorena@yahoo.com

² Univ.Prof. Dr., USAMV Bucharest, ion_dona@yahoo.com

The conceptual evolution of the rural space reveals its dynamic character. While at the beginning of the European Union, the focus was only on agriculture, in time, the focus began to be laid on the rural space complexity (Dona, 2015). The rural space proves to be a dynamic element, under permanent evolution and relating to the urban area, and in this way the modern rural space tends to replace the traditional one. (Brînzan Oana, 2006)

A definitive form of rural space definition is given by the Council of Europe in the European Charter for Rural Areas (Recommendation no. 1296/1996), where the rural space “denotes a stretch of inland or coastal countryside, including small towns and villages, where the main part of the area is used for: a. agriculture, forestry, aquaculture and fisheries; b. economic and cultural activities of country-dwellers (crafts, industry, services, etc.); c. non-urban recreation and leisure areas (or natural reserves); d. other purposes, such as for housing”.

In the European vision, according to Recommendation 1296/1996 concerning the European Charter for Rural Areas 1996, the rural space has three main functions:

- the economic function guaranteeing a system of agricultural, forestry, and fisheries production and its primary processing (under the form of small and medium-sized enterprises) and the development of non-agricultural activities and services; assurance of an appropriate level of incomes compared with that in the urban area; sustainable use of natural resources, etc.;

- the ecological function has in view to promote the protection and conservation of natural resources (land, water, air), to maintain and preserve landscapes; to maintain and protect biodiversity, etc.;

- the socio-cultural function has in view to preserve and develop the socio-economic roles of rural areas, by protecting the traditional culture, the local customs and heritage, while promoting the association relations between the urban inhabitants and the country-dwellers, as well as the local associative relations.

The Romanian rural space went through a sinuous redefining period throughout the existence period of the European Union (MARD, 2015). While the EU was consolidating the multifunctional rural area concept, Romania was going through a contradictory process, mainly generated by the land ownership change (the inter-war period when the private ownership was consolidated, the communist period when farmers’ expropriation took place, and the period after 1989 when land was restituted to former owners).

Thus, after 1989, a series of important socio-economic processes took place in Romania’s rural area, such as land restitution, economy restructuring, external migration, unequal development of rural communities depending on the proximity to urban centers; thus the rural communities in the vicinity of towns developed faster than the isolated communities, which seem to be forgotten in time (MARD, 2015).

The rural household

There is no uniformity in defining the household in the world (necessary for data comparability in different European and world surveys), even though all definitions imply a certain form of life and consumption in common. Certain definitions incorporate pooling and sharing incomes within the household.

In the European Union, the most frequently used criteria in defining a household are the following: co-residence (living together in the same house), pooling and sharing the incomes and resources, sharing the expenses and ultimately, existence of family or emotional ties (United Nations, 2007).

In Romania, the individual household represents a unit consisting of one or several physical persons, having in general kinship ties, who are living together and share the resources they have, who obtain agricultural products, mainly or exclusively for their own consumption.

“The rural households are complex (social, economic, spiritual) living systems, integrated into a specific environment, the rural environment”. “A household is a production workshop, based on the work of a family group, aiming at meeting its own consumption needs”. H.H. Stahl considered that the archaic peasant household is based on a family nucleus consisting of a married

couple and their children and that on the household there is a certain labour division, by age and gender. M. Vulcănescu said that *“meeting the family’s consumption needs (...) provides the peasant family with a greater resilience to crisis”* (Bădescu, 2006).

Eric Wolf considered that *“the peasant does not put an enterprise into operation in an economic sense, he manages a household, not a business”*. *“The peasant household is simultaneously a production and consumption unit”*. *“Between the peasant household and the capitalist enterprise there is a difference in structure. The capitalist enterprise revolves around money, as a fundamental element, while the peasant household base is the family group”* (Bădescu, 2011)

“The backbone of the Romanian people, of the Romanian nation and contemporary state, was based on the peasant household, which meant continuity and tradition, and mainly spatial infrastructure specific to the rural area, which has generated agri-food resources for the entire population” (Bohateruț in Popescu and Istudor, 2017).

“The agricultural holdings without legal status, of individual household farm type are specific to the traditional peasant household”, these being “the pivot of Romanian rural society by overlapping with the households of the population from the rural area” (Bohateruț in Popescu and Istudor, 2017).

The main characteristic of rural households is that it is not fully subject to the modern economic laws, being rather governed by a series of less quantifiable principles (traditions, customs, traditional cultural patterns, etc.), which protected it in times of crisis, of transition, yet hindered it from technological, informational, economic and social progress.

The typology of the rural household can be established by its demographic size (number of persons on the household), by social structure (mono, pluri-family or non-family), by economic size (household’s incomes), by educational level, by access to healthcare, technical and public utility infrastructure, etc.

Kideckel (1993) approaches the household as production and consumption unit, as well as support to the identity between individuals, proposing the following rural household typology (Kideckel quoted in Mihalache and Croitoru, 2011):

- the key households are those households directly involved in the social life of localities, with influence and involvement in the political decision process;
- the mobile households are those middle households aiming at changing their social structure through spatial mobility and education;
- the integrated households are those traditional households that gain their existence from the agricultural activities, socially integrated but without political implications;
- the transition households that often change their residence locality, and Kideckel includes in this category all those households from households of employees, physicians up to semi-nomadic gypsy households;
- the marginalized households are those households that cannot gain their existence in the absence of social aid.

The rural household must be treated as a main component of rural space, and the rural space operates as a system based on internal resources, also with outside influences. From the analysis of the Romanian rural system, we shall find out significant differences both across regions and within regions. These are generated by a series of factors that are more or less difficult to highlight, to measure.

At present, the rural household must face the same challenges that the rural area to which they belong also has to face. The agricultural sector economy prevails in the present Romanian rural economy, and its main characteristic is the high share of subsistence farms (they overlap with the rural household in a large part), which most often produce for self-consumption and only occasionally for the market, which utilize the most part of UAA and a great part of the labour input. The farming practice must ensure the food security, contribute to the fight against climate changes and provide jobs and incomes for the rural population.

Sustainable rural development

There is no clear, comprehensive definition of rural development in the literature (Clark et al, 1997; Nooy 1997); at this moment, it would not be possible either to construct a comprehensive and generally accepted definition because this would trigger many controversies both theoretically (existence of a multitude of terms defining the same thing) and politically (the rural development policies that benefit certain actors or countries).

In Robert Chamber's opinion, "*Rural development is a strategy to allow a certain group of people, poor men and women from the countryside, to earn for themselves and their children what they need and what they want. This implies helping the poorest people looking for a living in the rural areas to have access to most of the rural development benefits. The group includes small famers, tenants and people without land*".

Rural development can be defined as a process of development and utilization of natural and human resources, through governmental policies and programs, of technologies, infrastructure, institutions and organizations, as well as through governmental policies and programs, in order to foster and speed up economic growth in the rural areas, to provide jobs and to improve rural life quality for self-sustaining purposes. Furthermore, besides economic growth, rural development also implies changes in the population's attitude and in many cases even a change of habits and beliefs. Briefly, the rural development process must represent a series of modifications through which a social system changes from a lifestyle perceived as "non-satisfactory" to better living conditions, both materially and spiritually (Singh, 1990).

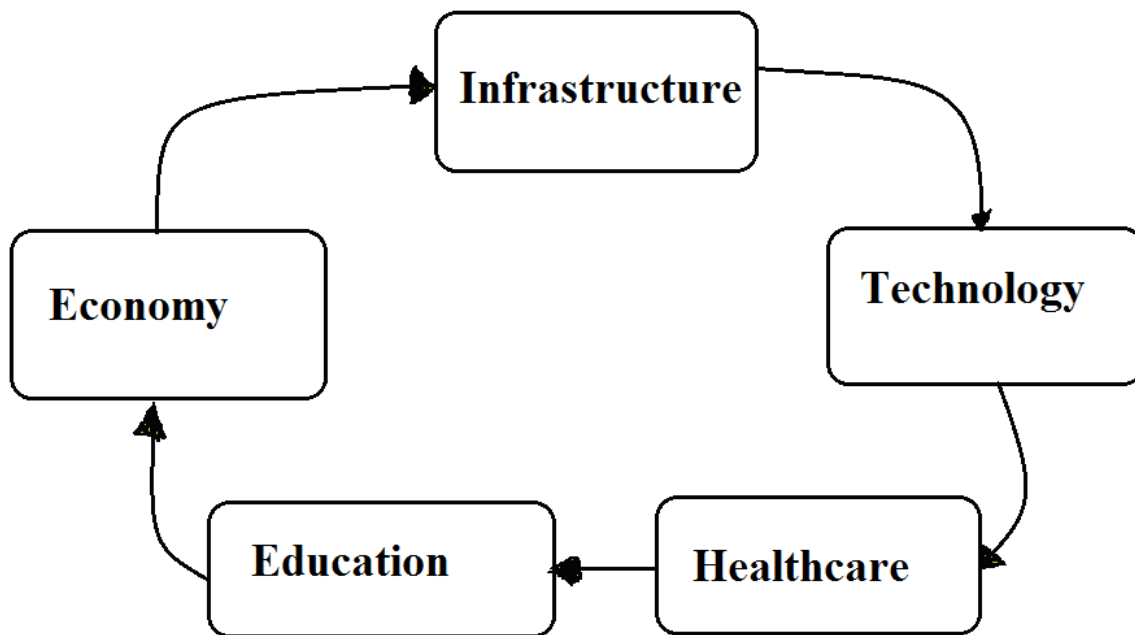


Figure 1. Rural development

Sison and Valera (1991) define rural development as follows: *A process by which rural poverty is alleviated through the sustained growth of productivity and incomes of low-income workers and households from the countryside.*

"A better quality of life in poorer countries of the world that implies higher incomes, but it means much more. It also includes better education, higher healthcare and nutrition standards, less poverty, a cleaner environment, a better quality of opportunities, more individual freedom and a richer cultural life" (World Bank, 1991). The rural development concept was also used in the official documents after the Cork Declaration (1996). The definition formulated for the rural development is *"the discipline, essentially socio-economic, whose objective is to maintain rural*

societies through occupational diversification that will improve the quality of life and avoid rural exodus. At the same time, it takes into consideration the utilization of natural resources, with possibilities to be used in other economic sectors as well”.

In the OECD experts' opinion (OECD, 1995), rural development is seen as:

- a territorial concept (dealing with the spatial differences in terms of problems and perspectives, development opportunities and options);
- a multi-sectoral concept (concerning a wide range of demographic, economic, social and environmental aspects; the Council of Europe highlights the importance of sectoral cooperation, horizontal integration of activities and policies);
- a dynamic concept (concerned with the long term environmental changes and the adjustments from technology, economy and society).

The rural development is concerned with the population distribution process not to be biased in favour of urban areas. In order to prevent this, the analyses concerning the demographic pressures, job creation and economic welfare are the main rural development problems.

There is a recent change in thinking on rural development, which highlights the importance of rural areas for the quality of life of the entire society, as the important public goods are found here, such as a clean environment, attractive landscape and cultural heritage (OECD, 2001).

In recent years, there has been a wide recognition of the fact that rural economy is not limited to the farming sector, but has also in view the population, the economic activities, the infrastructure and natural resources from the rural areas (Csaki and Lerman, 2000). At the same time, livelihoods in rural areas are not limited to the incomes exclusively obtained from the farming activity, but can also depend on different other sources (Ellis, 1998). It has been recognized that, on long term, the non-agricultural sector development in the rural area is a critical factor in supplying jobs and incomes in the rural area (Bright et al., 2000).

Rural development is the process providing opportunities, services and facilities for the rural people, so that these can improve their social, economic, political, cultural and physical welfare while taking into account the natural environment (Battad, 2003).

Rural development appeared as a reaction to the previous modernization paradigm that has prevailed in politics, practice and theory until recent times (Ploeg, 2000). It is a thing of the past when the urban centers expected from the rural areas only to be supplied with cheap food. The urban centers were considered growth poles, while the rural areas were considered territories lagging behind. Therefore, the focus of rural development had an exogenous orientation; modernity had to be brought from the city to the countryside, more specifically to the agricultural sector (Ward et al., 2005). The effort to promote the agricultural specialization of the rural areas, characterized by the mechanization and industrialization of agricultural products, had a great negative impact on the natural, economic and cultural environment, which caused the decline of this development type (Woods, 2011).

The first criticisms to the modernization paradigm were not late to appear, immediately after the 1960s. The economic crisis of the 1970s showed that this model did not contribute to sustainable development in the peripheral areas, and from that moment the development perspective acquired a territorial character. Gradually, the concept, which had been associated with economic growth so far, began to shift its focus on environment and quality of agricultural products. Thus, the sectoral approach was abandoned in favour of a new approach that has the territorial cohesion as target objective. The main characteristics of the territorial development model are: utilization of available resources (economic, social, technological, institutional, infrastructure, environment, cultural resources) in the territory, the local control of the development process and keeping profit in the respective area (Bowler, 1999).

Thus, in the last decades, the traditional modernization paradigm (exogenous development), focusing on the sectoral approach, was replaced by a new development paradigm (endogenous development), focusing on the integrated development at local level.

While modernization promoted a specialization in farm production and provided for a separation of agriculture from the other rural activities, the new model of rural development has

focused on the cohesion between activities both at farm level and between different farms and the other rural activities (Ploeg, 2000).

The numerous changes concerning rural development were transposed at the European Union level – from an approach focusing on the agricultural sector towards a territorial approach and towards a greater diversification of economic activities (Van der Ploeg et.al., 2000; Leon, 2005; OECD, 2006); these changes had a direct or indirect effect on all the constituent elements of the rural space and of course also on the rural households.

Thus, one can speak about 4 main rural development models, having the following characteristics:

- The model focused on the agricultural sector that took shape after the Second World War. The agricultural production growth was set as the first priority, followed by other priorities such as the increase of labour force and services in the rural area, which were approached as a direct result of the support provided to production in the farming sector.
- The multi-sectoral approach model that recognizes the limits of the agricultural production support policy and considers agriculture as one of the many economic sectors that become rural development objectives. The focus may continue to be on agriculture, but there is also an encouragement for agricultural diversification.
- The territorial approach model recognizes the existence of wider interactions within the rural economy and the importance of social and environmental aspects, besides the economic aspects.
- The local approach model recognizes the differences between the rural areas and the variation of circumstances, actions that take into consideration the specificity of solutions at local level.

The current concept of rural development is based on sustainable development. The rural development concept has been progressively taken over by the sustainable development concept in the European Union Treaties (Stafie, 2013), and the stages of this process were the following:

1. 1987, the Single European Act recognizes the sustainable development concept, providing for “*environment conservation, protection and quality improvement, contributing to the protection of human health and to the prudent and rational use of natural resources*”;

2. 1992, Maastricht Treatise, in which sustainable development is seen as compatibility between the economic and social development and natural environment protection;

3. 1997, Amsterdam Treaty, which provides for sustainable development as a fundamental objective of the European Union;

4. 2000, the Lisbon Strategy, whose objective for the European Union was to become “*the most competitive and dynamic knowledge-based economy in the world by the year 2010, capable of sustainable economic growth associated with more and better jobs and with greater social cohesion*”, mentioning the rural development principle only at theoretical level.

5. 2001, the European Council in Göteborg complements the Lisbon Strategy with the principle of rural development;

6. 2005, the European Commission reviews the European Union’s strategy and the sustainable development principles, namely: promotion and protection of fundamental rights; solidarity between generations and within the same generation; guarantee of an open and democratic society; participation of citizens, societies and social partners; coherence and integration of policies; making use of the best available knowledge; precautionary principles and the “polluter pays” principle.

7. 2013, the environmental objectives target the sustainable use of natural resources and the fight against climate changes.

According to the Europe 2020 Strategy – launched under the background of the deep economic crisis and of the intensification of globalization challenges (pressure on resources and population ageing) – EU wants to become a smart, sustainable and inclusive economy.

The rural development policy of the European Union has continuously evolved in order to face the new rural space challenges, which mainly target food security, supplying high quality food,

environment protection, rural area diversity through the development of non-agricultural activities, and maintaining the urban-rural balance by the improvement of the living conditions in the rural area.

We must take into account the fact that rural development represents a new development model of the agricultural sector. Until the early 1990s, the scale expansion, intensification, specialization and industrialization tended to be the parameters that defined the development trajectory of the agricultural sector. The inevitable effect of this development model was the rural exodus manifested by the decrease of the number of farms and the sharp decrease of employment opportunities. Furthermore, the regional disparities grew larger, while the tensions increased between agriculture, on one hand, and landscape, nature, environment and quality of products, on the other hand. (Ploeg, 2000)

At present, the rural development challenges are represented by the new needs and expectations in relation to the production of the so-called “public goods” (beautiful landscapes and natural values), to obtaining sufficient and high quality foodstuffs under environment (natural resources) protection conditions and animal welfare and rural population’s life quality increase.

CONCLUSIONS

The rural household, as main actor in the rural area, is subject to the same social, economic and cultural challenges from the rural area, generated by the reconfiguration processes of the rural area (communist stage 1949-1989, transition stage 1990-2006 and post-accession to the EU). None of these stages has generated a unitary process in terms of the intensification of social and economic phenomena or from the geographic point of view (Mihalache, Croitoru, 2011).

The Romanian rural area is currently facing a discrepancy, in the sense that deep changes have been produced in the basic infrastructure modernization and explosive growth of new housing estates and the modernization of the old ones, while Romania’s agriculture has still remained a non-modernized sector, of extensive type, with low average yields per hectare and per animal head, with low efficiency and high share of subsistence farms, with an accelerated demographic ageing of the rural population and lack of diversification of non-agricultural activities (Bohateret, 2015).

Even though the modernization paradigm was replaced by the rural development paradigm, Romania’s agriculture and rural communities need to continue their modernization process (which had a sinuous evolution rather than a continuous constant evolution like in the European developed countries, taking into consideration the new orientations of the current rural development process.

The modernization of the primary sectors in the rural area (agriculture, forestry, fisheries) contributes to competitiveness growth for the improvement of rural area performance and revitalization and job creation in the countryside.

The applied development type has a direct effect on the rural household viability and on the rural area implicitly. At present, it is necessary to have in view that under the efficiency requirements, there is a risk of irreversible transformation of the traditional rural space, of disappearance of a significant part of rural households and along with them, of the traditional production and living practices.

At present, in Romania’s rural area, the operating structures define a complex and diverse rurality. Out of this reason, any development/modernization type should be based on the specificity of the rural areas, on those defining phenomena and processes for each area in part (Giurcă, 2012).

REFERENCES

1. 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, București
2. Bădescu, I., Cucu-Oancea, Ozana, Șiseștean, G. (2011). *Tratat de Sociologie Rurală*. Editura Mica Valahie. București.
3. Bright, H., Davis, J., Janowski, M., Low, A. & Pearce, D. (2000). *Rural non-farm livelihoods in Central and Eastern Europe and Central Asia and the reform process: A literature review*. NRI RNFE report no. 2633
4. Brînzan Oana. (2006). *Dezvoltare rurală*. Editura Universității Aurel Vlaicu, Arad.

5. Bohateret, V., 2015, *Viitorul gospodăriei țărănești în România din perspectivele recensămintelor agricole în Economia agrară și Dezvoltare rurală. Realități și perspective pentru România*. Ediția a VI-a.
6. Bowler, I. (1999). *Endogenous agricultural development in Western Europe*. Tijdschrift voor Economische en Sociale Geografie, n°90 (3).
7. Clark, J.R.A. et al. (1997). *Conceptualising the evolution of the European Union's agri-environment policy: a discourse approach*. *Environment and Planning*.
8. Csaki, C. & Lerman, Z. (2000). *Agricultural transition revisited: Issues of land reform and farm restructuring in East Central Europe and the former USSR*. Washington DC, World Bank.
9. Dona, I. (2015). *Economie Rurală*. Editura Economică, București.
10. Giurcă Daniela și ceilalți. (2012). *Reforma Politicii Agricole Comune în contextul perspectivei bugetare post-2013*. Institutul European din România, București.
11. Mihalache și Croitoru. (2011). *Mediul rural românesc: evoluții și involuții. Schimbare socială și antreprenariat*, Editura Expert, București
12. Ploeg și ceilalți. (2000). *Rural Development: From Practices and Policies towards Theory*. Sociologia Ruralis, Vol 40, Number 4. Published by Blackwell Publishers, UK și SUA.
13. Popescu, G., Istudor, N. (2017). *Gospodăria țărănească în economia rurală*. Probleme de politică agrară. Colecția 4. Editura ASE
14. Singh, I., (1990). *The Great Ascent: The Rural Poor in South Asia*. Baltimore, MD: Johns Hopkins University Press.
15. Stafie Alina. (2013). *Dezvoltarea durabilă a spațiului rural: situația României în cadrul strategiei de dezvoltare durabilă la nivel mondial și în Uniunea Europeană*. Revista Management Intercultural. Volumul XV, Nr. 2 (28).
16. Ward, N., Atterton, J., Kim, T.-Y., Lowe, P., Phillipson, J. and Thompson, N. (2005). *Universities, the Knowledge Economy and 'Neo-Endogenous Rural Development'*. Centre for Rural Economy Discussion Paper Series, n°1, 1-15.
17. Woods, M. (2011). *Rural*. Oxon and New York. Routledge.
18. *** Ministerul Agriculturii și Dezvoltării Rurale din România. (2015). *Unitate și diversitate în satul românesc. În cadrul proiectului „Înființarea și sprijinirea Rețelei Naționale de Dezvoltare Rurală”*
19. *** OECD, (1995). *Review of Rural Policy FINLAND*. OECD, Paris.
20. *** OECD, (2001). *Territorial Outlook*. Paris, 2001. Reference to Chapter 9: Rural Trends and Policy Issues.
21. United Nations, (2007). *The Wye Group Handbook Rural Households Livelihood and Well-Being. Statistics on Rural Development and Agriculture Household Income*. United Nations, New York and Geneva.

TOURISM AND AGROTOURISM EVOLUTION ON AN EUROPEAN AND NATIONAL LEVEL

EUGENIA-DORINA CIOBANU(RĂDOI)¹, MANEA DRĂGHICI²

Abstract: *In this article we wanted to identify, analyze and present the evolution in the last years of the tourism and agrotourism on an European and national level. In order to do that, the following indicators have been analyzed: the evolution and structure of international arrivals of tourists around the globe, the evolution and structure of international tourism encash, the evolution and share of tourist accommodation in Romania, the evolution and share of the accomodation capacity in Romania, the evolution of arrivals in accomodation units from Romania and the evolution of overnight stays in accomodation units from Romania. Following this analysis that is presented in the article in the rows below, we come to the conclusion that the tourism and agrotourism, on an European and national level, has had a constant growth in the last 5 years, thus representing an important branch with possibilities to develop economy, generating profit.*

Key words: *tourism, agrotourism, boarding*

JEL clasification: Q11

INTRODUCTION

With the help of the specific research methods in tourism, having as analysis instruments the statistics indicators presented in the rows above, in this article we will present the evolution of tourism and agrotourism, in Europe and Romania, having as reference years the period 2010 - 2015. The term tourist has been used for the first time in 1800 by Samuel Pegge, in a writing called "Anecdotes Of The English Language", by formulating "A traveller is now -a- days called Tour-ist" [1] Theobald (1994) suggested that etymologically the word „tour” comes from Latin (turnare) and Greek (tornos), with the meaning of circle – the movement around a central point or an axis. After being absorbed into the English language the word tour got the meaning of the action of moving in a circle. Consequently, a tour represents a round trip and the one who takes such a trip bears the name of tourist. [2]

According to other opinions, tourism represents "the art of travelling for pleasure" (Bran, F. ,1997). The same author sees tourism as "the leisure activity that consists in travelling or living away from the place of residence for fun, rest, enrichment of experience and culture due to the knowledge of new human aspects and unknown landscapes". [3]

Since then, the necessity of the man named tourist to relax psychologically and physically after a period of physical or intellectual work, his need of knowledge, of movement, especially for the urban residents who have a sedentary lifestyle and human's natural need for socialization has registered a continuous increase from one year to the next and this led implicitly to the evolution and improvement of this economy branch, respectively the tourism activity.

This continued dynamics made tourism throughout the years an important factor of the socio-economical progress in all the countries that exercise it and have developed this way.

Through it's complex content, the tourism activity involves material potential as well as the human potential of a country, helping the economical, social, cultural evolution and international relations evolution of course. Tourism, through it's ample activity is a generator of new jobs and new income, thus contributing to the improvement of the living standard of that country's inhabitants.

The fact that this branch of the economy has developed continuously through implementing new forms of tourism, through the arrival of new and diversified structures of tourist accomodation, with accomodation and food services, through bringing in new equipments and recreation centers, all of these in order to satisfy the demands and needs of the tourists who have

¹PhD Student, email: radoi_eugenia_dorina@yahoo.com, USAMVB, e-mail: radoi_eugenia_dorina@yahoo.com

²Prof.dr.univ.,USAMVB, e-mail: dmprofesor@hotmail.com

become more and more pretentious, has led to the creation of one of the most powerful branches in the economy, with a substantial input on the national, european and global GDP.

MATERIALS AND METHODS

The analysis of the tourism evolution on a european and national level has been made with the help of the following indicators: international arrivals of tourists around the globe, international tourist encash, the existing accommodation structures in Romania, the existing lodging capacity in Romania, the existing accommodation units in Romania and the evolution of the overnight staying in the accommodation units in Romania.

All the data within this article has been taken and analysed from the World Tourism Organization publications: UNWTO Tourism Highlights 2016 Edition and from The National Institute of Statistics's statistical data, Tourism Breviary editions – 2012, 2013, 2014, 2015, 2016.

RESULTS AND DISCUSSIONS

In the following rows we are going to analyze the European tourism evolution through two important indicators: the international tourist arrivals as well as the international tourist encash (income). By analyzing the statistical data, respectively the number of tourists that have arrived around the world and in Europe throughout the years 2010 – 2015, we see a significant growth, in the world as well as in the European Union.

The figures show us the the number of arriving tourists increased year by year, registering an important evolution of this industry, namely tourism activity.

It can be noticed that the tourists have chosen in large numbers the Southern/Mediterranean Europe as leisure destination, the least of them going towards Northern Europe.

Western Europe has also attracted a large number of tourists and Eastern/Central Europe attracted similar percents.

The biggest rate-of-rise was registered however in Eastern/Central Europe – 6,1%.

According to a United Nations World Tourism Organization publication (UNWTO) called „Tourism highlights”, EU is a major touristic destination, five of it's member states being among the first ten destinations in the world in 2014. [4].

Table 1. The evolution and structure of tourist international arrivals around the globe

Zona geografica	2010	2011	2012	2013	2014	2015	Media	Stdev	Coef var	Semnf	Ritm anual
	mil pers	mil pers	mil pers	mil pers	mil pers	mil pers	mil pers	mil pers	%		%
Total lume	950	994	1040	1088	1134	1184	1065	87.6	8.2	mica	4.5
economii avansate	506	523	551	586	619	647	572	55.2	9.6	mica	5.0
economii în curs de dezvoltare	442	460	484	501	515	536	490	34.9	7.1	mica	3.9
Europa	484.8	504	533.9	566.6	580.2	607.6	546	47.0	8.6	mica	4.6
Europa de Nord	62.7	59.3	65.6	68	70.8	75.6	67	5.8	8.7	mica	3.8
Europa Occidentală	154.4	159	166.7	170.8	174.4	179.7	168	9.5	5.7	mica	3.1
Europa Centrală/Orientală	94.5	103.5	111.2	126.9	120.2	127.1	114	13.2	11.6	mij	6.1
Europa Meridională/Mediter.	173.3	182.2	190.4	201	214.8	225.1	198	19.7	10.0	mij	5.4
Din care UE 28	380	401.3	411.1	433.9	454.1	477.9	426	36.0	8.5	mica	4.7

Source: Processed data from the World Tourism Organization: UNWTO Tourism Highlights 2016 Edition, UNWTO World Tourism Barometer Vol. 14 - May 2016 [5].

In Table 2, we can also note the tourist encash worldwide and in Europe, which, just like tourist arrivals, have obviously increased, along with them year by year.

So, the largest encash belonged to Southern /Mediterranean Europe with 138,8 billion €, from the total amount and the smallest encash belonged to Central/Eastern Europe with just 42,4 billion € out of the registered total, the average of the last 6 years that have been analyzed.

Thereby, if in 2010 the tourism encash at an European level had a total of 252.7 billion €, in 2015 was registered a tourism encash in total amount of 334 billion €, the average of the last 5 years being 296 mild €.

As a first conclusion, we can highlight that Europe has a 40-50% percentage of the number of tourist arrivals and of the tourism encash worldwide, thus being the most visited holiday destination.

Table 2. The evolution and structure of international tourism encash

Zona geografică	2010	2011	2012	2013	2014	2015	Media	Stdev	Coef var	Semnf	Ritm anual
	mild €	mild €	mild €	mild €	mild €	mild €	mild €	mild €	%		%
Total lume	744	793	892	931	975	1110	907.5	131.3	14.5	mij	8.3
Economii avansate	444	482	536	591	610	668	555.2	83.8	15.1	mij	8.5
Economii în curs de dezvoltare	255	266	303	311	364	442	323.5	69.7	21.5	mare	11.6
Europa	308.8	335.3	353.4	370.2	386.1	403.9	359.6	34.6	9.6	mica	5.5
Europa de Nord	46.3	50.1	52.6	56.3	62.2	68	55.9	8.0	14.4	mij	8.0
Europa Occidentală	107.2	116.1	122.9	125.8	130.2	131.9	122.4	9.3	7.6	mică	4.2
Europa Centrală/Orientală	36.3	40.2	43.8	45.4	43.8	45.4	42.5	3.6	8.4	mică	4.6
Europa Meridională/Mediter.	118.9	128.8	134	142.7	149.9	158.6	138.8	14.5	10.4	mij	5.9
Din care UE 28	252.7	271.8	291.2	305.2	321.2	334	296.0	30.5	10.3	mij	5.7

Source: Processed data from the World Tourism Organization: UNWTO Tourism Highlights 2016 Edition, UNWTO World Tourism Barometer Vol. 14 - May 2016 [5].

Hereinafter we are going to analyze the evolution of tourism and agrotourism in our country, using the following indicators and presenting statistical data representing the number of tourist accommodation structures, Romania's accommodation capacity, the number of tourists that have arrived in our accommodation units and their overnight staying.

The data will be presented in 4 individual tables, in order to help analysing the statistical data, to understand the evolution and to draw correct conclusions.

Table 3. The evolution and the share of the tourist accommodation structures in Romania

Tipuri unități	2010	2011	2012	2013	2014	2015	Media	Stdev	Coef var	Semnf	Ritm anual
	nr un	nr un	nr un	nr un	nr un	nr un	nr un	nr un	%		%
Total, din care:	5222	5003	5821	6009	6130	6821	5834	656.9	11.3	mij	5.5
Hoteluri	1246	1319	1400	1445	1473	1545	1405	108.2	7.7	mica	4.4
Moteluri	151	184	206	215	212	221	198	26.4	13.3	mij	7.9
Hanuri turistice	4	4	3	3	5	3	4	0.8	22.3	mare	-5.6
Hosteluri	114	145	178	185	204	248	179	46.5	26.0	mare	16.8
Vile turistice	768	548	621	621	624	643	638	71.8	11.3	mij	-3.5
Bungalouri	267	205	242	249	242	280	248	25.7	10.4	mij	1.0
Cabane turistice	134	147	146	152	162	196	156	21.5	13.8	mij	7.9
Sate de vacanta	4	5	6	6	9	7	6	1.7	27.9	mare	11.8
Campinguri	51	44	48	48	52	66	52	7.6	14.8	mij	5.3
Tabere de elevi si prescolari	92	69	70	62	62	63	70	11.5	16.5	mij	-7.3
Popasuri turistice	32	41	39	35	35	33	36	3.5	9.7	mij	0.6
Pensiuni turistice	949	1050	1247	1335	1323	1527	1239	209.3	16.9	mij	10.0
Pensiuni agroturistice	1354	1210	1569	1598	1665	1918	1552	247.1	15.9	mij	7.2
Casute turistice	49	27	36	45	53	61	45	12.2	26.9	mare	4.5
Spatii de cazare pe nave	7	5	10	10	9	10	9	2.1	24.4	mare	7.4

Source: The National Institute of Statistics, Tourism Breviary, editions 2013, 2014, 2015, 2016 [6].

In Table 3 we notice that the number of the tourist accommodation structures that have tourist lodging function has increased on a national level from 5.222 in 2010, to 6821 in 2015, the increase being a significant and important one for our objective to observe the level of development of the tourism activity in our country. Also, we notice that of the total of touristic accommodation structures that have lodging functions, the tourist and agrotourist boardings have the largest share, so approximative half of the accomodation units offer the possibility to spend leisure in a natural environment, authentic and quiet, a form of tourism that has been requested more and more by tourists, especially ones from urban environments, who look for a natural oasis of relaxation when choosing their leisure destination.

Table 4. The evolution and the share of accommodation capacity in Romania

Tipuri unitați	2010	2011	2012	2013	2014	2015	Media	Stdev	Coef var	Semnf	Ritm anual
	nr loc	nr loc	nr loc	nr loc	nr loc	nr loc	nr loc	nr loc	%		%
Total, din care:	311698	278503	301109	305707	311288	328313	306103	16360.5	5.3	mij	1.0
Hoteluri	185521	175149	181702	183330	186236	190275	183702	5103.5	2.8	mica	0.5
Moteluri	6126	7219	8078	8493	7883	8331	7688	884.5	11.5	mij	6.3
Hanuri turistice	97	77	81	61	143	63	87	30.4	35.0	mare	-8.3
Hosteluri	5218	6140	7562	8482	9116	11757	8046	2322.6	28.9	mare	17.6
Vile turistice	16822	12590	14775	14074	13812	14473	14424	1395.5	9.7	mij	-3.0
Bungalouri	4565	2481	2663	2834	2722	2768	3006	773.4	25.7	mare	-9.5
Cabane turistice	5667	5928	5150	5183	5128	5876	5489	377.6	6.9	mica	0.7
Sate de vacanta	157	307	352	372	717	557	410	197.6	48.2	mare	28.8
Campinguri	25358	12801	12816	11945	12925	15039	15147	5106.9	33.7	mare	-9.9
Tabere de elevi si prescolari	16874	10689	10908	9851	9759	6979	10843	3270.8	30.2	mare	-16.2
Popasuri turistice	2043	1813	1847	1800	2209	1792	1917	171.0	8.9	mica	-2.6
Pensiuni turistice	18422	20499	25019	27325	27295	32051	25102	4977.1	19.8	mij	11.7
Pensiuni agroturistice	20208	20683	27453	28775	30480	35188	27131	5804.2	21.4	mare	11.7
Casute turistice	4164	1732	2199	2665	2398	2657	2636	824.7	31.3	mare	-8.6
Spatii de cazare pe nave	456	395	504	517	465	507	474	45.8	9.7	mica	2.1

Source: The National Institute of Statistics, Tourism Breviary, editions 2013, 2014, 2015, 2016 [6].

Table 4 presents Romania's accommodation capacity, in which hotels hold 60% of the registered total, respectively 328313 accommodations available in 2015, rising compared to the 311698 available in 2010.

Table 5 The evolution of arrivals in the accommodation units from Romania between 2010 - 2015

Tipuri de unitați	2010	2011	2012	2013	2014	2015	Media	Stdev	Coef var	Semnf	Ritm anual
	mii pers	mii pers	mii pers	mii pers	mii pers	mii pers	mii pers	mii pers	%		%
Total, din care:	6072.8	7031.6	7686.5	7943.2	8465.9	9930.4	7855	1309.3	16.7	mij	10.3
Hoteluri	4594.1	5368.2	5779.9	5917.9	6326.2	7282.4	5878	904.7	15.4	mij	9.7
Hosteluri	104.4	126.9	153.8	147.8	189.2	258.1	163	54.4	33.3	mare	19.9
Moteluri	204.5	221.1	230.8	242.5	231.7	259.9	232	18.8	8.1	mica	4.9
Hanuri	0.6	0.6	0.8	0.6	1.3	1.9	1	0.5	52.7	mare	24.4
Vile turistice	212.8	212.2	241.0	242.2	231.3	291.5	238	29.1	12.2	mij	6.5
Cabane turistice	74.0	80.5	86.3	94.9	94.0	94.9	87	8.8	10.0	mij	5.1
Bungalouri	14.4	15.4	16.8	16.4	18.1	24.4	18	3.6	20.3	mare	11.1
Sate de vacanta	1.8	2.1	3.5	5.8	3.3	5.9	4	1.8	47.6	mare	27.4
Campinguri	84.1	73.6	62.5	42.9	30.8	60.7	59	19.6	33.1	mare	-6.3
Popasuri turistice	9.0	11.1	12.1	13.0	14.5	17.7	13	3.0	23.3	mare	14.6
Casute turistice	2.0	5.0	6.9	9.6	12.0	11.7	8	4.0	50.5	mare	42.6
Tabere de elevi si prescolari	65.7	66.0	51.5	48.1	59.5	48.1	57	8.4	14.8	mij	-6.1
Pensiuni turistice	406.6	479.6	586.1	653.5	704.1	899.4	622	174.7	28.1	mare	17.2
Pensiuniagroturistice	289.9	360.7	447.1	501.7	549.3	672.7	470	136.6	29.0	mare	18.3
Spatii de cazare de pe nave	8.8	8.7	7.3	6.2	0.4	0.3	5	3.9	74.5	mare	-49.1

Source: The National Institute of Statistics, Tourism Breviary, editions 2013, 2014, 2015, 2016 [6].

In Table 5, we can see that during the analyzed period respectively 2010 – 2015, the dynamic and the share of arrivals in the tourist accommodation units that have tourist lodging functions by structure types, there is an important growth in the number of tourists that have arrived to our accommodation units.

Thus, the number of tourist arrivals in the accommodation units in our country has grown from 6072,8 thousand tourists in 2010 to 9930,4 thousand tourists in 2015.

The largest percent, throughout the accommodation unit is held by the hotels with a percentage of approximative 74,83 % of total arrivals in accommodation units in Romania.

Table 6 The evolution of overnight staying in the accommodation units in Romania between 2010 - 2015

Tipuri unități	2010	2011	2012	2013	2014	2015	Media	Stdev	Coef var	Semnf	Ritm anual
	mii înnp	mii înnp	mii înnp	mii înnp	mii înnp	mii înnp	mii înnp	mii înnp	%		%
Total, din care:	16051	17979	19166	19363	20280	23519	19393	2491.2	12.8	mij	7.9
Hoteluri si moteluri	13102	14707	15554	15538	16326	18468	15616	1777.3	11.4	mij	7.1
Hanuri turistice	3	2	1	1	2	2	2	0.8	41.1	mare	-7.8
Hosteluri	224	277	335	357	428	588	368	128.2	34.8	mare	21.3
Vile turistice Bungalouri	582	610	666.00	670.00	595.00	735.00	643	58.0	9.0	mica	4.8
Cabane turistice	134	143	152	168	170	182	158	18.2	11.5	mij	6.3
Sate de vacanta	3	3	7	18	9	15	9	6.2	67.7	mare	38.0
Campinguri si casute turistice	206	205	181	146	121	213	179	37.5	21.0	mare	0.7
Tabere de elevi si prescolari	311	276	201	195	238	233	242	44.5	18.4	mij	-5.6
Popasuri turistice	21	25	26	32	36	45	31	8.8	28.4	mare	16.5
Pensiuni turistice	802	929	1084	1197	1273	1664	1158	301.8	26.1	mare	15.7
Pensiuni agroturistice	605	741	906	996	1082	1368	950	267.9	28.2	mare	17.7
Spatii de cazare pe nave	58	61	53	46	1	1	37	28.1	76.6	mare	-55.6

Source: The National Institute of Statistics, Tourism Breviary, editions 2013, 2014, 2015, 2016 [6].

In Table 6 we see that the hotels stand out also regarding the number of overnight stay with a share of approximative 80,52 %, percentage to which we added the overnight stay at motels, the next ones in the ranking being the touristic and agrotouristic boards, adding up approximative 10% of the total of overnight stay in the accommodation units in Romania.

CONCLUSIONS

As shown in the statistical situations analyzed and presented above, we see first of all a growth in all the aspects of the tourism and agrotourism activity developed in Romania. Secondly, we conclude that our country is well situated regarding the number of accommodation units and accommodation capacity, but the booking degree is lower than it should be, due to the outdated material base or to the fact that it's not up to customer expectations, it has deficiencies and malfunctions like the mismatch of the accommodation capacity with the tourist resort functions, the inferior degree of comfort, the unqualified personal, etc.

In conclusion, only $\frac{1}{4}$ of our country's accommodating capacity is used in tourism activity, as Romania is situated among the last countries in the European ranking, just after Bulgaria regarding the filling degree of the accommodation capacity. [7]

Considering the fact that Romania has a very small degree of capitalizing the tourist potential, approximative 20 – 30% and the fact that the tourist base is very old and has an advanced degree of physical and moral effeteness, the investment efforts must be intensified and oriented towards its modernization and development if we want the tourism encash to grow and this branch of economy to prosper, thus improving the inhabitant's standard of living, especially for those who live in the rural area, where, at the moment, there are the biggest problems, as people live here and there in extreme poverty.

On a national level we have available all the resources and the tourist potential needed in order to become a competitive industry in tourism, locally as well as internationally but, without the involment of the authorities, of the investors and of the inhabitants, we will never fully profit from what we have and we will never be able to capitalize and we will never become a solid destination, tourism wise.

In that regard MIE, established a plan to enhance the national territory – PATN, which is the base for the complex and durable development, including the regional development of the territory and it stands for our country's specific contribution to the development of the European area and the premisis to go into the European economico-social development dynamic. [8]

Tourism is above all, a service industry, as the country's government plays an important part in supporting the training programmes and in potentiating the contracting and management capacity of the small and medium-sized enterprises by promoting proper training programmes supporting tourism small-sized enterprises.[9]

At the moment, Romania, is more competitive than its neighbour competitors regarding the prices, the environment, the openness toward tourism and commerce, but less competitive regarding technology, human resources and infrastructure.[10]

BIBLIOGRAPHY

- [1] Marketing în turism, accessible on-line at http://www.referat.ro/cursuri/download/Marketing_in_turism_-_Servicii_44f35.html, accessed in August 2016
- [2] Turism Wikipedia, accessible on-line at <https://ro.wikipedia.org/wiki/Turism>, accessed in October 2016
- [3] Bran, F., 1997- „*Turism rural*”, Ed. Economică, Bucureşti
- [4] Organizația Mondială a Turismului, UNWTO Tourism Highlights 2016 Edition, UNWTO World Tourism Barometer Vol. 14 - May 2016, accessible on-line at <http://www2.unwto.org/>, accessed in August 2016
- [5] Institutul Național de statistică, Breviar turism edițiile 2013, 2014, 2015, 2016, accessible on-line at <http://www.insse.ro/cms/ro/content/turismul-rom%C3%A2niei-breviar-statistic>, accessed in August 2016
- [6] Eurostat, accessible on-line at http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics/ro, accessed in October 2016
- [7] Eurostat, accessible on-line at <http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tin00180&language=en>, accessed in August 2016
- [8] MIE- PATN - Planul de amenajare a teritoriului național, accessible on-line at <http://www.mie.ro/printeaza.php?p=1081>, accessed in October 2016
- [9] Strategia dezvoltării durabile a sectorului turistic, accessible on-line at <http://academiacomerciala.ro/concurs/2012/102/106/publicatii/Strategia%20dezvoltarii%20durabile%20a%20sectorului%20turistic.pdf>, accessed in October 2016
- [10] Analiza competitivității industriei turistice din România în contextul globalizării economice, accessible on-line at <http://www.management.ase.ro/reveconomia/2008-1/4.pdf>, accessed in October 2016

THE TOURISM AND AGROTOURISM POTENTIAL OF THE TULCEA AND VRANCEA COUNTIES - COMPARISON

EUGENIA-DORINA CIOBANU(RĂDOI)¹
PETRUȚA TUREK-RAHOVEANU²

Abstract: *Being part of the South-East Region of the country, Tulcea County as well as Vrancea County are important tourism areas, with high tourist potential, harmoniously distributed throughout the counties territories.*

Tulcea County is a gate towards the Danube Delta Biosphere Reservation, ranked on the third place by ecological importance in the world, is a tourism destination unique in our country, with large possibilities of development. Throughout the County there are 1 Municipality, 5 cities, 46 de parishes and 133 villages, which means that the area is mostly rural.

Vrancea County, located at Muntenia's borderline to Moldova, in the area of the Curvature Carpathians, is also an important tourist area with real chances of increasing the capitalizing degree of existing tourism potential.

It consists of 1 Municipality, 4 cities, 64 parishes and 331 villages, the rural area being dominant here also. The standard of living of the inhabitants from the rural area, in both counties is not a very good one, poverty being the problem which the inhabitants have been facing for years, in spite of the tourism potential that is not capitalized to its maximum.

The present article aims to analyze the tourist potential of the counties, to show the problems that limit the tourism activity and to highlight a few development and capitalizing possibilities of the tourist potential, on full capacity.

Key words: *tourism, agrotourism, tourist potential, tourist activity*

JEL Classification: *Q 11*

INTRODUCTION

Our country has a rich tourism potential, natural as well as anthropical, more diversified than other tourism competitor countries but, due to the fact that it's not fully capitalized, the standard of living of the inhabitants from the areas with a rich tourist potential is low, as they are living in extreme poverty in most of the rural areas.

The Danube Delta Biosphere Reservation, one of Romania's strong points from a tourism point of view, the tourist target that holds the 1st place in Europe when it comes to beauty and scientific importance and the 3rd place regarding the ecological importance in the world, all of this making Tulcea County one of the most visited counties by Romanian and foreign tourists. [3]

Also in the South-East region, another County, Vrancea County, has an appeal for tourists and it's visited by them every year due to the tourist potential diversity, to the enchanting country landscapes and the cities charm, that are rich in history and tourist attractions that are important from a cultural point of view, nationally as well as globally. [4]

In spite of the richness of the tourism of this South-East Region, respective of the Tulcea and Vrancea counties, the counties that are being analyzed in our article, the inhabitants from those areas deal with poverty, their standard of living bordering extreme poverty.

A possibility to increase their standard of living would be getting involved in tourism and agrotourism activities in order to capitalize the existing tourism potential and rendering a quality tourism product for the tourists who go, more and more, towards these types of tourism, namely, rural tourism and agrotourism.

MATERIALS AND METHODS

The analysis of the two counties from the South-East Region, regarding the tourism and

¹PhD Student, email: radoi_eugenia_dorina@yaho.com, USAMVB,

² PhD Student, email: turek_anca@yaho.com, USAMVB

agrotourism potential, has been made with the help of the following indicators: the tourism development tally by localities for the Tulcea and Vrancea counties, the number of approved tourism units from the two counties of the analyzed region and the number of authorized rural tourism boards and agrotourism boards from the two counties, ranked by quality.

RESULTS AND DISCUSSIONS

From the statistical data below, respectively the tourism development tally for the localities from Tulcea and Vrancea Counties, from the South-East Development Region, data that have been taken from The List of Areas with High Tourism Potential – Annex 10 from Sub measure 6.2 – Support for Setting Up Non-Agricultural Activities in Rural Areas – from the Ministry of Agriculture and Rural Development/The Agency for Rural Investments Financing website, we can conclude that most localities that are developed from a tourism point of view and also have great tourism development possibilities are in the Tulcea and Vrancea Counties, the only one between them being Constanța County.

Boasting a number of 24 localities, Tulcea County sums up a 21,2% percentage of total administrative-territorial units with high tourism potential.

This County's advantage, as previously said in the rows above, is the existence of the Danube Delta Reservation on its territory, a well known and visited tourist attraction that has real possibilities of an even greater development and capitalization in the future.

The localities with a great tourism potential from Tulcea also have in their territory important reservations, parts of the Delta, the Măcin Mountains, hills, etc.

Vrancea County, ranked third by tourism development, has 19 localities with high tourism development potential, the calculated percentage being 17% of total administrative-territorial units that have tourism development possibilities from The South-East Development Region.

Vrancea attracts tourists and has localities with high tourism potential as well, that are being tallied in the table below through the availability of rustic landscapes and by conserving the traditions, the history and the culture of the area.

Most localities from the development region that we are analyzing have scores between 20-29 points, we can see in the table below that 63 localities out of 113 from the region are in this category, summing a 56% percent of total tallied in the 20-29 points category.

Above 50 points, regarding the tourism development potential, no locality from the South-East Region fits into this category. [5]

Localities in the counties of Tulcea and Vrancea,
depending on the tourist development scores, 2016

County	UM	Total		Total points development potential					
		Locality	%	1-9	10-19	20-29	30-39	40-50	50
Tulcea	Nr. loc	24,0	21,2	X	2	14	7	1	X
	%	100,0	X	X	8,3	58,3	29,2	4,2	X
Vrancea	Nr. loc	19,0	16,8	X	1	13	5	X	X
	%	100,0	X	X	5,3	68,4	26,3	X	X
Total inhabitants reg. Southeast	Nr. loc	113,0	100,0	1	13	63	32	5	X
	%	100,0	X	0,9	11,5	55,8	28,3	4,4	X

Source: Data processed after Annex 9 - List of areas with high tourist potential

Moving on with the analysis of the two counties from the South-East Region regarding the tourist potential, we will continue to analyze the capitalizing degree of this tourism and agrotourism potential, based on the number of authorized tourist units, on types, categories and comfort degree, for each county.

In the table below, we can find the data from the reference year 2016.

Therefore we observe in the data from the table presented below, the large number of authorized units in the two counties that we are analyzing, summing approximate 22% of total approved units from the South-East Development Region, which has 6 reference counties. [6]

Number of authorized touristic enterprises in Tulcea and Vrancea,
Regiunea Sud-Est, 2016

County	UM	Total		Hotel	Pensions	
		Nuber	%		Total	Agrotouristic
Tulcea	Nr.units	394	18,8	22	168	11
Vrancea	Nr.units	90	4,1	8	57	7
Total inhabitants reg. Southeast	Nr.units	2219	100,0	451	433	32
	%	100	x	20,3	19,5	1,4

Sursa: date prelucrate după -Lista structurilor de primire turistice cu funcțiuni de cazare clasificate-

The number of boardings surpasses the number of other types of tourist accommodation structures, which proves the tourist's preference for nature, open-air and simplicity and the number of agrotourism boardings, increasing compared to the last years is significant too, proving that agrotourism amplifies and that tourists are heading more and more towards rural tourism, towards authentic and natural.

This helps us reach another partial conclusion, that the inhabitants from the rural area have opportunities to improve their standard of living by engaging in tourism and especially agrotourism activities that tourists look for in their counties.

The data in the table below, data that represent the number of rural tourist boardings and the number of agrotourist boardings sorted by comfort, show us the offer diversity of tourist boarding in the rural area, which is something that started, as I previously stated, with the tourist large demands towards the rural area in the last years, for spending leisure and holidays in the rural areas with a high tourist potential. [7]

The number of rural guesthouses and fauna in Tulcea and Vrancea
counties by quality in the year 2016

Județul	UM	Total unitati		Unitati dupa numarul de flori				
		Numar	%	“1“	“2“	“3“	“4“	“5“
Tulcea	Nr. unitati	12	34,3	X	5	7	X	X
	%	100,0	X	X	41,7	58,3	X	X
Vrancea	Nr. unitati	7	20,0	X	2	5	X	X
	%	100,0	X	X	28,6	71,4	X	X
Total inhabitants reg. Southeast	Nr. unitati	35	100,0	X	11	21	1	2
	%	100,0	X	X	31,4	60,0	2,9	5,7

Sursa: date prelucrate dupa: -Lista structurilor de primire turistice cu funcțiuni de cazare clasificate-

CONCLUSIONS

In conclusion, Tulcea and Vrancea counties, important counties from the South-East Development Region regarding tourist and agrotourist activity, have a rich tourism potential and

there is the possibility of developing this activity through which it can be capitalized to the maximum tourist potential of the areas and, of course, of improving the standard of living of the inhabitants of those areas, especially of those from the rural area.

Involving a large number of inhabitants in the tourism and agrotourism activity, promoting the areas and the tourist attractions, rendering a quality tourism product with multiple recreation possibilities and the chance to take part in the household activities, offering traditional food, handicraft activities to which tourists can partake, those are just a few of the measures that could be taken in order to develop those areas with a huge, not only tourist, development potential.

BIBLIOGRAPHY

- [1] Tulcea County, accessible on-line at <https://ro.wikipedia.org/wiki/Tulcea>, accessed in September 2017
- [2] Vrancea County, accessible on-line at <http://www.comune.ro/?/judet/ijud42/>, accessed in September 2017
- [3] The Danube Delta, accessible on-line at https://ro.wikipedia.org/wiki/Delta_Dun%C4%83rii, accessed in September 2017
- [4] The most beautiful places in Vrancea, accessible on-line at <http://epochtimes-romania.com/news/cele-mai-frumoase-locuri-din-vrancea---233794>, accessed in September
- [5] Annex 9 – List of areas with a high tourist potential, accessible on-line at http://portal.afir.info/informatii_generale_pndr_investitii_prin_pndr_sm_6_2_infiintare_activitati_neagricole?amp;lang=RO, accessed in September 2017
- [6] List of accommodation structures with lodging functions by ranking, accessible on-line at <http://turism.gov.ro/informatii-publice/>, accessed in September 2017
- [7] List of tourist accommodation structures with lodging functions by ranking, accessible on-line at <http://turism.gov.ro/informatii-publice/>, accessed in September 2017

ESTIMATIVE ANALYSIS OF BREAKEVEN POINT FOR BELL PEPPER CROPS IN CONVENTIONAL AND ORGANIC FARMING SYSTEM - FORECAST 2017/2018

NECULA DIANA MARIA¹

Abstract: Bell pepper, either fresh or preserved, is one of the most common vegetables in the Romanian cuisine, being appreciated for its health benefits, which is why its cultivation is extremely widespread throughout the country. The paper addresses scientifically the methods necessary for analyzing the economic efficiency of the pepper crop in the conventional and organic farming system by providing forecasts for the cultivation year 2017/2018. Using specific indicators, result indicators and profitability indicators were estimated production costs, prices and profitability per product unit, estimates that can be used in making decisions about future production cycle.

Keywords: economic efficiency, breakeven point, pepper crops, conventional system, organic system

JEL Classification: O12, Q14, Q57

INTRODUCTION

Bell pepper is a vegetable of origin in Central and South America, being considered one of the oldest plants used in culture. From here it spread to the north, to the US and to the south, to Colombia, Venezuela, Equator, Brazil, Chile, Argentina and Uruguay. In 1493 the pepper was brought to Europe and spread to southern areas (Italy, France) in the 16th century, and to the Balkan Peninsula in the 17th century.

The most well-known, cultivated and consumed species is *Capsicum annuum* due to its high adaptability to the pedoclimatic conditions of the different cultivars and varieties, allowing it to be marketed throughout the year.

In our country, pepper has an important place, with many uses, being used in the preparation of a very wide range of dishes in the canning industry, while some species and varieties of peppers have a special decorative value and can be grown in pots

Due to the multitude of varieties, pepper is particularly important for increasing the consumption of vegetables and ensuring proper nutrition. The high economic value of pepper is also due to the fact that it ensures high incomes for growers by capitalizing on the domestic and foreign markets.

MATERIAL AND METHODS

Cultivation technology for bell pepper in conventional and organic agriculture system was adapted to the existing conditions and resources at Buzau SCDL.

A. Precursor-cultures

	Conventional system	Ecological system
Very good	- alfalfa and clover in the first year after grubbing; - perennial herbs; - annual legumes (peas, beans).	
Good	- root vegetables (carrot, parsley, celery, red beet, etc.); - bulbous vegetables (onion, garlic, leeks)	
Average	- spicy vegetables (cucumbers, courgettes, melons, etc.); - cabbage vegetables (cabbage, cauliflower, etc.)	
Unsuitable	- solanaceae vegetables (tomatoes, peppers, eggplants, potatoes);	

B. Application of fertilizers

	Conventional system	Ecological system
--	---------------------	-------------------

¹ Dr.ing. CSI II - Research Institute for Agricultural Economics and Rural Development, necula.diana@iceadr.ro

Organic fertilizers	Soil fertility status		T / ha		
	Low		40-50		
	Average		30-40		
	Good		20-30		
	High		0-20		
Chemical fertilizers	Soil fertility status	Phosphorus P ₂ O ₅ kg / ha	Potassium K ₂ O kg / ha	Nitrogen N kg / ha	In green technologies no synthetic fertilizers are applied. Instead, organic fertilizers are used, applied during the periods and doses recommended by the scientific research.
	Low	100-140	105-145	125-175	
	Average	80-105	75-100	80-120	
	Good	60-85	60-85	60-80	
	High	0-45	0-35	-	
Basic fertilizer fertilization with organic / chemical fertilizers is performed with the 55-75 HP tractor in aggregate with the organic / chemical fertilizer machine.					

C. Soil works

	Conventional system	Ecological system
Works performed in the autumn		
Soil Mobilization (Discharge of previous crops)	<ul style="list-style-type: none"> - for the discharging of the previous crop, the shredding of the vegetal remains and the loosening of the soil for leveling. - It is done with the 55-75 HP tractor in the aggregate with the disc harrow and the adjustable harrow. - the period: immediately after the harvesting the previous crop. - Working depth: 7-12 cm. 	
Maintenance leveling	<ul style="list-style-type: none"> - to ensure optimum conditions for crop irrigation. - it is done with the 55-75 HP tractor unit and the grader. 	
Basic fertilization	<ul style="list-style-type: none"> - with organic/chemical fertilizers - is done with the 55-75 HP tractor in aggregate with the organic/chemical fertilizer machine. 	<ul style="list-style-type: none"> - with organic fertilizers - It is done with the tractor 55-75 HP in aggregate with the machine for organic fertilizer.
Depth Plowing (28-30 cm)	<ul style="list-style-type: none"> - for loosening soil and incorporating fertilizers - It is done with the 55-75 HP tractor unit, the plug and the starter harrow 	
Subsoiling (deep loosening)	<ul style="list-style-type: none"> - it is recommended to be done once every 3-4 years, especially on heavy soils. - It is done with the 55-75 HP tractor in the aggregate with the ground loosening machine. 	
Works performed in the spring		
Preparing the germinative bed	<ul style="list-style-type: none"> - to provide land suitable for planting seedlings - It is run with the 55-75 hp tractor unit and combiner - the period: April, the third decade 	
Soil herbicidation	<ul style="list-style-type: none"> - is made with authorized substances according to the recommendations of the specialists in the field 	
Furrow marking	<ul style="list-style-type: none"> - for soil modeling - It is run with the 55-75 HP tractor unit and the furrow machine - working depth: 18-20 cm. - the period: April, the third decade 	
Soil modeling	<ul style="list-style-type: none"> - to ensure the conditions for planting the seedlings. - It is done with the 55-75 HP tractor unit and the soil modeling machine. - the period: April, the third decade 	

D. Establishment of culture

	Conventional system	Ecological system
The period of planting	<ul style="list-style-type: none"> - it is established that the plants are not affected by the late spring bruises (soil temperature reaches 14-15 °Celsius) - the calendar date shall be determined by the climatic conditions of that year. - the first decade of May in warmer areas and the second or even third decade of May in colder areas. 	

Density of plants	- is determined depending on the species: 65-88 000 pl/ha bell peppers, red peppers, 54-75 000 pl / ha peppers, 78-95 000 pl / ha long peppers and 88-140 000 pl / ha chili.
Planting technique	- mechanized with 40-45 HP tractor and planting seedlings at 70-75 cm between rows and 15-20 cm between plants in a row. - manually at 60 cm between rows and 15-20 cm between pl / row.
Depth to be planted	- will be up to the level at which the seedlings were produced. - for seedlings grown in pots, the top level of the pot must be at ground level.

E. Crop maintenance

	Conventional system	Ecological system
General works		
Watering	- after planting, to ensure a uniform and rapid emergence of the crop - it can be done manually (approx. 1L water / pl), on furrows (150-200 m / ha), or dripping (water saving).	
Fill in the voids	- is made with seed of the same age and variety. - 4-5 days after planting (runs manually)	
Phaseal fertilization	- may be associated with phytosanitary treatments. - It is carried out with the 40-45 HP tractor in aggregate with the plant-protection machine	
	During the vegetation, complex chemical fertilizers are recommended. Fertilization can be done together with the pesticide treatments or maintenance culture.	Specific products made in ecological mode are used in doses recommended by the technical research.
Slaughter in vegetation (unless the mulch is used)	- it is advisable to carry out as many times as necessary to maintain a clean, weed-free crop - The working depth is small to protect the root system of plants.	
Irrigation of culture	- it is recommended not to wet a short period of time after planting to foster a deep rooting, and then watering is performed regularly, depending on the precipitation. - dripping is recommended, constantly ensuring the water needs of the plant. - is done from the establishment of the crop until the end of the vegetation period, 1 - 2 times a week, depending on the nebulosity and weather conditions / atmospheric humidity. - 1.5-2 liters of water/plant is administered at a pressure of 1-1.2 atmospheres and during the intensive fruit formation and growth, the doses will increase.	
Herbicides	- is carried out prior to the planting of seedlings, with specific herbicides recommended. - is with the 55-75 HP tractor in aggregate with the sprayer.	
Combating diseases and pests	- the most common diseases: Fusarium disease, fruit spot and blushing, Pustular spot, Root rot, stem rot, fruit rot, gray mold, etc. The pepper has no specific pests, the most common being the Colorado beetle, the fen cricket, the green and red lice of the Solanaceae. - is done with 40-45 HP tractor in aggregate with the plant for phytosanitary treatments	
	Chemical control may be achieved with recommended doses of substances authorized specialists and observing the pause time.	Are used products made under specific ecological technology and recommended doses applied by the technical research field.

F. Harvesting

Conventional system	Ecological system
- harvesting takes place staggered, depending on the maturity of the fruit and according to the destination of the production (fresh consumption, industrialization or export) - are harvested manually, sorted, packaged and transported as quickly as possible to the disposal units.	
Medium production varies depending on the variety or hybrid grown as follows: - 20 - 60 t/ha pepper, bell pepper and long pepper - 8 - 12 t/ha of chili pepper and red pepper	Estimated yields are 25-30% lower than in the conventional system

RESULTS AND DISCUSSIONS

I. The structure and the analysis of the production costs for bell pepper culture in conventional and organic agriculture system - estimates 2017-2018

For the open field cultivation of bell peppers in the conventional system, a production of 40 t / ha was planned, while for those cultivated in the organic system a production of 32 t / ha. Regarding total agro-technical expenditures in case of field cultivation in the conventional system, investments of 65.554 lei / ha are estimated, while for the conventional system the estimates were 5.7% higher. Raw material and materials costs have the largest share of total expenditure total, 70% conventional system and 76% organic system. The share of mechanized works costs was 28% in the conventional system and 22% in the ecological system, of the total estimated agro-technical expenditures.

Table 1: Structure of production costs for the cultivation of bell pepper in a conventional and organic farming system

Culture	Cultivation system	Production (kg / ha)	Total agro-technical expenditure		Mechanized work		Hand works		Materials and materials	
			lei / ha	%	lei / ha	%	lei / ha	%	lei / ha	%
Bell pepper in the field	conventional	40000	65 554	100	1423	2	18257	28	45 874	70
	ecological	32000	69 515	100	1221	2	15337	22	53115	76

Source: Own calculations

II. Analysis of income and expenditure budgets for the cultivation of bell peppers in conventional and organic farming - forecast 2017-2018

- Bell pepper cultivated in a conventional farming system

At an average production of 40 t / ha of bell peppers, a production value of 89,426.5 lei / ha is obtained, and by adding the subsidy of 585 lei / ha, a gross product of 90,011.5 lei / Ha.

Variable costs represent 70.86% of total expenditure per crop, and value inputs with materials and materials account for 78.03% of variable costs. Of the total fixed expenditures representing 21.13% of the expenditures per crop, the highest proportion of 84.09% is occupied by the permanent labor force value.

By deducting the total expenses from the value of the production, the taxable income amounts to 14,904.4 lei / ha, and finally the net income and the net income rate of 12,519.7 lei / ha and 16.8% respectively. The important synthetic indicator of the economic efficiency with which the cultivation of field bell peppers in the conventional field occurs, the production cost of 1,863.1 lei / t, was calculated by reporting the total expenditures to the estimated average production.

In order to ensure the rentability of the crop, it was determined domestic market price of 2235.7 predictable RON / t, calculated by applying a coefficient of 1.2 in the cost of production.

- Bell pepper cultivated in an organic farming system

The achievement of an average yield of 32 t / ha of bell pepper produced a production value of 95,690.9 lei / ha, and by adding the subsidy of 585 lei / ha, a gross product of 96,275.9 lei / ha was reached.

Variable costs account for 76.03% of total expenditure per crop, and value inputs for materials and materials account for 79.32% of variable costs. Fixed expenditures account for 23.96% of total expenditures, the permanent labor consumption value of 80.26% of fixed expenses.

By deducting the total expenses from the value of the production, the taxable income is 15,948.5 lei / ha, and finally a net income of 13,981.7 lei / ha and a net income rate of 16.8%. The synthetic indicator that express the most concludent the expresses the economic efficiency of the pepper crop in the ecological field, the production cost of 2.492 lei / t was obtained by reporting the total expenditures to the average production expected.

The profitability of the crop was achieved by calculating the foreseeable domestic market price of 2,990.3 lei / t, applying a coefficient of 1.2 to the cost of production.

Table 2: Income and expenditure budget for bell pepper in conventional system field
Calculations per hectare
2017/2018 (prognosis)

Estimated production = 40 tons

Nr.crt	indicators	UM	Conventional system	Ecological system
			40t / ha	32t / ha
1	A. VALUE OF PRODUCTION, of which:	lei	89426.5	95690.9
2	A.1. The value of the main production	lei	89426.5	95690.9
3	B (+). SUBSIDIES	lei	585.0	585.0
4	C (=) GROSS PRODUCT	lei	90011.5	96275.9
5	D (-) TOTAL EXPENSES	lei	74522.1	79742.5
6	D.1. Of which for the main production	lei	74522.1	79742.5
7	I. VARIABLE EXPENSES	lei	52811.7	60635.9
8	1. Expenditure on raw materials and materials	lei	41213.1	48099.8
9	- seed and planting material	lei	27320.0	28600.0
10	- organic fertilizers	lei	3000.0	2000.0
11	- chemical fertilizers	lei	1670.0	501.0
12	- substances for combating diseases and pests, foliar fertilizers	lei	4528.1	12253.8
13	- other materials	lei	4695.0	4745.0
14	2. Expenditure on mechanized works	lei	1423.3	1221.1
15	3. Irrigation costs	lei	4660.5	5015.4
16	4. Supply costs	lei	4121.3	4810.0
17	5. Insurance	lei	1393.5	1489.7
18	II. FIXED EXPENSES	lei	21710.4	19106.6
19	- Expenditure on permanent labor	lei	18256.7	15336.6
20	- General and management expenses	lei	1741.9	1862.1
21	- Loan interest	lei	655.5	695.1
22	- Amortization for buildings and utilities	lei	1056.2	1212.7
2.3	E (=) IMPOSABLE INCOME	lei	14904.4	15948.5
24	E.1 (-) Taxes and charges	lei	2384.7	2551.8
25	F (=) NET INCOME + Subsidies	lei	13104.7	13981.7
26	F.1 (=) INCOME NET	lei	12519.7	13396.7
27	G. RATED INCURRED TAX	%	20.0	20.0
28	H. NET INCOME RATE + Subsidies	%	17.6	17.5
29	H.1 RATA VENIT NET	%	16.8	16.8
30	COST OF PRODUCTION	lei / tone	1863.1	2492.0
31	PREVIOUS INTEREST PRICE MARKET	lei / tone	2235.7	2990.3

Source: Own calculations

CONCLUSIONS

In order to achieve estimated breakeven point of bell pepper crop in conventional and organic agriculture system – forecast 2017-2018, were used indicators of production and economic indicators.

Table 3: Synthesis of economic indicators for the cultivation of pepper in the field - forecast 2017/2018

Nr. crt.	Economic indicators of synthesis	UM	Conventional system	Ecological system
1	Average production at ha	t / ha	40.0	32.0
2	Production value at ha	lei / ha	89426.5	95690.9
3	Production costs per hectare	lei / ha	74522.1	79742.5
4	Variable costs	lei	52811.7	60635.9
5	Raw materials and materials	lei	41213.1	48099.8
6	Expenditure on permanent labor	lei	18256.7	15336.6
7	Fixed costs	lei	21710.4	19106.6
8	Unit production cost	lei / tone	1.9	2.5
9	Cost of capitalization	lei / tone	2235.7	2990.3
10	Productivity of work in physical expression	man-hours / tone	54.3	57.1
11	Profit or loss per unit of production	lei / ha	14904.4	15948.5
12	Profit or loss per unit of product	lei / ton	372.6	498.4
13	Rate of return	%	20.0	20.0
14	The threshold of return in units of value	lei	53024.6	52155.8
15	Revenue threshold in physical units	to	23.7	17.4
16	Risk of exploitation risk	%	59.3	54.5
17	Security Index (Is)		0.4	0.5

Source: Own calculations

From the table presented it is noted that the value of the produced output exceeds that of the expenditures made by 16.67% both in the conventional and in the ecological system.

Variable expenses accounted for 70.86% holding 76.03% of the total expenditure and the difference was made up of fixed costs. Materials and materials represent a proportion of 78.03% and 79.32% of total consumption.

Reference indices for expressing the economic efficiency of product costs, the production cost is 1863.1 RON / t in the conventional system, and the system is environmentally 25.24% higher, in particular owing to a lower approx. 20%. The average price per unit of product recovery is 2235.7 RON / t in the conventional system, when the ecological system is 25% higher.

Concerning the productivity of labor, it is noted that for one tone of product in a conventional system, 54.3 hours are consumed, of which 0.8 hours / t in mechanical works and 53.5 hours / t in manual works, while one tone of product required a total of 57.1 hours in the organic system, of which 0.9 hours / t for mechanical works and 56.2 hours / t for manual works.

The rate of return was 20% in the conventional system and in organic systems, the production of bell pepper in the field proving economically efficient. The profitability threshold means the physical or value level of production where the expenses incurred are totally covered by the value of money from the capitalization of production, that is, the level at which the profitability of the crop manifests itself.

As such, the cultivation of bell peppers is considered cost-effective in a conventional system of average production of 23.7 t / ha corresponding to the value of 53.024,6 lei / ha, because in an ecological system this threshold begins from an average production expressed in physical units of

less than 26.6% and more than 1.6%. The operating fluctuation rate consists of a synthetic indicator that evolves the risk in the case of non-realized output.

For bell pepper, this indicator is 59.3% for conventional and 54.5% organic system. The security index refers to the existing security margin of the crop, increasing in the same way as the value of the security index. For the bell pepper crop, this index is 0.4 and 0.5, respectively

BIBLIOGRAPHY

1. Berevoianu Rozi Liliana, Necula Diana Maria et al. Conventional and Organic Agriculture in Vegetable Growing Floriculture and Mental Plant Culture- Conceptual Approaches, ASE Publishing House, 2015
2. Necula Diana Maria, Necula Raluca Alexnadra et al., Technical and Economic Guide for Vegetable Production- prognoses 2016/2017, ASE Publishing House, 2016
3. Diana Maria Necula, Rozi Liliana Berevoianu, AE Dumitru, Technical and Economic Guide- Vegetable Production- prognoses 2017/2018, ASE Publishing House, 2017
4. Ciofu Ruxandra et al, 2004 *Treaty Vegetable*, Ceres Publishing House, Bucharest
5. Drăghici Elena, 2002 *Vegetable* Publishing Granada, Bucharest
6. Indrea D. et al, 2007, *growing vegetables*, Ceres Publishing House, Bucharest
7. Indrea D. et al., 2012, *Vegetable Culture*, Ceres Publishing House, Bucharest
8. Indrea D. Apahidean AS 2011 *vegetable grower guide*, Ceres Publishing House, Bucharest
9. Keith Stewart, 2013 *Storey's Guide to Growing Organic Vegetables & Herbs for Market: * Site Selection & Crop Planting, Care & Harvesting * Business Basics*, Storey Publishing, USA,
10. Popescu V. Popescu A. 2006, *growing vegetables in the field and in greenhouses*, publishing house MAST, Bucharest
11. Popescu V., Popescu A., 2012, *growing vegetables in greenhouses, greenhouses and hotbeds*, Ceres Publishing House, Bucharest
12. Stan Teodor N., 2005 *Technology vegetable cultivation*, Publisher Alfa
13. Decision no. 39 of 27 January 2017 - "De minimis aid for the application of the program to support tomato products in protected areas";
14. GEO 3/2015 for the approval of payment schemes that apply in agriculture between 2015 and 2020 and for the amendment of Art. 2 of the Law no. 36/1991 on agricultural companies and other forms of association in agriculture
15. Government Decision No. 1174 of 29 December 2014 on the establishment of a State aid scheme for the reduction of excise duty on diesel used in agriculture
16. National Rural Development Program 2013 - 2020, Sub-measure 4.1 - Investments in agricultural holdings
17. National Rural Development Program 2013 - 2020, Sub-measure 4.2. - Support for investments in the processing / marketing of agricultural products aimed at setting up / modernizing the processing and marketing units
18. Serban D, 2011, Luna May in Vegetable Industry. The horticultural calendar, agricultural works in the field and solariums, accessed in March 2017, <http://agroromania.manager.ro/articole/stiri/luna-mai-in-legumicultura-calendarul-horticultorului-lucrari-agricole-in-camp-si-Solarium-11263.html>
19. *** Legumiculture, accessed May 2017, <http://www.agricultor.ro/article/35032/Istoric-Legumicultura/1>
20. *** general technology of plant vegetables, accessed May 2017, <http://www.rasfoiesc.com/business/agricultura/TEHNOLOGIA-GENERALA-DE-CULTIVA79.php>

RESEARCH ON THE INFLUENCE OF THE SOIL TILLAGE SYSTEM ON SOYBEAN YIELD AT ARDS TURDA

ȘIMON ALINA¹, FELICIA CHEȚAN², CORNEL CHEȚAN³, VALERIA DEAC⁴

Abstract: *The purpose of this paper is to evaluate the soybean yield obtained from the application of the minimum tillage system compared to the classical tillage system. Conservative tillage systems have become an important part of agriculture, and the need to apply these systems is justified by the growing area of land degraded by the erosion process. Experimental factors: Factor A - the tillage system: classical tillage system and minimum tillage system (chisel variant); Factor B - soybean varieties: Onix, Felix, Mălina TD and Darina TD; Factor C - experimental years: 2015 and 2016. Following the application of the conservative tillage system, there is a slight decrease in yield compared to the classical tillage system, and between the two years studied, in 2016 there are yields with significantly higher differences compared to 2015. The application of conservative tillage systems brings important long-term benefits to both the soil and the environment by reducing soil compaction and fossil fuels used in crop technology.*

Keywords: *climatic condition, soybean, tillage systems, yield*

JEL Classification: Q01, Q15, Q16

INTRODUCTION

Soil is the thin layer of the ground in which biological processes are produced (Răuță and Cârstea, 1983) and introducing conservative farming systems is trying to improve, conserve and more efficiently use natural, biological and water resources (Guş et al., 2003; Rusu et al., 2009).

The large number of works and repeated crossings on the ground with agricultural tractors and machines negatively influences soil properties resulting in soil structure degradation, surface and depth compaction, decreased humus content, reduced biological activity, resulting in decreased natural fertility of the soil.

Awareness of the problems arising from the use of intensive farming systems has led to the search for sustainable measures to assist farmers, among which the most important measures are the implementation of conservative soil cultivation systems, the cultivation of legumes for soil enrichment in rotation nutrients (Șimon et al., 2014) and the cultivation of plants used as raw material for biofuels.

The main aspects of these agricultural systems are the abandonment of the plow with a total or periodic plow, the rationalization of the number of works and the preservation at the soil surface of at least 30% of the total vegetal remains (Chețan et al., 2015; Fabrizzi et al., 2005) in order to protect the soil from surface erosion, while eliminating the phenomenon of compacting it.

The technological works included in the conservative tillage system help to restore the soil structure, improve soil drainage, protect the soil against erosion of water and wind (Șimon et al., 2016). A major importance in the application of sustainable farming systems is the amount of vegetal remains left at the surface of the soil left by a crop after harvesting, these plant residues being sources for the formation of humus, which helps to soil structuring and soil leaching and to improve agrochemical indices it is important to rotate plants that

¹ CS Drd. Ing. Șimon Alina, Stațiunea de Cercetare și Dezvoltare Agricolă Turda, Cluj, România, maralys84@yahoo.com

² CS Drd. Ing. Chețan Felicia, Stațiunea de Cercetare și Dezvoltare Agricolă Turda, Cluj, România,

³ CS Drd. Ing. Chețan Cornel, Stațiunea de Cercetare și Dezvoltare Agricolă Turda, Cluj, România,

⁴ CS Drd. Ing. Deac Valeria, Stațiunea de Cercetare și Dezvoltare Agricolă Turda, Cluj, România,

leave plant rich plant residues that leave small amounts of plant debris and plants that leave large amounts of nutrients in the soil such as legumes with high nutrient-rich plants.

Soybean is currently one of the most important agricultural plants being used in human and animal nutrition but also as a raw material for industry, researchers being interested in the nutritional value, the potential of the soy in human health (Hermansen et al., 2000) the agro-phytotechnical importance as it contributes to the increase of soil fertility by the fixing of atmospheric nitrogen by the symbiosis between soybeans and *Rhizobium japonicum* bacteria, which form root radicals (Roman et al., 2006), constituting a good precursor for most agricultural crops.

Soybean has a high capacity to adapt to different climatic and soil conditions, with the best results being obtained on deep, fertile, neutral or slightly acidic soil, well-drained, rich in humus, phosphorus, potassium and calcium of humidity is a plant with relatively high requirements, the maximum intensity of water consumption taking place in June-August, when the soy consumes 5,8-4,6 mm/day.

MATERIAL AND METHOD

The experiment was conducted between 2015-2016 at Agricultural Research and Development Station Turda (ARDS Turda), on a faeozem vertical soil with neutral pH, loam-clay texture, humus medium content, good phosphorus and potassium supply.

The soybean was sown with a distance of 18 cm, with the Gaspardo Directa 400 seed drill at 65 g.s./m². The soybean has been grown in a crop rotation system for 3 years, the pre-plant being maize.

The experimental factors are: Factor A - experimental years: A1 - 2015, A2 - 2016; Factor B - Tillage system: B1 - The classical tillage system, which includes a 30 cm deep hole after harvesting the previous crop and soil processing to prepare the germinating bed with the disc and combiner before sowing; B2 - Minimum tillage system with the chisel at 30 cm deep after harvesting the previous crop and soil processing to prepare the germinating bed with the rotary before sowing; Factor C - soybean varieties: C1 - Onix, C2 - Felix, C3 - Mălina TD, C4 - Darina TD.

After sowing, treatment with Glyphosate (4 l/ha) was performed in the two systems. Control of monocotyledonous and dicotyledonous weeds was performed with Pulsar herbicides (1,0 l/ha) and Agil (1,0 l/ha) in weed rosette phenophase.

To protect the soybean culture against the red spider (*Tetranychus urticae*), the Omit 570 EW (0,8 l/ha) insecticide treatment was performed and with the Ridomil Gold MZ 68 WG fungicide was treated the *Peronospora manshurica* (2,5 kg/ha).

The obtained results were statistically processed by the variance analysis method and the lowest significant difference was determined - DL - (5%, 1% and 0,1%) (ANOVA, 2015).

Climate conditions are a determinant of agricultural yield, and the analysis of the evolution of climatic factors is justified in the current context of climate change, which is increasingly visible both globally and in our country.

The climatic conditions of the years 2015-2016 are presented according to the Turda Meteor Station. Over the past 59 years, the annual average temperature recorded was 9,1⁰C (Table 1) and the annual precipitation amount was 520,6 mm (Table 2). The average temperatures recorded during the soybean crop growing months varied in the two years but were higher than the average for 59 years with 1,5⁰C in 2015 being considered a warm year and 0,9⁰C in 2016, a year considered warmly.

In 2016, the temperature values recorded in the soybean crop growing months ranged from multi-year averages with a deviation of -0,7⁰C in May, with a cool spring up to +2⁰C in

June, characterized as a warm moon, in the other months the recorded temperatures were close to normal.

Table 1. Average air temperatures (⁰C), Turda 2015-2016

2015													
Monthly average	Ian.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual average
	-0,7	0,0	5,5	9,6	15,8	19,4	22,3	21,9	17,3	9,7	6,1	0,7	10,6
Average 59 years	-3,4	-0,8	4,5	9,9	15,0	17,8	19,7	19,3	15,0	9,5	3,9	-1,4	9,1
Deviation	+2,7	+0,8	+1,1	-0,3	+0,8	+1,6	+2,6	+2,6	+2,3	+0,2	+2,2	+2,3	+1,5
2016													
Monthly average	Ian.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual average
	-2,8	4,6	5,9	12,4	14,3	19,8	20,5	19,6	17,1	8,3	2,9	-2,7	10,0
Average 59 years	-3,4	-0,8	4,5	9,9	15,0	17,8	19,7	19,3	15,0	9,5	3,9	-1,4	9,1
Deviation	+0,6	+5,4	+1,4	+2,5	-0,7	+2,0	+0,8	+0,3	+2,1	-1,2	-1,0	-1,3	+0,9

Source: Turda Meteor Station, longitude: 23⁰47'; latitude 46⁰35'; altitude 427 m

The amount of precipitation recorded in the first half of 2015 was below the monthly average of the 59 years, the spring months of 2015 were drought, and in June although it was a very rainy month in the first decade, only 0.6 l / m², following very dry July and rainy August, soybean suffered during this period due to the drought recorded during periods of vegetation when it needed acute water, which was specific to the summers of 2015 was the persistence of high temperatures up to on the heel threshold, over a long period of time.

Table 2. Recorded precipitation (mm), Turda 2015-2016

2015													
Monthly amount	Ian.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual amount
	12,3	20,9	12,8	32,2	66,0	115,7	52,2	72,2	172,6	45,4	32,0	6,9	641,2
Average 59 years	21,3	18,7	23,1	44,7	67,7	84,5	76,7	55,9	40,3	32,0	28,7	26,9	520,6
Deviation	-9,0	+2,2	-10,3	-12,5	-1,7	+31,2	-24,5	+16,3	+132,3	+13,4	+3,3	-20,0	+120,6
2016													
Monthly amount	Ian.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual amount
	25,0	23,8	47,0	62,2	90,4	123,2	124,9	91,0	24,6	152,2	45,3	7,2	816,8
Average 59 years	20,8	18,4	19,3	44,4	67,1	83,4	72,9	54,6	42,0	32,5	32,3	26,0	513,6
Deviation	+4,2	+5,4	+27,7	+17,8	+23,3	+39,8	+52,0	+36,4	-17,4	+119,7	+13	-18,8	+303,2

Source: Turda Meteor Station, longitude: 23⁰47'; latitude 46⁰35'; altitude 427 m

In 2016, the sum of precipitations was higher than the average for 59 years, being considered an excessively rainy year, temperatures and precipitation were beneficial for soybean culture, and yields are the result of the interaction of optimum climatic conditions.

RESULTS AND DISCUSSIONS

The climatic conditions of the crop growing period play a decisive role in the formation and expression of soybean yield, as can be seen in Table 3 of the production resulting in 2016, when the precipitation and temperatures recorded optimal conditions for the development of the plants was higher than that determined in 2015, with a very significant

difference of over 1625 kg/ha, the water deficit correlated with the thermal surplus during the flowering-grain period made the average production of the four varieties in 2015 to be only 2043 kg/ha.

Table 3. Influence of the annual factor on soybean production, Turda 2015-2016

Experimental year	Yield (kg)	Diferences (kg)	Significance
2015 (control variant)	2043	-	mt.
2016	3668	1625	***
LDS (p 5%) 19 LDS (p 1%) 95 LDS (p 0,1%) 555			

The tillage system influences the productivity elements of the agricultural crops and finally the obtained yields, in the case of the minimum tillage system (the chisel variant) the obtained yields were very close to the variant worked according to the classic system (the variant plows with the return of the furrow) the difference of -9 kg/ha being statistically unsecured, the average yielded recorded for the application of the conservative tillage system was 2851 kg/ha, as can be seen in Table 4.

The research carried out by Chețan and collaborators (2016) over the period 2012-2014 on the same soil type, at the Onix soybean genotype, showed that soybean is a culture that lends itself to the application of conservative tillage systems, the yield obtained being close to that recorded in the classical tillage system.

In addition to these results supporting the implementation of conservative tillage systems, it is important to take into account their long-term benefits (reducing soil compaction, erosion and fossil fuel consumption, improving soil fertility and economic efficiency).

Table 4. Influence of soil soil system factor on soybean production, Turda 2015-2016

Tillage system	Yield (kg)	Diference (kg)	Significance
Classical (control variant)	2860	-	mt.
Minimum	2851	-9	0
LDS (p 5%) 6 LDS (p 1%) 13 LDS (p 0,1%) 142			

Regarding the average yield recorded by the four soybean varieties studied during the period 2015-2016, the control variant, Onix variety, recorded the lowest yield of only 2807 kg/ha, the Felix and Darina TD varieties there were recorded more yields with significant distinct differences of 18-20 kg/ha compared to the control variant, but Mălina TD is distinguished by an average yield of 2963 kg/ha, with a very significant difference of +156 kg/ha compared to the control variant.

Good results of yield for soybeans Felix, Mălina TD and Darina TD obtained Mureșanu and collaborators (2012), during 2007-2010, the yield increases made by these varieties cultivated at ARDS Turda compared to the control variant Onix were 0,7% for Felix, 0,1% for Mălina TD and 11,7% for Darina TD.

Table 5. Influence of the variety factor on soybean production, Turda 2015-2016

Varieties	Yield (kg)	Diferences (kg)	Significance
Onix (control variant)	2807	-	mt.
Felix	2827	20	**
Mălina TD	2963	156	***
Darina TD	2824	18	**
LDS (p 5%) 12 LDS (p 1%) 17 LDS (p 0,1%) 124			

Consumption of fuel needed for a ha of soybean cultivation differs according to the adopted tillage system, classical technology involves a larger number of mechanized agricultural works to prepare the germinating bed, which makes the total fuel required for a ha of 99,9 l (Table 6), at a total cost of 599,4 lei/ha compared to the minimum tillage system where the number of works is reduced and the fuel consumption reaches 82,8 l/ha (Table 7) at a cost total of 496,8 lei/ha, with 17,1 l/ha less fuel and a cost of 102,6 lei/ha lower, besides this economic aspect it is also important to reduce soil compaction as a result of the reduction of the number of crossings with agricultural machinery on the soil surface.

Table 6. Fuel consumption and expenditures/ha at the application of the classical tillage system

Tillage	Diesel consumption (l/ha)	Price (lei)	Cost (lei/ha)
Plowing (30 cm)	28	6	168
Disking (2)	5,7x2	6	68,4
Processing with the combiner	5,7	6	34,2
Sprayer (2)	1,6x2	6	19,2
Sown + Fertilized	8	6	48
Treatment	1,6	6	9,6
Harvesting	30	6	180
Harvest transport	6 hours	6	36
Strains transport	6 hours	6	36
Total	99,9		599,4

Table 7. Fuel consumption and expenditures/ha at the application of conservative tillage system

Tillage	Diesel consumption (l/ha)	Price (lei)	Cost (lei/ha)
Processing with chisel (30 cm)	28	6	168
Rotary harrow processing	6	6	36
Sprayer (2)	1,6x2	6	19,2
Sown + Fertilized	8	6	48
Treatment	1,6	6	9,6
Harvested by chopping and spreading vegetal remains	30	6	180
Harvest transport	6 hours	6	36
Total	82,8		496,8

As regards the cost of the materials needed in the soybean culture process, this is the same for the two tillage systems (classical and conservative) and is 1424,1 lei/ha, as shown in Table 8, the most the high price of products for the protection of soybean culture.

Table 8. Expenditure on materials

Materiale	Cantitity (kg/l/ha)	Price (lei/kg/l)	Price/ha (lei/ha)
Seeds of soybean (Onix, Felix, Mălina TD, Darina TD)	100	4	400
Chemical fertilizers N ₄₀ P ₄₀ (NPK 20:20:0)	200	1,7	340
Fungicide Ridomil Gold MZ 68 WG	2,5	106,82	256,15
Insecticide Omite 570 EW	0,8	20	16
Herbicide Clean Up (glyphosat)	3	36,33	108,99
Herbicide Pulsar	1	145	145
Herbicide Agil 100 EC	1	158,05	158,05
Total			1424,1

Analyzing the total expenditure by cultural technology, Table 9 shows that the total cost of the classical technology is 2023,5 lei/ha with 102,6 lei/ha higher than the conservative tillage technology, the economic efficiency of minimum tillage systems being one of the advantages of implementing conservative tillage systems.

Table 9. Total spend per technology

Tillage system	Diesel consumption (l/ha)	Price (lei/ha)	Material costs (lei/ha)	Total (lei/ha)
Classical	99,9	599,4	1424,1	2023,5
Minimum	82,8	496,8	1424,1	1920,9

The economic efficiency achieved as a result of applying the minimum tillage system results only from the fuel economy used/ha, due to the fact that the outputs achieved for the two tillage systems are close, following the application of the conservative tillage system, a profit per hectare higher by 89,1 lei compared to the one obtained after applying the classical tillage system where the profit is 2266,5 lei/ha, as can be seen from Table 10.

Table 10. Economic efficiency of systems according to outputs

Tillage system	Cost (lei/ha)	Average yield (kg/ha)	Soybean price (lei/ha)	Yield price (lei/ha)	Profit (lei/ha)
Classical	2023,5	2860	1,5	4290	2266,5
Minimum	1920,9	2851	1,5	4276,5	2355,6

CONCLUSIONS

Soybean yield is greatly influenced by climatic conditions, the yield difference achieved in a year where conditions are optimal for soybean cultivation compared to a year in which environmental conditions are less favorable may also be 100%.

By applying the minimum tillage systems, the average yield does not decrease very much compared to the yield recorded in the classical tillage system, the difference being insignificant, but with the implementation of the conservative tillage systems an important fuel and money economy is achieved.

REFERENCES

1. Carter, M., et. al. (1994). *Conservation Tillage in Temperatour Agrosystems*, Lewis Publishers an Arbor London;
2. Chețan, Felicia, Chețan, C., Rusu, T., Alina, Șimon. (2015). *Effects the winter wheat cultivation, in system without plowing, on the soil properties*, ARDS Turda, 2005-2014, *The 8th International Symposium Soil Minimum Tillage System*, Cluj-Napoca, Vol.8, No. 22, pag.119-125;
3. Chețan, Felicia, Chețan, C., Felicia Mureșanu. (2016). *Stabilirea influenței tehnologiei de cultivare a soiei asupra solului, producției și eficiența economică în zona Turda*, *Economie agrară și dezvoltare rurală, realități și perspective pentru România*, pag: 124-129;
4. Fabrizzi, K. P., Garcia, F. O., Costa, J. L., Picone, L. I. (2005). *Soil water dynamics, physical properties and corn and wheat responses to minimum and no-tillage systems in the southern Pampas of Argentina*. *Soil & Tillage Research* 81: 57–69.
5. Guș, P., Ileana Bogdan, Rusu T. (2003). *Sisteme convenționale și neconvenționale de lucrare a solului*, Editura Risoprint, Cluj-Napoca;
6. Mureșanu, E., Mărginean Raluca, Enescu, T. (2012). *Cristina TD și Mălina TD, soiuri timpurii de soia*, An INCDA Fundulea, Vol. LXXX, *Genetica și ameliorarea plantelor*, pag. 89-97;
7. Răuță, C., Cârstea S. (1983). *Prevenirea și combaterea poluării solului*, Editura Ceres, București;
8. Roman, Gh. V., Ion, V., Epure, Lenuța Iuliana. (2006). *Fitotehnie - Cereale și leguminoase pentru boabe*, Editura Ceres, București;

9. Rusu, T., Guș, P., Bogdan, Ileana, Moraru, Paula Ioana, Pop, A. I., Clapa, Doina, Marin, D. I., Oroian, I., Pop, Lavinia. (2009). *Implications of Minimum Tillage Systems on Sustainability of Agricultural Production and Soil Conservation*, *Journal of Food, Agriculture & Environment*, vol. 7 (2): 335-338;
10. Șimon, Alina, Chețan, Felicia, Chețan, C., Ignea, M., Deac, Valeria. (2014). *Rezultate privind influența densității și a fertilizării asupra producției la soiurile de mazăre de tip afilea*, AN. I.N.C.D.A. Fundulea, Vol. LXXXII, pag. 227-232;
11. Șimon, Alina, Rusu, T., Chețan, Felicia. (2016). *Influence of the tillage system on the degree of weeding in peas*, *12th International Symposium "Young People and Agriculture research"* Timișoara;
12. ***ANOVA, 2015, PC program for variant analyses made for completely randomized polifactorial experiences;
13. ***Stația Meteo Turda

THE EVOLUTION OF THE FRUIT SECTOR IN ROMANIA BETWEEN 2010-2016

PETRUȚA ANTONETA TUREK-RAHOVEANU¹
DANIELA NICOLETA BĂDAN²

Abstract: *In this article we analyze the current state of the fruit sector in Romania as well as the evolution of this sector between 2010-2016. Considering the importance of fruit consumption, this article aims to analyze the evolution of the surfaces, productions and average prices for the main inland fruits. Due to the decrease of the orchard surfaces and tree farms we can see variations in the productiveness per hectare, which leads to a high degree of imbalance in procurement. Sustaining the fruit sector is one of the primary directions of PNDR 2014-2020 through the Food-Growing Subprogram.*

Key words: *areas, production, productiveness*

JEL Classification: *Q13, L11*

INTRODUCTION

Romania is a country with an agrarian tradition that has the favourable pedoclimate conditions thus developing in time a strong agriculture capable of insuring the intern consumption and to export.

Horticulture represents one of the most intensive sectors in agriculture, depending on the changing in the crop system of the species and varieties, it accentuates its enhancement degree.

Fruits are agro-alimentary products that are included in human every-day food, they help to maintain the healthy state of the consumers by having a content high in vitamins, iron, calcium and phosphorus mineral salts.

The cultivation of trees and fruit scrubs in Romania has been exercised for millennia, always having a tendency to modernize. Regarding the orchards and the nursery farms, the cultivated area in the private sector is of 0.78% of the county's total agrarian area.

Fruits have a special importance for the national economy due to their quality, as they are demanded by the population and the food industry. So, if for the corny and technical crops there are 10-12 basic varieties that are being produced, for the horticultural crops there are 35 brands of vegetables and 25 brands of fruits, to which it adds the products resulting from their processing.

A present-day problem consists of supplying quality fruits that are necessary in every-day diet as well as making a higher production per hectare. This objective (higher fruit production) must be fulfilled to insure the consumption of at least 50-60 kg of fresh fruits/inhabitant, which leads to a higher demand a bigger diversity of fresh fruits.

In order to satisfy the personal needs (self-consumption) there are enough areas of up to 400-500 sqm cultivated with different species and varieties and, for a commercial purpose, there are required surfaces that surpass a few hundred sqm, from 1000 -2000 sqm up to a few hectares, cultivated with one-two fruit-growing species.

¹ Cercetător Științific grad III Turek-Rahoveanu Petruța, Institutul de Cercetare pentru Economia Agriculturii și Dezvoltare Rurală, turek.petruta@iceadr.ro

² Asistent Cercetător Științific Bădan Daniela Nicoleta, Institutul de Cercetare pentru Economia Agriculturii și Dezvoltare Rurală, badan.daniela@iceadr.ro

MATERIAL AND METHOD

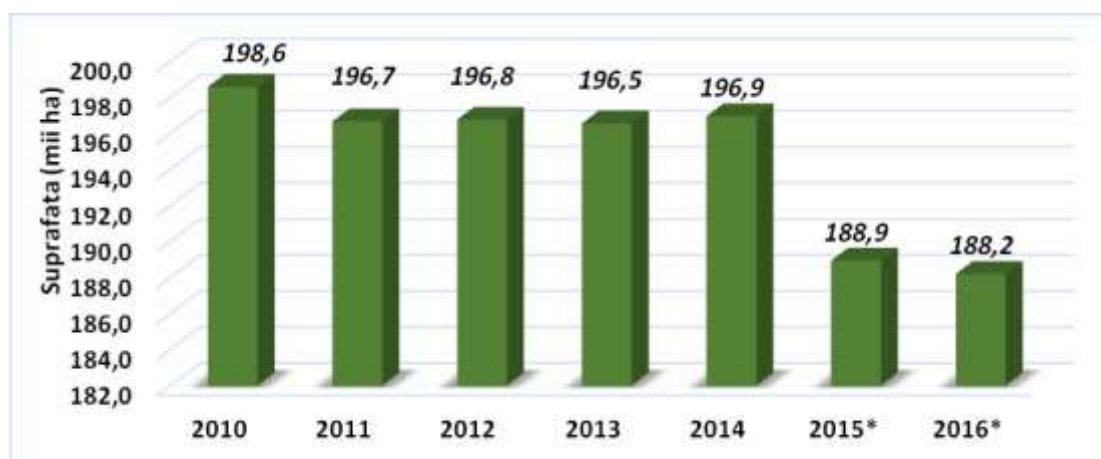
The present study uses the quantitative and qualitative analysis of the evolution of the fruit sector during 2010 - 2016 taking under consideration the physical indicators like the used agrarian area, the fruit production and the average prices, using the data supplied by INSSE and MADR as well as data from the field of study literature.

RESULTS AND DISCUSSIONS

The fruit-growing activity holds an important spot in Romania's agriculture, having a long tradition.

The changes of ownership over the lands, the clearance of plantations on important surfaces, the aging of the fruit-growing plantations, the mincing of the orchard surfaces as well as the lack of interference from specialists in high importance technological workmanship or neglecting to perform them, have contributed to the decrease of the of the fruit-growing areas and the decrease of the workforce.

Diagram 1. The total surface of orchards and fruit-growing nursery gardens (thousand ha)



Source : INSSE

* own calculations –estimated

From diagram nr.1 it's shown the fact that during 2010 – 2016 the total cultivated area with orchards and fruit-growing nursery moved to and fro, registering in 2015 a decrease of 1 % compared to last year.

The two important factors that caused the mincing of the fruit-growing surface and the interest in cultivating inland fruits have been the lack of funding and the high VAT which daunted investments in this sector.

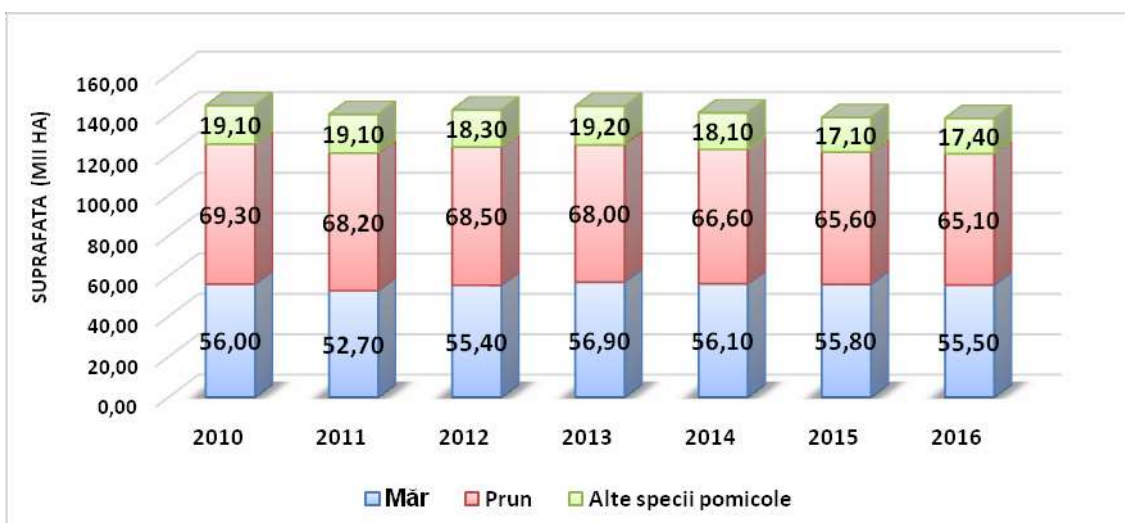
Another factor consisted of the invasion of local markets with agrarian products, mainly fruits that have been produced in other countries that have a more accessible price and a special appearance, so that the farmers have been discouraged and forced to give up a large part of fruit-growing cultivations as they failed to bring profit.

The main fruit-growing species cultivated in Romania are the apple and the plum, which fill significant areas.

During the analyzed period, their surface followed a decreasing trend. So, if in 2010 the two fruit-growing species (apple and plum) represented 58,5% (125,3 thousand hectares) of the total cultivated surface with orchards and nursery gardens, in 2016 along with the decrease of the orchard cultivated surfaces, the share of the two species had 56,03% respectively 120,6.thousand ha.

We can see the fact that the area cultivated with plums had a larger share, showing a decreasing trend with a maximum cultivated surface in 2010 of 69,30 thousand hectares, only to decrease at the end of the period to 6,06 % compared to 2010. The cultivated area with apples has reached a minimum in 2011 (52,7 thousand hectares) with 11,95% smaller than 2010 and in 2016 the respective species held a surface that was 0,89 % smaller than the one from the first year of analysis. (diagram nr.2).

Diagram nr.2 The evolution of the surfaces for the main fruit-growing species (thousand hectares)

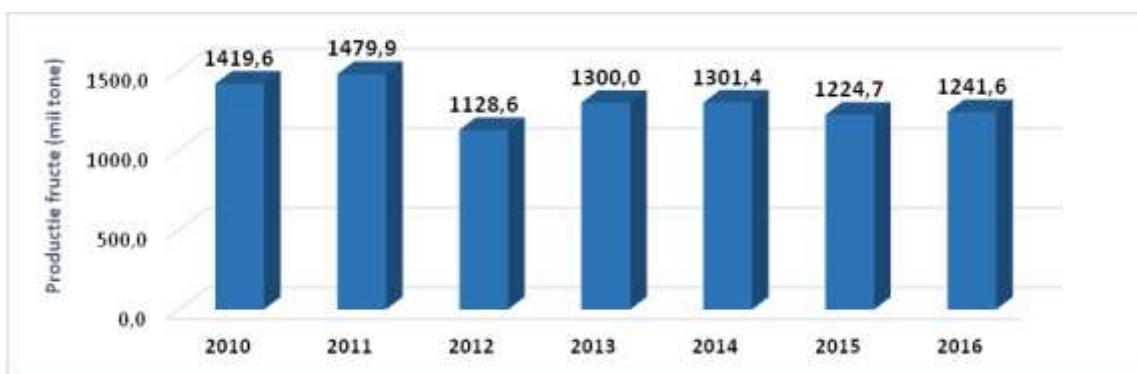


Source: INSSE

The determinant factors that led to a fluctuating production have been the decreasing of the surfaces and the bad weather conditions in the referred year as well as the low potential of the plantations.

The total fruit production (diagram nr.3) according to the data provided by INSSE, has reached a maximum of 1479,9 thousand tons in 2011, being with 4,2% larger than in 2010 only to decrease drastically in 2012 with 23,74% compared to 2011.

Diagram nr. 3 The evolution of the total fruit production (thousand tons)



Source: INSSE

Regarding the main fruit trees species, the 2012's production (table 1) registered decreases in: apricots (-33,3%), pears (-32,1%), sweet cherries-cherries (-23,3%), plums (-18,0%) and apples (-14,8%).

The structure of the fruit production in Romania is poorly diversified, as the assortment range is dominant in apples and plums which hold approximately 80% of total fruit production.

The apple production shows an oscillating trend with a maximum of 620,36 thousand tons in 2011 with 12,2 % more than in 2010 and with a minimum of 462,94 thousand tons in 2012, 16,26 % lower compared to the reference year. The highest rate has been registered in 2011 with 43,8% of total fruit production, followed by the plum production with 34,32 % .

Table nr.1 Fruit production by range (thousand tons)

SPECIFICATION	2010	2011	2012	2013	2014	2015	2016
Total	1419,6	1479,9	1128,6	1300,0	1301,4	1224,7	1241,6
PLUMS	624,9	573,6	424,068	512,46	495,29	496,5	512,98
APPLES	552,86	620,36	462,94	513,6	513,195	476,06	467,26
PEARS	60,38	66,9	54,27	66,85	61,29	45,60	52,75
PEACHES	10,85	21,15	16,84	18,43	23,76	21,33	22,87
NECTARINES	0,39	1,34	0,6	0,7	0,95	0,50	0,78
SWEET CHERRIES AND CHERRIES	70,3	81,8	70,54	80,48	82,81	75,50	73,83
APRICOTS	23,8	33,75	29,09	28,3	43,61	30,99	30,73
NUTS	34,36	35,07	30,55	31,76	31,52	33,40	34,10
STRAWBERRIES	21,43	18,91	15,8	23,2	21,94	21,60	23
OTHER FRUITS	20,37	26,97	23,9	24,21	27,07	23,30	23

Source INSSE ,MADR

Regarding the plum species, in 2010 it has been obtained a maximum of 624,8 thousand tons - 17,9% more than in the last year of analysis.

The production obtained for sweet cherries and cherries in 2016 surpassed by 5,02% the production from the first year of the analysis, and the nectarines one is of approximately 2,6 times larger than the level obtained in 2010, their share being insignificant.

In 2014 the fresh peaches production had the maximum level, being two times higher than the one in 2010 when the minimum level has been registered.

Table nr.2 Evolution of performances in the apple and plum orchards

ORCHARDS	2010	2011	2012	2013	2014	2015	2016
APPLE	98.73	117.72	83.56	90.26	91.48	85.32	84.19
PLUM	90.56	84.10	61.91	75.36	74.37	75.68	78.80

- kg/ha-

Source: own calculations

Table nr.3 The performances variation coefficient

ORCHARDS	2010-2016	2010-2012	2013-2015
APPLE	13.01	17.11	3.67
PLUM	11.53	19.06	0.91

-percent%-

Source: own calculations

For the fruiter species like apple and plum, the performances are unstable registering a diverse range of values.

In the 2010-2016 period the performance variation coefficient shows a high value for apple - 13,01% and for plum 11,53%.

During 2010-2012 we notice the highest degree of variation and during 2013- 2015 there have been registered the smallest values of the variation coefficient. These variations of performance have lead to a changing supply, which is why the disequilibrium degree in procurement will be high.

Setting the fruit prices is influenced by a series of elements such as the reduction of the cultivated areas and the production obtained implicitly and covering the whole production expenses in order to get a big enough profit to extend the production and marketing activity. The price variations are caused by the seasonal character of production which is tied to the permanent market demand.

The price difference is determined by the areal character of the offer correlative to a dispersion of the demand in all of the geographical regions. Other factors that influence the fruit prices are the quality, the prices are higher for superior qualities and smaller for inferior qualities and the cultivated varieties that have a higher market demand.

Table 4. The evolution of the average prices of the main fruits

-lei-

SPECIFICATION	2010	2011	2012	2013	2014	2015	2016
APPLES	2.16	2.62	2.68	2.79	2.75	2.67	2.67
PEARS	3.89	4.04	4.19	4.18	4.92	4.53	4.79
PEACHES	4.02	3.58	4.2	4.13	3.73	3.73	3.39
APROCOTS	4.39	4.54	4.42	4.2	4.15	4.81	4.83
SWEET CHERRIES	5.67	5.72	7.47	6.51	7.06	6.26	7.26
CHERRIES	4.86	4.79	6.63	5.55	5.34	4.99	5.38
PLUMS	2.12	2.32	2.59	2.34	2.5	2.37	2.15
NUTS	5.05	7.25	6.28	8.29	8.04	9.2	7.02
STRAWBERRYS	4.64	4.97	6.04	7.41	5.14	5.29	5.13

Source: *INSSE*

The fruit prices have a growing tendency due to the mincing of the cultivated areas and of the internal production. The apples register a relative constant average price, reaching a maximum 2.79 lei/kg in 2013, 29,16% higher than in the first year of the analyzed period. The smallest average prices can be observed with plums, the prices varying between 2.12 lei/kg and 2,59lei/kg. The average prices of the sweet cherries have increased by 28% in 2016 compared to the reference year 2010.

The average prices of nuts in the analyzed period register an increasing trend reaching 9.2 lei/kg in 2015, almost double compared to the price from 2010, followed by a decrease of 23.69 % in 2016 compared to last year.

While the prices of all the pesticides, fuels, equipments have increased, the fruit prices stayed low, which turned the farmer's investments into significant losses and, as a result, the market has been invaded by imported fruits.

CONCLUSIONS

The surfaces cultivated with orchards have a mincing tendency for the majority of species because the new seeding rate is lower than the clearing one.

The structure of the orchards in Romania is 64% dominated by classic orchards with a density up to 400 trees per hectare and aged orchards (55% of the surface).

The prices of the inland fruits exercise an orientation and a setting function of the offer and demand through negotiations and beneficiaries. Those are influenced by a large range of factors among the most important being the production costs, the seasonal character of the production, the areal character of the offer and the quality, the level of freshness and, they also depend on the intended market.

The necessary investments in order to attain the objectives set by the fruit producers to increase production can be achieved through the National Rural Development Program 2014-2020, The Fruit-growing Subprogram which invests irredeemable European funds for: increasing the competitiveness of the fruit-growing exploitations by endowing with equipment, setting-up, updating and/or expanding processing units, founding fruit-growing plantations, the reconversion of the existing plantations and the increase of the areas covered by fruit-growing nursery gardens.

BIBLIOGRAPHY

1. Graur, M. Ghid pentru alimentație sănătoasă, Editura Performatica, Iași, 2006
2. Turek-Rahoveanu A. și colaboratorii, Analiza sectorului legume-fructe în România, Editura Cartea Universală, București, 2008
3. Anuarul statistic al României, 2010 -2016
4. *** madr.ro
5. ***insse.ro

COMPLEX DEVELOPMENT ALTERNATIVES IN SOUTH-MUNTENIA REGION –PROSPECTIVE ASSESSMENTS

BUCUR SORINEL IONEL¹

Abstract: *To raise the issue of the complex development of a zone where the agricultural production is the prevailing economic activity implies a certain difficulty, induced by the natural question: how can pluri-activity be generated in a predominantly mono-active rural area? Even if, at first sight, the issue could be considered relatively marginal, in reality, at least two essential “agents”: agriculture, as such, and the remaining national economy have participated to the complex development of the rural area. Agriculture, because when it reaches performance, it becomes capable to generate surplus supply compared to the local consumption needs, available for re-distribution to other deficit areas or for processing. The national economy, because it generates alternative incomes for the surplus agricultural population through various non-agricultural activities developed in the rural area. Starting from the premise that regional development, in general, and rural development, in particular, takes place almost exclusively through local initiatives, we consider that by identifying certain production intensification opportunities in crops and livestock species that have favorable conditions in the counties from South-Muntenia region, we can shape the main pillars for the complex development at regional level.*

From the methodological point of view, the approach is based on public statistical information, using well-known statistical methods for processing the information, of comparison or structural type, the results being mainly presented under table form. The information support necessary for the development of the present approach was based on data supplied mainly by the National Institute of Statistics, through the Tempo-Online database.

Key words: *sustainable development, alternatives, criteria.*

JEL Classification: *R10, R11, R12.*

INTRODUCTION

In the context of financial support measures implemented through multiple national and Community programs, the identification of complex development alternatives has acquired increased importance at national and at local level in particular. In South-Muntenia region, agriculture is the main activity in the rural area; hence the conclusion that can be drawn is that it is on the economic revigoration and development of this branch that any zonal economic development strategy largely depends, targeting the improvement of the general situation of the local economy, having as final effect the diminution of economic and social discrepancies compared to other areas. The realism of this conclusion comes to be part of a more general feature of South-Muntenia region, i.e. the problems of this region derive from a too net divide between the industrial area, concentrated in certain counties, and the agricultural and rural area, covering almost the entire territory of the region.

In the context mentioned above, we consider that such an approach applicable at the level of a development region that is important in size in the Romanian economy can be considered as a first step for constructing alternative models in other areas as well.

MATERIALS AND METHODS

From the methodological point of view, the present approach is based on public information supplied by the national statistics through Tempo-Online database, covering the time horizon 1990-2015. Considering the quite limited information fund, which is in many cases outdated, we should specify that the current approach is based on constructing certain development alternatives at the level of the component counties of South-Muntenia region, the starting point being represented by the level of total productions for the main agricultural

¹ Scientific researcher, Institute of Agricultural Economics - INCE, e-mail: bucursorinelionel@yahoo.com.

products. It should be made clear that this approach is part of a larger approach, i.e. the complex sustainable development of the rural area in South-Muntenia region.

RESULTS AND DISCUSSIONS

In order to identify regional development alternatives, it was necessary to take into consideration certain working hypotheses, among which we can mention the following:

- a) Out of the agricultural products for which we have data on total productions in each of the seven counties, for the period 1990-2015, we selected the most representative six products, with a significant share in the population's consumption (wheat, rye, grain maize, sunflower, vegetables, cow and buffalo cow milk, meat total).
- b) After determining the annual averages of total productions in the six selected products, for the period 1990-2015, we calculated the shares of each county in total region, three counties with the highest shares in each product in part to be selected afterwards.
- c) The third working hypothesis consists in determining the annual modification rate of total productions in the six selected products, for the period 1990-2015, and three counties with the highest positive rates will be selected.

Referring to the second working hypothesis, the following average shares of counties in total region were determined, for the six selected agricultural products (Table no. 1).

Table no. 1. Share of counties in total region for the main crop and livestock products, 1990-2015 (%)²

	Rye	Wheat	Grain maize	Sunflower	Vegetables	Live weight of slaughter animals for consumption – tons total	Milk production (calves consumption included) – cow and buffalo cow milk – thou. hl
Argeş	23.3	7.8	9.0	4.9	10.9	12.5	24.6
Călăraşi	12.5	24.4	21.1	26.6	6.0	21.2	7.7
Dâmboviţa	14.4	5.7	11.3	2.4	31.5	14.9	17.6
Giurgiu	30.6	12.7	11.8	11.8	11.6	9.9	10.8
Ialomiţa	16.4	17.0	18.5	24.7	15.8	15.4	10.3
Prahova	20.5	5.9	11.6	3.6	9.7	13.7	14.0
Teleorman	62.7	26.5	16.6	26.0	14.5	12.5	15.1

Source: own calculations based on Tempo-Online data, NIS, 2017.

At the same time, the third working hypothesis presupposed the determination of the annual modification rates of total production, for the main agricultural products, in each county of South-Muntenia region (Table no. 2).

It is worth mentioning the presence of negative modification rates in certain selected products in most counties from the region South-Muntenia. However, 16 situations have been identified in which positive rates were noticed in one or other of the six analyzed products.

² The first three shares for each product are written in red.

Table no. 2. Average annual modification rate of crop and livestock production, by main products, in the counties from South-Muntenia region, 1990-2015

	Rye	Wheat	Grain maize	Sunflower	Vegetables	Live weight of slaughter animals for human consumption – tons total	Milk production (calves included) – cow and buffalo cow milk – thou. hl
Argeş	-5.5	1.2	0.3	3.1	1.7	-1.8	-0.8
Călăraşi	-6.7	-1.5	-0.1	1.7	1.12	-3.2	0.7
Dâmboviţa	5.1	2.4	2.0	1.8	-4.4	0.2	-1.9
Giurgiu	-0.3	-2.5	-0.4	1.7	6.2	-1.3	-0.2
Ialomiţa	-13.9	1.9	-0.9	4.2	1.1	-2.6	-1.7
Prahova	-3.0	2.7	1.4	3.4	2.0	-3.5	-3.1
Teleorman	-1.8	-0.6	0.7	6.1	-0.6	-0.1	0.003

Source: own calculations based on Tempo-Online data, NIS, 2017.

Correlating the results from the two previous tables, one can notice that the panel of counties with high shares in more than two products does not coincide with the panel of counties with high rates, in more than two products (Table no. 3).

Table no. 3. Panel of selected counties by significant shares and rates

County	Share in total (%)	County	Modification rates (%)
<i>Rye</i>			
Argeş	23.3	Călăraşi	5.1
Giurgiu	30.6		
Teleorman	62.7		
<i>Wheat</i>			
Călăraşi	24.4	Călăraşi	2.4
Ialomiţa	17.0	Giurgiu	1.9
Teleorman	26.5	Ialomiţa	2.7
<i>Grain maize</i>			
Călăraşi	21.1	Călăraşi	2.0
Ialomiţa	18.5	Ialomiţa	1.4
Teleorman	16.6	Prahova	0.7
<i>Sunflower</i>			
Călăraşi	26.6	Giurgiu	4.2
Ialomiţa	24.7	Prahova	6.1
Teleorman	26.0	Teleorman	3.5
<i>Vegetables</i>			
Dâmboviţa	31.5	Argeş	1.1
Ialomiţa	15.8	Dâmboviţa	6.2
Teleorman	14.5	Ialomiţa	2.0
<i>Meat total</i>			
Călăraşi	21.2	Călăraşi	0.2
Dâmboviţa	14.9		
Ialomiţa	15.4		

Cow and buffalo cow milk			
Argeş	24.6	Argeş	0.7
Dâmboviţa	17.6	Prahova	0.003
Teleorman	15.1		

Source: own calculations based on Tempo-Online data, NIS, 2017.

From the determination of high shares and high rates for the six representative products in the counties from South-Muntenia region, at least two operational criteria can be deduced, in order to substantiate the complex development alternatives in the region. *The first criterion* presupposes attributing high development rates to counties with high shares in total region, for each selected product, starting from the premise that the entities in which agricultural production develops even more strongly may become irradiating poles of related activities. *The second criterion* would presuppose attributing high rates to counties with low shares for the selected products, which would mean allocating additional material and financial resources in areas with low productivity levels. From the two operational criteria we opt for the first, according to which the additional investments can be more efficiently capitalized in entities with already well-established performance potential.

Taking into consideration the preliminary methodological benchmarks, the hypotheses and operational criteria presented above, the next step was represented by the substantiation of the development alternatives for agricultural production as a main pillar of complex development of the communities from South-Muntenia region. In this respect, 3 alternatives of feasible rates for total production development were identified, for the six representative agricultural products (**Table no. 4**).

Table no. 4. Projected rates for the main crop and animal products (%)

	Alternative 1 (A1)	Alternative 2 (A2)	Alternative 3 (A3)
Rye	5.1	5.1	5.1
Wheat	2.7	2.3	1.9
Grain maize	2.0	1.7	0.7
Sunflower	6.1	5.2	3.5
Vegetables	6.2	3.7	1.1
Meat total	0.2	0.2	0.2
Cow and buffalo cow milk	0.7	0.4	0.4

Source: own calculations based on Tempo-Online data, NIS, 2017.

Due to the high heterogeneity of annual average rates, in the period 1990-2015, in the selected counties for each representative product, the average rate for the three counties with the highest levels was adopted as alternative. Once the working hypotheses, operational criteria and development alternatives were established, the next step of the approach was represented by the quantification of prospective production evolutions for the representative products, from the selected communes, for the period 2016-2018, on the basis of formula:

$$Qp^{k_{i,j}} = Q0_{i,j} * (1+rQ^{k_{i,j}})^t, \text{ where:}$$

k = 1,2,3 – development alternatives; i = 1,2...6 – selected agricultural products; j = 1,2,3 – selected communes; t = 0,1...7 – forecast years; Qp = forecast level of total production; Qo = reference (baseline) level of total production; RQ = annual modification rate of total production.

The results of the econometric model application are presented for each of the six agricultural products and for the related counties.

Thus, for *rye*, the total production gain achievable in all three selected counties (Argeş, Giurgiu, Teleorman) ranges from 56.5 tons (2016) to 178.3 tons (2007) in Alternative 1 (**Table no. 5**).

Table no. 5. Alternative evaluations of total rye production in selected counties from South-Muntenia region, in the period 2016-2018 (tons)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Argeş	233.7	233.7	233.7	245.5	245.6	245.6	258.0	258.2	258.2
Giurgiu	306.9	307.0	307.0	322.5	322.6	322.6	338.9	339.1	339.1
Teleorman	628.2	628.3	628.3	660.1	660.3	660.3	693.6	694.0	694.0
Total estimated	1168.8	1169.0	1169.0	1228.2	1228.6	1228.6	1290.6	1291.2	1291.2
Baseline	1112.2	1112.2	1112.2	1112.2	1112.2	1112.2	1112.2	1112.2	1112.2
Differences	56.5	56.7	56.7	115.9	116.3	116.3	178.3	179.0	179.0

Source: own calculations based on Tempo-Online data, NIS, 2017.

The analysis of obtained results highlights that Alternative 1 seems sustainable and realistic for the time horizon 2016-2018.

As regards *wheat production*, it should be specified that V3 is the optimum alternative, according to which the production gain in 2016 compared to 2015 is about 20000 tons. Although this product has multiple uses, both in the food and agricultural sector, representing a basic element for animal feed, it is difficult to estimate whether V1 or V2 variants are feasible in the current conditions. That is why, under the background of maintaining a certain reserve with regard to the increase of total wheat production, we consider it feasible to reach the quantity estimated under Variant 3 (Table no. 6).

Table no. 6. Alternative evaluations of total wheat production in selected counties from South-Muntenia region, in the period 2016-2018 (tons)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Călăraşi	393464.7	392162.4	390417.5	403951.5	401281.9	400823.1	414717.8	410613.4	408319.0
Ialomiţa	274611.2	273702.2	272484.4	281930.2	280067.0	277580.3	289444.3	286579.7	282771.4
Teleorman	428073.8	426656.9	424758.5	439483.0	436578.5	432702.1	451196.2	446730.8	440794.2
Total estimated	1096149.7	1092521.5	1087660.4	1125364.7	1117927.4	1111105.4	1155358.4	1143924.0	1131884.7
Baseline	1067693.1	1067693.1	1067693.1	1067693.1	1067693.1	1067693.1	1067693.1	1067693.1	1067693.1
Differences	28456.6	24828.5	19967.4	57671.6	50234.3	43412.4	87665.3	76230.9	64191.6

Source: own calculations based on Tempo-Online data, NIS, 2017.

Grain maize, which is less a cash crop due to its prevalent use as animal feed, has slightly lower oscillations of the production gains by the three development alternatives, compared to the baseline level (Table no. 7).

Table no. 7. Alternative evaluations of total maize production in selected counties from South-Muntenia region, in the period 2016-2018 (tons)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Călărași	416973.2	415637.9	411539.5	425381.7	422661.5	414367.5	433959.7	429803.9	417214.8
Ialomița	365950.4	364778.5	361181.6	373330.0	370942.7	363663.5	380858.3	377211.0	366162.5
Teleorman	329254.3	328199.9	324963.7	335893.9	333746.0	327196.7	342667.3	339385.8	329445.1
Total estimated	1112177.9	1108616.2	1097684.9	1134605.5	1127350.1	1105227.7	1157485.4	1146400.7	1112822.4
Baseline	1090193.6	1090193.6	1090193.6	1090193.6	1090193.6	1090193.6	1090193.6	1090193.6	1090193.6
Differences	21984.3	18422.6	7491.3	44411.9	37156.6	15034.2	67291.8	56207.1	22628.8

Source: own calculations based on Tempo-Online data, NIS, 2017.

Among the three alternatives, we consider that Alternative 3 seems more plausible, conferring total production levels that would cover not only the food and feed consumption needs, but also certain quantities for agri-food processing purposes (combined feed, starch industry, etc.).

By contrast with wheat, rye and grain maize, which are the main components of the domestic human food and animal feed consumption, the *sunflower crop production* was an activity that had to adjust to the domestic and foreign market requirements in the period 1990-2015. Taking into consideration that generally, the domestic market became relatively saturated as regards the domestic supply of sunflower oil, we consider it opportune to adopt Alternative A3, as strategy for the future development of this crop (Table no. 8).

Table no. 8. Alternative evaluations of total sunflower production in selected counties from South-Muntenia region, in the period 2016-2018 (tons)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Călărași	103793.3	102863.7	101223.9	110150.1	108186.0	104764.1	116896.3	113783.6	108428.2
Ialomița	96270.6	95408.4	93887.5	102166.8	100345.0	97171.1	108424.0	105536.9	100569.6
Teleorman	101255.2	100348.4	98748.7	107456.6	105540.5	102202.3	114037.9	111001.3	105776.8
Total estimated	301319.1	298620.5	293860.0	319773.6	314071.4	304137.6	339358.2	330321.8	314774.7
Baseline	283929.7	283929.7	283929.7	283929.7	283929.7	283929.7	283929.7	283929.7	283929.7
Differences	17389.4	14690.8	9930.3	35843.8	30141.7	20207.9	55428.5	46392.1	30844.9

Source: own calculations based on Tempo-Online data, NIS, 2017.

Consequently, we adopted the annual average sunflower production increase rate from the period 1990-2015 (5.2%) as a feasible strategy, by which the achievable total production gain can cover both the eventual additional solvent demand, derived from the increase of the population's real incomes and the foreign market demand niches, which may emerge following the production oscillations in the representative growing areas for this crop.

Vegetables, crop that has highly suitable growth conditions in the counties from South-Muntenia region, had an accelerated average growth rate of total production in the period 1990-2015 (3.7%). Considering that the food complement role played by vegetables in relation to other components of the human food consumption is on the verge of exhaustion, on the one hand, and that the sale possibilities on the foreign market are relatively limited by the EU rigid quality standards, on the other hand, we consider it opportune to adopt Alternative 3 for vegetable production development in the selected counties, according to which production would increase by 3.7% each year (Table no. 9).

Table no. 9. Alternative evaluations of total vegetable production in selected counties from South-Muntenia region, in the period 2016-2018 (tons)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Dâmbovița	212684.2	207592.5	202500.7	225889.9	215203.6	204776.2	239915.5	223093.7	207077.3
Ialomița	106502.5	103952.8	101403.1	113115.3	107764.1	102542.5	120138.6	111715.1	103694.8
Teleorman	98117.9	95768.9	93420.0	104210.1	99280.2	94469.7	110680.6	102920.2	95531.3
Total estimated	417304.6	407314.2	397323.8	443215.2	422247.8	401788.5	470734.7	437729.0	406303.3
Baseline	392908.7	392908.7	392908.7	392908.7	392908.7	392908.7	392908.7	392908.7	392908.7
Differences	24395.9	14405.5	4415.1	50306.5	29339.1	8879.8	77826.0	44820.3	13394.6

Source: own calculations based on Tempo-Online data, NIS, 2017.

The production and consumption of meat – most often considered as performance barometer of a modern agriculture – should find favourable conditions in the rural communes located in the proximity of a great urban consumption center. From the perspective of annual average consumption of meat and meat products, one of the immediate solutions for improving it is the increase of pig and poultry meat production (as fast growing animal species, highly dependent on the fodder cereal production). In this context, among the three meat production development alternatives, in the three selected counties (Argeș, Giurgiu, Teleorman), we opted for Alternative 3, based on production growth by 0.2% (Table no. 10).

Table no. 10. Alternative evaluations of total meat production in selected counties from South-Muntenia region, in the period 2016-2018 (tons)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Călărași	82397.1	81954.2	81954.2	82567.2	82118.1	82118.1	82737.7	82282.4	82282.4
Dâmbovița	48005.0	48001.9	48001.9	48104.1	48097.9	48097.9	48203.4	48194.1	48194.1
Ialomița	49732.1	49728.9	49728.9	49834.8	49828.3	49828.3	49937.7	49928.0	49928.0
Total estimated	180134.2	179685.0	179685.0	180506.1	180044.4	180044.4	180878.9	180404.5	180404.5
Baseline	165830.9	165830.9	165830.9	165830.9	165830.9	165830.9	165830.9	165830.9	165830.9
Differences	14303.3	13854.1	13854.1	14675.3	14213.5	14213.5	15048.0	14573.6	14573.6

Source: own calculations based on Tempo-Online data, NIS, 2017.

One of the representative products considered appropriate for prospective evaluations in the selected communes from the region, i.e. *cow and buffalo cow milk*, had an annual average rate of 0.4% in the period 1990 – 2015, in total investigated counties. Following the application of this rate, we can opt for Alternative 2 or 3, with extremely small differences between them, resulting, in fact, from the rounding of values (Table no. 11).

Table no. 11. Alternative evaluations of total cow and buffalo cow milk production in selected counties from South-Muntenia region, in the period 2016-2018 (thousand hl)

	2016			2017			2018		
	A1	A2	A3	A1	A2	A3	A1	A2	A3
Argeș	1895.4	1888.4	1888.4	1909.4	1895.5	1895.5	1923.6	1902.5	1902.5
Dâmbovița	1354.6	1349.6	1349.6	1364.6	1354.6	1354.6	1374.7	1359.7	1359.7
Teleorman	1164.0	1159.8	1159.8	1172.7	1164.1	1164.1	1181.4	1168.4	1168.4
Total estimated	4414.0	4397.8	4397.8	4446.7	4414.2	4414.2	4479.7	4430.6	4430.6

	2016			2017			2018		
Baseline	4381.5	4381.5	4381.5	4381.5	4381.5	4381.5	4381.5	4381.5	4381.5
Differences	32.5	16.3	16.3	65.2	32.7	32.7	98.2	49.1	49.1

Source: own calculations based on Tempo-Online data, NIS, 2017.

CONCLUSIONS

In the region South-Muntenia, there may be potential for the specialization of certain territorial entities in obtaining agricultural products, for which it has favourable natural and technical-economic conditions, necessary for an intensive agriculture practice. As a result of using the above-mentioned statistical model, three alternatives were obtained for the prospective level of total production, for each of the representative agricultural products.

Based on these indicative benchmarks, opportunity calculations can be made concerning the implementation of programs targeting the diversification of agri-food processing, as second pillar of the complex development of the communities from South-Muntenia region.

Starting from the premise that regional development, in general, and rural development, in particular, almost exclusively takes place through local initiatives, we consider that by the identification of development opportunities in the agri-food sector sphere, the main milestones of the complex development of the rural area from South-Muntenia region can be practically set.

The essential support in this period is more than ever represented by the objective intervention of decision-makers, both as regards the outline of strategic local development priorities, depending on the specific characteristics of each area, and mainly as regards the effective collaboration with the local authorities, in order to identify activities generating gross value added.

REFERENCES

Bucur, S., Bucur, C. (2016): “Rural area of the region South-Muntenia – evolutions and gaps of the socio-economic indicators. Case study: Arges, Dambovita and Prahova counties”, în volumul „Economie agrară și dezvoltare rurală. Realități și perspective pentru România”, noiembrie 2016, ISSN 2285–6404, ISSN-L 2247–7187, Editura ASE, pag. 263-271 (English version in tome: “Agrarian economy and rural development. Realities and perspectives for Romania”);

Bucur, S., Bucur, EC (2015): „Performanța sectorului agroalimentar – evoluții și disparități teritoriale în perioada post-aderare la nivelul regiunii Sud-Muntenia”, capitol din volumul: „Perspectivele agriculturii și dezvoltării rurale prin prisma noii politici agricole comune 2014-2020”, Ed.Academiei Române;

*** (1990-2017): Tempo-Online database, NIS;

ANALYSIS OF THE IMPACT OF THE USE OR NON-USE OF NEONICOTINOIDS IN AGRICULTURE

PETRE IONUȚ LAURENȚIU¹

Summary: *Neonicotinoids are a class of chemical insecticides derived from nicotine. Like nicotine, neonicotinoids act on certain types of receptors in nerve synapses. They are much more toxic to invertebrates, such as insects, than to mammals and birds. The popularity of neonicotinoids for pest control is their water solubility, which allows them to be applied to the soil and taken over by the plants. The present paper will present, analyse and evaluate the impact of the use of these insecticides in the agriculture of Romania. In the first phase of the study, we will present the overall situation of the main cultures for which these neonicotinoids are used, by qualitative and quantitative analysis of data from local, national, European and international databases. In the second phase the effect and effort of the use or non-use of these insecticides in agriculture will be estimated. Thus, the difference in production will be determined in an untreated and treated one, and we will see the value of the neonicotinoids in production, on the other hand, the less positive effects of the use of these types of insecticides, namely pollution, or what they call some "ecological disaster", but also its effect on apiculture and implicitly on bees. This study will be pertinent and objective, without favoring or disfavoring any person or institution in these two areas.*

Key words: neonicotinoids, effect, effort, agriculture, apiculture.

JEL classification: Q15, Q52, Q57

INTRODUCTION

Neonicotinoids belong to the category of systemic pesticides, more precisely, the active substance in the insecticide is captured by the plant through the juice in the body of the pests by ingestion, and therefore each part of the plant is poisonous to the pests.

Neonicotinoids are a set of pesticides launched on the market in the 1990s as substitutes for older and more harmful pesticides. This name comes from the way it acts on insects that have ingested these products.

The European Union prohibits the use of these products for seed treatment, but also for spraying plants in vegetation. However, products containing neonicotinoids may be used in the spraying of fruit trees during vegetative rest.

In our country there are certain derogations from the European Union that allow the use of certain substances containing neonicotinoids for seed treatment during the sowing of the crops.

Crops in Romania are infested by a bunch of dangerous pests that can destroy a particular crop in a very short time. The most common problem facing farmers (predominantly in the south of the country) is the "corn grove". Unfortunately, this pest is more prevalent in our country and less in neighboring countries, in the West not representing a problem. Those who adopt and support these categories of pesticides believe that their main asset is the way they act on pests, ie it acts directly on the target, blurring the attack of the pest (target), not affecting the other insects.

Lately, the emphasis has been placed on the effects of pesticides on crops and on animals and the environment. In the foreground, pesticides containing neonicotinoids, which are believed to lead to bee death.

Bee's death due to the use of neonicotinoids can be clearly proven as follows: seeds can be treated inappropriately from the point of view of the amount of pesticides and when the seeds are sown by rubbing the seeds with each other, packaging, the seed drill gear, the substance descends from the seeds, and then carried by the wind gets in direct contact with the bees, the honey plants or the hives.

A second way of contamination of bees would be when the active substance in cellulose juice reaches the floral organs, including nectar and pollen, but in very small quantities; but this method was not 100% scientifically proven.

¹ Research Assistant - Research Institute for Agriculture and Rural Development email: petre.ionut@iceadr.ro

The third type of contamination would be neonicotinoid treatment in the vegetation phase. It may be the most harmful for bees, although these pesticides are not approved for their use at the time of the inflorescence, some farmers do not consider treating the fruit trees when they are blooming.

Beyond the bees, one report² also states that these insecticides contribute negatively by disrupting the ability of the earthworms to soil and soil.

In this article we will highlight the situation of the surfaces treated with these pesticides, together with their degree of seizure in the total area, in order to create an overview of this situation. Bee families will also be analyzed. At the same time, the effects and efforts of the use or non-use of these insecticides, as well as the economic differences in the production and the negative effect of neonicotinoids will be analyzed.

MATERIALS AND METHODS

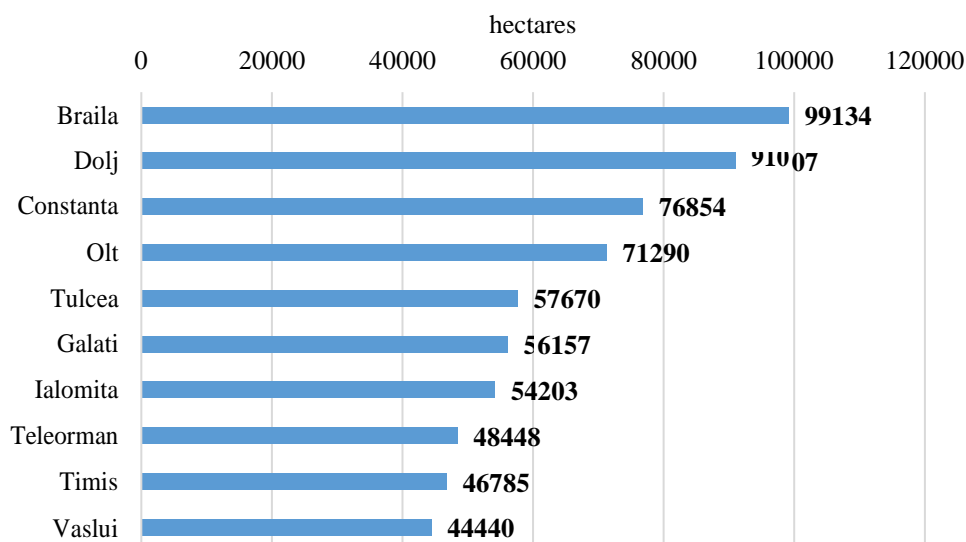
The first part of the paper will use data on total and county areas cultivated with sunflower. This culture has been established in that it is a major source of nectar for the beekeeping sector and at the same time a common culture among farmers, which is being treated with neonicotinoid. These data were taken over from the National Institute of Statistics; another reason why this culture was chosen was that its situation would be compared with the data taken from the National Phytosanitary Authority, the Office for the Control of the Marketing and Use of Plant Protection Products, which specifies the surfaces treated with neonicotinoids.

In the second part, the obtained data will be evaluated qualitatively and quantitatively, and an economic analysis will be carried out, of the main advantages and disadvantages of the use of these products.

RESULTS AND DISCUSSIONS

In Romania, in 2016, approximately 1.04 million hectares were sown with sunflower, accounting for 63.8% of the total area of oily plants. Analyzing the areas for each county, at the same time making their ranking from the point of view of the areas cultivated with the sunflower, we can state that no county exceeds the share of 10% of the total sunflower area (at national level). The following figure shows the first 10 counties depending on the area planted with sunflower in 2016:

Figure 1 Areas planted with sunflower in the first 10 counties in 2016



Source: insse.ro

² Worldwide Integrated Assessment of the Impact of Systemic Pesticides on Biodiversity and Ecosystems - Volume 22, Issue 1, January 2015 ISSN: 0944-1344

As can be seen from Figure 1, in 2016, the largest area of sunflower in a county was made in Braila, 99,13 thousand hectares, justifying being in the Great Island of Braila, which exploits a significant area of land. This county has a share of 9.53% of the country's total sunflower area.

On the second place, with 91 thousand hectares (8.75% of the surface of Romania with sunflower), Dolj county, followed by Constanta (with 7.39%), Olt (with 6, 86%), Tulcea (5.5%), Galati (by 5.4%), Ialomita (by 5.21%), Teleorman (by 4.66%), Timis (by 4.5%) and Vaslui tenth with a share in the total sunflower area of 4.27%. On the opposite side, the lowest share of a county is in Covasna, where 6 hectares were grown in 2016, or 0.001% of the total country.

Following the collection of data from the National Phytosanitary Authority, with the help of the Romanian Bees Growers Association, regarding the crops and surfaces treated with neonicotinoids, only those with sunflower were extracted, resulting in the following statistics:

Table 1 Situation of sowing areas with sunflower seed treated with ppp from the neonicotinoid group JUNE 2016

No. crt.	County	Crop	Surface treated (Ha)	The quantity of treated seeds (Kg)	Amount of seed treated per hectare (Kg / ha)
1	Arad	Sunflower	3583,36	17205	4,80
2	Arges	Sunflower	4287,01	23383	5,45
3	Bacau	Sunflower	457,21	2760	6,04
4	Botosani	Sunflower	315,14	1080	3,43
5	Braila	Sunflower	47744,00	119349	2,50
6	Calarasi	Sunflower	14251,57	49195	3,45
7	Buzau	Sunflower	8306,01	39882	4,80
8	Bihor	Sunflower	3439,7	16510	4,80
9	Cluj	Sunflower	374,01	4805	12,85
10	Dolj	Sunflower	3774,71	19127	5,07
11	Ialomita	Sunflower	16872,78	73004,64	4,33
12	Ilfov	Sunflower	2916,71	13721,41	4,70
13	Galati	Sunflower	10052,09	35926	3,57
14	Maramures	Sunflower	67,84	339	5,00
15	Mures	Sunflower	360,41	1441,8	4,00
16	Giurgiu	Sunflower	4602,57	16021	3,48
17	Neamt	Sunflower	1993	9706	4,87
18	Prahova	Sunflower	4286,68	19127	4,46
19	Vaslui	Sunflower	17126,67	84320	4,92
20	Iasi	Sunflower	1636,21	8316	5,08
21	Olt	Sunflower	12283,63	67484,04	5,49
22	Tulcea	Sunflower	3292	17443	5,30
23	Teleorman	Sunflower	4051,73	16020	3,95
24	Timis	Sunflower	8865,34	44046	4,97
25	Suceava	Sunflower	202	920	4,55
26	Satu Mare	Sunflower	3564,39	18107,10	5,08
TOTAL	-	Sunflower	178706,77	719238,99	4,88

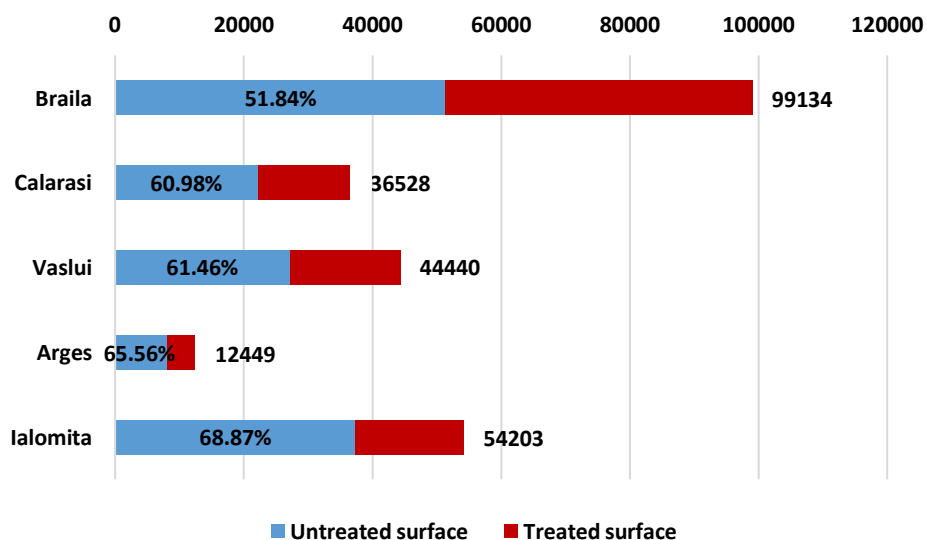
Source: Romanian Bees Growers Association

Table 1 summarizes the areas and quantities of hectares and sunflower seeds that were treated in 2016, so it can be seen that at national level, the area treated with neonicotinoids is 178 thousand hectares. This total area was sown with treated seeds with a total weight of 719.24 tons, which means a sowing rate of 4.88 kilograms of seed per hectare.

Among the counties that have the largest areas with sunflower treated, there are: Braila (47.7 thousand hectares), Vaslui (17.13 thousand hectares), Ialomita (16.87 thousand hectares), Călărași (14.25 thousand ha) and Olt (with 12.28 thousand ha); of these 5 counties, four are also found in the top ten counties that cultivate the sunflower at national level, of which Calarasi County is an

exception, having a total sunflower area of 36.5 thousand hectares, therefore the super-surface treated in this county is 39%.

Figure 2. The first 5 counties depending on the weight of the treated area

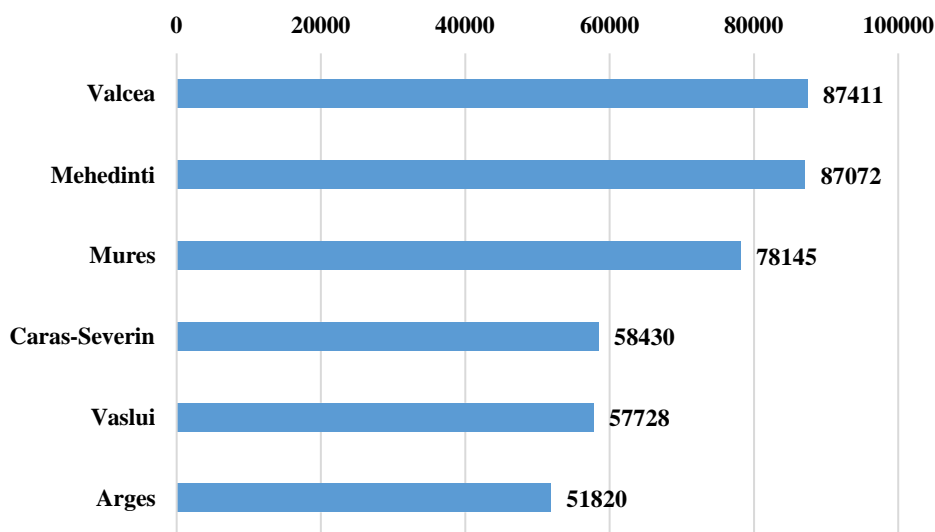


Source: own calculations

At national level, the treated sunflower area is present in a share of 17.19% of the total area. Figure 2 shows the first 5 surfaces where the treated surface is present at a high level. Therefore, out of the 99.134 thousand hectares of sunflower in Braila in 2016, 48.16% of them (48.16 thousand hectares) were treated. Calarasi County, although it does not have a total area with very large sunflowers (36.5 thousand ha), ranks second in terms of the share of the treated area in total, ie 39.02% (representing about 14.25 thousand ha.). With 38.54% (17.13 thousand hectares), the area treated with neonicotinoids, out of the total sunflower area, in the county, is ranked third in the county of Vaslui. The county of Argeş, with a share of the area planted with sunflower, in the national total of only 1.2% (12.5 thousand ha), holds a total area of sunflower treated with pesticides of 34.44% (respectively 4.3 thousand ha.). Fifth place, according to the weight of the treated area, is Ialomita County, which has such a surface area of 31.13% (16.8 thousand hectares).

As far as the bee population is concerned, according to data from the National Institute of Statistics, in 2016 there were almost 1.44 million bee families; referring to the total sunflower area, reporting these series of data, the number of bees families per each hectare of sunflower, namely 1.38 hives / ha of sunflower. Referring to the counties of Romania, in Figure 3, the first 6 counties were presented, depending on the number of bee families.

Figure 3. Effects of bee families in the first counties (2016)



Source: insse.ro

The top of the ranking, 87.4 thousand bee families rank Vâlcea county, representing 6.08% of the national bee population. On the second place, at a very small distance of only 340 bee families, lies Mehedinti County, which has a share in Romania's population of 6.06%. Mureş County occupies the third position in this ranking, with 78.15 thousand bee families, with a share of 5.44%. With 4.06% of Romania's total hives, Caraş-Severin County, is ranked fourth. The following two counties (Vaslui and Argeş) occupy the fifth and sixth places in this ranking, respectively with a percentage of 4.02% and 3.61% of the bee population, but these two counties occupy 3rd and 4th place in the top of the counties most of the treated areas.

The other three counties in the ranking of the weight of the treated surface (fig. 2), Brăila, Călăraşi, Ialomiţa are found in the last 10 counties according to the number of bee families, so we can assume that one reason would be the treatment of quite large areas these pesticides (neonicotinoids). For example, Braila County, which ranks first among the counties with the largest areas of sunflower, occupies the before last place among the counties with the most bee families, followed by Ilfov (which is reduced from the point of view of the physical dimension) and Covasna County where there are only 6 hectares of sunflower, so it is understandable why there are no bees there.

In order to better describe this situation, the information on the areas under sunflower, the treated ones, the weight of the latter and the number of bee families are summarized in Table 2:

Table 2 Centralization

County	Sunflower Surface (ha)	The sunflower surface treated (Ha)	Share (%)	Effective bee families (No)
Braila	99134	47744	48.16%	14142
Calarasi	36528	14252	39.02%	21934
Vaslui	44440	17127	38.54%	57728
Arges	12449	4287	34.44%	51820
Ialomita	54203	16873	31.13%	20224
National Level	1039823	178707	17.19%	1437394

Source: *insse.ro, aca.org.ro*

As mentioned above, at the national level, the proportion of sunflower treated areas with neonicotinoids in total sunflower areas was 17.19% in 2016, so we can say that the bee population is affected of these substances in the same percentage on average; so that of almost 1.44 million families will suffer 247 thousand.

If we refer to the counties, we can see that almost half of the sunflower fields in Braila were treated in 2016, which means that about 6810 bee families will be at risk. In the counties of Vaslui and Argeş, the situation is even worse, given the large share of the treated areas and the large number of bee families, thus reaching the risk of 22,25 thousand families in Vaslui and about 17, 85,000 families in Arges. Of all the counties in Table 2, in Ialomita the situation is not so difficult because the number of bee families is quite low, thus in this county about 6300 hives.

By referring to the economic aspects and effects, we can analyze, in terms of effect and effort, in order to determine the amount of loss or gain, depends on the situation, data referring to outputs, prices acquisition environments and differences in production.

Table 3 Value of losses in case of non-use of neonicotinoids

County	Sunflower production (t)	Share of treated areas in production (t)	Production due to the non-use of neonicotinoids	Loss / Difference (35%) (t)	Average purchase price (lei / kg)	Loss Value (thousand lei)
Braila	225249	108482	70514	37969	1.48	56194
Calarasi	97921	38204	24833	13372	1.61	21528
Vaslui	54159	20872	13567	7305	1.37	10008
Arges	17226	5932	3856	2076	1.61	3343
Ialomita	135316	42122	27380	14743	1.61	23736
National Level	2032340	349283	227034	122249	1.51	184596

Source: *own calculations based on data insse.ro*

In Romania, in the year 2016, 2 million tons of sunflower were harvested, of which 349 thousand tons were harvested from the areas under the treatment of pesticides (respecting the weight

of the surface treated). After a study³, on average, losses on sunflower production, in the case of non-use of neonicotinoids, are about 35 percent. Thus, in the present case, the loss at national level, expressed in physical units, was 122.25 thousand tons, this being considered at the national average purchase price of 1.51 lei per kilogram of sunflower, a loss of 184.5 million lei would have been recorded in the case of the abandonment of the use of insecticides.

As expected, if pesticides were to be abandoned, farmers in Braila would suffer the most, registering a loss of 56.2 million lei. On the opposite side, the lowest loss registered in Arges County, worth 3.3 million lei.

Table 4 Amount of earnings for non-use of neonicotinoids

County	Production of honey (t)	Possible production (t)	Difference (t)	Average purchase price (lei / kg)	Win value (thousand lei)
Braila	210	311	101	14.17	1433
Calarasi	322	448	126	12.49	1569
Vaslui	826	1144	318	14.33	4562
Arges	674	906	232	12.49	2899
Ialomita	296	388	92	12.49	1151
National Level	21202	24846	3644	15.11	55058

Source: own calculations based on data insse.ro

At the national level in 2016, 21.2 thousand tons of honey were extracted; by abstract, if the share of the surfaces would affect the bee mortality in the same way, and therefore a lower level of production, it would be assumed that there may be favorable proportions directly proportional. Thus, if the level of production would increase, the same percentage would have obtained in 2016, an amount of extracted honey of 24.85 thousand tons. Compared to the real situation, this would be higher by 3644 tons of honey, valued at the average purchase price of 15,11 lei per kilogram of grocer's last year, there would be a national gain of 55 million lei.

Referring to the counties, it can be seen, as expected and expected, that the first county according to the value of the extra gain is Vaslui, where the largest number of bee families are registered among these five counties in Table 4; this would have been 4.5 million lei. The lowest gain in the five counties analyzed was 1.15 million lei, resulting in Ialomita.

CONCLUSIONS

Comparing the two situations, namely the value of the losses (Table 3) and the value of the gains (Table 4), it can be noticed that the withdrawal of the pesticides from the sunflower production technology affects the sphere of the agricultural producers more strongly than the beekeepers, to production. Thus, in the present case, the value of losses is greater than that of earnings of about 3.35 times.

By comparing the five counties analyzed, significant differences can be observed in most areas, so in the county of Braila, where the largest area of sunflower is present, and among the fewest bee families (a reason may be the fact that this area is treated in a weighting of 48%), there were deviations between the value of the losses and 39 times the winnings in favor of the first category.

In Calarasi County, the difference between the value of the losses due to the non-use of pesticides and the gain obtained as a result of the increase in honey production was 13.7 times, in the county of Vaslui 2.2 times in the Ialomita County of 20 times. Thus, all the counties analyzed would record higher losses in the farmers 'sphere than beekeepers' profits; but in Argeş County these values are the closest and can be compared directly, so as a result of the dropout of toxic products, farmers' losses would amount to 3.34 million lei, instead the increases obtained by the bee breeders the increase in production would be 2.9 million lei, so a difference of only 15%.

³ <http://www.descopera.ro/stiinta/12950929-sa-fie-neonicotinoidele-cel-mai-mare-dezastru-ecologic-contemporan>

Concluding, taking into account only their productions and their values, it can be stated that the withdrawal of neonicotinoids from the technological sheet of the sunflower crop is not profitable; but if we consider the beehives lost, as a result of intoxication with these substances, together with the value of each family, we could say that the economic differences would not be so great. Taking into account the national share of the treated areas of 17.19% as a decrease in the number of bee families, it would result that 247 thousand families would be lost. Thus, adding this cost to the value of the gain, it would amount to 154 million lei, 16.6% lower than the losses of the agricultural holdings. All these can be added to the value of the gain, the outsourced expenses, representing the other negative effects of pesticides such as pollution (air, soil, water), the death of other creatures or their imbalances, and so on, thus pushing the balance into the other camp can talk about a profitability of the ban on neonicotinoids in agriculture.

BIBLIOGRAPHY

1. Chensheng Lu, Kenneth M. Warchol, Richard a. Callahan, „Sub-lethal exposure to neonicotinoids impaired honey bees winterization before proceeding to colony collapse disorder” *Bulletin of Insectology*, 125-130, 2014
2. Siceanu A, „Impactul tratamentelor fitosanitare cu insecticide neonicotinoide asupra albinelor http://www.icdapicultura.ro/content/media/pagini/Prezentare_impactul_neonicotinoidelor_asupra_albinelor.pdf
3. Tessa C. Van Dijk, Marja A. Van Staalduien, Jeroen P., Van der Slujs, (2013) „Macro-Invertebrate Decline in Surface Water Polluted with Imidacloprid” <https://doi.org/10.1371/journal.pone.0062374>
4. Worldwide Integrated Assessment of the Impact of Systemic Pesticides on Biodiversity and Ecosystems - Volume 22, Issue 1, January 2015 ISSN: 0944-1344
*** <http://www.descopera.ro/stiinta/12950929-sa-fie-neonicotinoidele-cel-mai-mare-dezastru-ecologic-contemporan>
5. *** <http://carafacumiere.ro/neonicotinoidele-pentru-fermieri-muma-pentru-apicultori-ciuma/>
6. *** <http://www.aca.org.ro>
7. *** www.insse.ro
- 8.

SOCIAL AND ECONOMIC DIMENSIONS OF LAND REFORM – A TERRITORIAL APPROACH

Marioara RUSU¹

Abstract: *Agricultural land represents one of the most valuable natural resources of a country, being both a significant form of national wealth, and an important source of economic and political power. The land reform has been a constant presence in the policy promoted by the governments leading Romania after the year 1990. By its amplitude and importance this represented a study issue treated and debated in many scientific works. Though, there is in Romania, a more reduced concern as regards the territorial dimensions linked to the land reform. The goal of the present paper is to bring a contribution in this field. The analysis was concentrated on the following main dimensions: the ownership structure of the agricultural land fund, the farms' structure and the land market's features. Within the context of the bigger and bigger importance given to de-centralization, the territorial approach could contribute efficiently to the supporting of the sustainable rural development.*

Key words: *land reform, land policies, Romania*

JEL Classification : *Q15, Q18*

INTRODUCTION

With a total area of 238,391 thousand km² and a population of 19.87 million inhabitants, Romania is considered an important country within the European Union (EU): the ninth place as the area and the seventh place as population. However, in terms of life standard, expressed in GDP at purchasing power parity (14674 in 2014), Romania ranks the last but one place in the 28 EU's Member States. Agriculture is an important branch of the national economy, both in terms of land resources (14.6 million hectares of agricultural land) and of the employed population in agriculture (2.5 million people). The contribution of agriculture to GDP was 4.7%. The ratio of the employed population in agriculture and the share of agriculture in GDP reveals a very low level of labour productivity. At the origin of this situation is the land reform started in the early 90s, through which the agrarian structures specific to the socialist period, based on large farms, changed. The land has been returned to former owners and the size of farms has been drastically reduced: Romania has the most atomized agricultural structure in the EU, with about 3.6 million farms (32.2% of the total EU's farms) and an average size of 3.45 ha (Eurostat, 2016). Most of these farms are considered to be subsistence and semi-subsistence farms: self-support in subsistence farms accounts for 90-92% of their production and for semi-subsistence farms is 50-52% (Otiman and Steriu, 2013). This situation shows to a great extent why most Romanian rural regions are among the poorest regions of the EU and why the out migration has been so manifest in recent years (Popescu, 2016).

MATERIAL AND METHOD

The objective of this paper is to analyse the main features of land reform and its socio-economic effects at county level. The paper mainly looks at the effects of land policies on agricultural land ownership structures, farms structure and the land market. The methodology used was based on the statistical analysis of primary data, using the Excel quantitative analysis program as a working tool. The analyse was based on statistical came from the following sources: a) statistical data / information provided by Ministry of Agriculture; b) statistical data / information provided by Eurostat; c) statistical data / information provided by the National Institute of Statistics.

RESULTS AND DISCUSSIONS

In the post-socialist period, land reform was a constant presence in the policy promoted by the governments that ruled Romania.

¹ Senior researcher, Institute of Agricultural Economics, Romanian Academy, Bucharest, rusu.marioara@gmail.com

1. Ownership structure of the agricultural land fund - territorial disparities

The main achievement of the land reform was represented by the change of ownership of agricultural land. At the end of 1989, out of the 14,759 million hectares of agricultural land in Romania, 60% were co-operative property, 28% state ownership and 12% private property. In 2014, the distribution of these lands was quite different: 94% private property and 6% public property (Lup, 2014; INS, 2016).

The situation registered at national level is also found at the territorial level within the 42 counties. The vast majority of counties have over 90% private agricultural land. The Sălaj, Hunedoara, Bacau, Teleorman, Vaslui, Dâmbovița and Suceava counties have private agricultural land above the national average (96%). The state property, which registered a drastic decrease in the post-socialist period, is present in over 10% in the counties of Brăila, Vâlcea, Tulcea, Caraș-Severin and Vrancea.

The ownership structure of private agricultural land is similar in the case of agricultural use categories. Large private property weights are found especially in arable, vineyards and orchard categories. Thus, in more than 29 counties private arable land has a share higher than the national average (95.83%). In six counties - Harghita, Gorj, Maramures, Vâlcea and Dâmbovița the share of private arable land is even higher than 99%. At the opposite pole there are three counties - Brăila, Caraș-Severin and Tulcea - with a share of less than 85% of private arable land. Above the national average (91.42%) there are 33 counties, within the vineyards category. Private orchards have weights above the national average (95.08%) in 28 counties. With lower national averages, pastures (86.42%) and meadows (84.93%) have a larger scale than other categories of use. Thus, the share of private owned pastures varies between 43.72% in Vrancea County and 98.87% in Vaslui County. The difference is even greater in the meadows category: 6.9% in Ilfov County and 100% in the Giurgiu and Teleorman counties.

2. Territorial disparities of the structure of agricultural farms

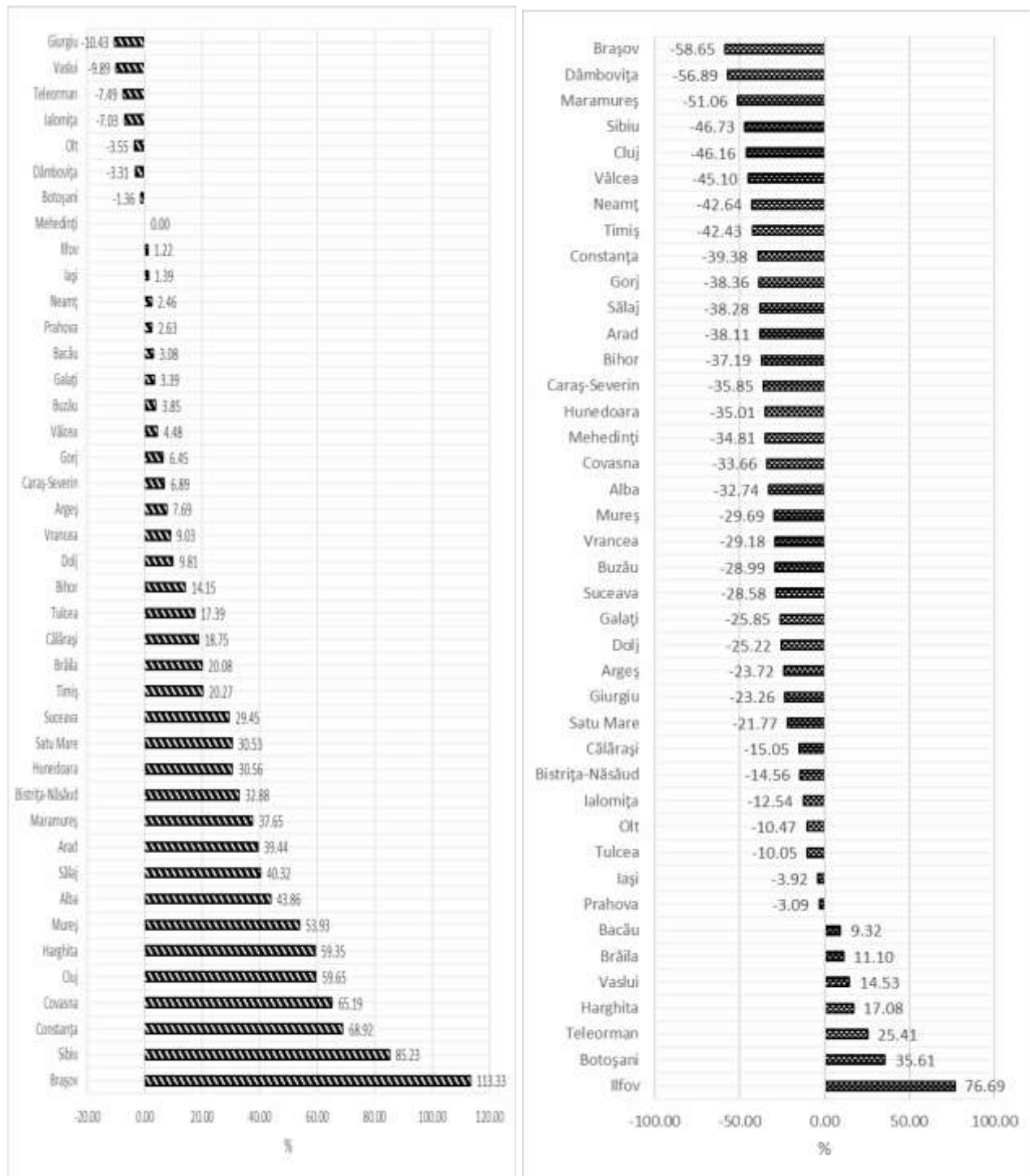
The description of agricultural holdings can be achieved by presenting some landmarks that capture the most important aspects at national level, as well as by capturing those characteristic details at a territorial level. The restructuring of agricultural farms and the process of restitution of agricultural land have been significantly linked processes. The agricultural pattern characteristic of the socialist economies, characterized by a high degree of land concentration, has undergone major changes as a result of the implementation of the land reform and led to the emergence of an agrarian structure with two poles: on the one hand, individual farms with very small size and on the other hand big farms, of hundreds and thousands of hectares. Beneath various forms of organization the situation persisted in the Romanian agriculture throughout the transition period.

At the territorial level, individual households predominate in mountain and hilly counties, largely preserving the socialist pattern. The counties with over 70% of the agricultural area worked by the individual households are: Maramures, Gorj, Suceava, Valcea, Bistrita-Nasaud, Mehedinti, Salaj, Dambovita and Cluj. On the opposite side there are counties with less than 40% of the agricultural area worked by the individual households (Calarasi, Ialomita, Tulcea, Teleorman, Braila, Constanta). Between 2002-2013, in the most counties there was a consolidation process of individual households, expressed by increasing the average area. Only seven counties registered negative trends: Giurgiu, Vaslui, Teleorman, Ialomita, Olt, Dambovita, and Botosani (Fig. 1).

Although there have been many critical positions, most of which have been perceived as "successors" of former CAPs, agricultural associations with legal personality have occupied an important place in Romanian agriculture. The average operated area of the hundreds of hectares has placed them in a favourable position for the application of modern technologies and the achievement of relatively high yields. Many of these associations have transformed over time into companies with legal personality. Agricultural farms with legal personality are particularly developed in the southern counties in the plain area. They operate over 60% of the total agricultural area in the following counties: Calarasi, Ilfov, Ialomita, Tulcea, Teleorman and Braila. Whether

during the first years of the post-socialist period there was a process of consolidation of these farms, the trend was negative in the period 2002-2013, with the exception of seven counties (Bacău, Brăila, Vaslui, Harghita, Teleorman, Botoșani and Ilfov) (fig.1).

Figure 1: Evolution of the average area of individual holdings (left) and of farms with legal status (right), in the period 2002-2013



Source: author's processing after NIS, Structural Survey in Agriculture 2002 and 2013

The analysis of the average area of the Romanian farms in the period 2002-2013 indicates their consolidation in most of the counties. Thus, over 50% of the average area increase was recorded in the counties of Brașov, Tulcea, Brăila, Harghita, Constanța and Ilfov. There are eight counties (Gorj, Vâlcea, Buzău, Mehedinți, Vaslui, Olt, Dâmbovița, Argeș) that recorded negative values: the average area decreased during this period of time. In 2013, the distribution of farms by

average size and by counties indicates that the smallest farms are located in the mountainous counties. The hilly counties have medium sized farms and the largest farms are located in the counties of the west, south-east and central part of the country in plain areas (fig.2).



Figure 2: Distribution of farms by average size and by counties, in 2013
 Source: author's processing after NIS, Structural Survey in Agriculture 2002 and 2013

3. Land market - specific particularities

After the 1989 Revolution, for a relatively long time, the land market, as the main means of consolidating farms, remained inoperative or operated on informal basis. If land leasing began to operate legally since 1994, the purchase and sale of agricultural land became operational only in 1998.

Since the beginning of the post-socialist period there have been land transactions, but those interested in these transactions have adopted a series of informal solutions, such as the conclusion of legal acts of donation accompanied by private sale-purchase acts (Popescu, 2001). During 1999-2003, the new landowners sold 340,699 thousand hectares of agricultural land, which accounted for 3% of the total agricultural land owned by individuals. About 4% of the new owners, go into land transactions during this period. Thus, in 2003, the land price was only 228 euro / ha (MARD, 2004).

Often, the slow start-up of the agricultural land sale and purchase market has been attributed to the lack of the legal framework for a rather long period, but also due to the delay in the issuance of property titles; relatively small incomes from agricultural activity that offered reduced capital opportunities to facilitate the purchase of land; the inflationary process that prompted some potential sellers to stay on hold; the small number of entrepreneurs willing to start an agricultural activity, etc.

After 2005, the market for the sale of agricultural land was more accelerated: supported first of all by the real estate boom and then by land acquisitions by foreign companies (Luca, 2014). The volume of transactions increased especially after Romania joined the EU (2007). Agricultural land sales prices have also increased. Territorial profile shows significant disparities in the average price per hectare of agricultural land.

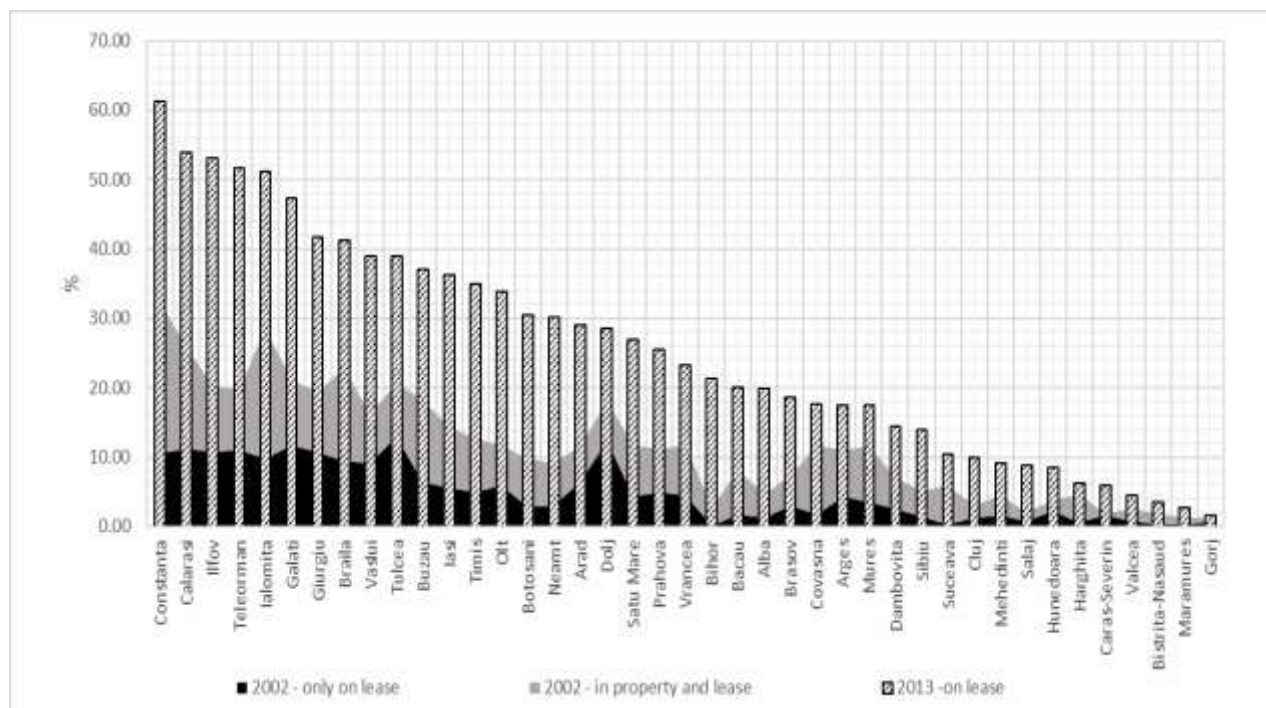
The highest prices (2600-3800 euro/ha) were registered in the following areas: Western Romania - in the counties of Timis, Arad and Bihor, counties recognized as having a significant agricultural potential and a developed agriculture; in the Center of the country the counties of Sibiu, Braşov, Covasna, Buzău and Prahova – these are counties with tourist potential and higher degree of urbanization; in the south, in the Romanian Plain - Giurgiu, Calarasi and Constanta counties. There are also two compact areas where the agricultural land is sold at lower prices (1500-1900

euro/ha): the south-west part - Mehedinți, Gorj, Vâlcea and Hunedoara counties; the central and eastern areas - the counties of Galați, Bacau, Harghita, Mureș, Bistrița-Năsăud and Sălaj.

The lease, an institution that was banned during the communist regime, became operational in the post-communist period, since 1994. The importance of this institution is widely recognised. The lease of agricultural land facilitates the development of larger commercial farms. It is also an alternative for owners who, for various reasons (age, urban residence, lack of financial funds, etc.), cannot work the agricultural land and do not want to sell it.

After Romania's accession to the EU, the lease market began gradually to become legally. Without legal contracts, the lessees cannot access European funds and cannot apply for bank credits. The statistical data shows that the lease registered slowly but surely a tendency of expansion compared to 2002 (fig. 3). In 2013, at the national level, the land under lease agreement accounted for about one third of the total agricultural area.

Figure 3: Evolution of agricultural land leased by county, in the period 2002-2013



Source: author's processing after the INS, General Agricultural Census 2002 and Structural Survey in Agriculture 2013

At the county level it can notice a consolidation of the lease especially in the south and east parts of Romania. Here are the counties where the largest leased agricultural area is located: Constanta 61,19%, Călărași 53,95%, Ilfov 53,07%, Teleorman 51,60%, Ialomița 51,13%, Galați 43,37 %, Giurgiu 41.72%, Brăila 41.26% (fig.3). There are also two compact regions where the leased agricultural areas are small: the first is located in the south-western part of Romania including the counties of Hunedoara, Sibiu, Caras-Severin, Gorj, Valcea and Mehedinți; the second one is located in the north-western part of the country and includes the following counties: Maramures, Suceava, Sălaj, Cluj, Bistrița-Năsăud. Specialists place the phenomenon of lease in the category of those that appeared and developed after 1990, following the implementation of the land reform (Prosterman și Rolfes, 1999; Rusu, 2002; Popescu, 2016).

CONCLUSIONS

Land reform, at various historical moments, impacts the overall economic and social development of a country, contributes to improving agricultural productivity and employment. Land reform was one of the most important dimensions of economic reform that was implemented in

Romania in the post-socialist period. The main outcome of the land reform was the change of agricultural land ownership. Thus, private land ownership has strengthened at both national and county levels. The restructuring of agricultural farms and the process of restitution of agricultural land have been significantly interrelated processes. The agrarian pattern specific to the socialist economy characterized by a high degree of concentration has undergone radical changes following the reforms that took place during the transition period: a polarized structure has been shaped, both at national and county level, with a large number of small sized farms coexisting alongside a small number of large sized farms exploiting large areas of agricultural land. At territorial level, individual households are predominant in mountain and pre-mountain counties, and farms with legal personality operate large land plots in plain counties. After the 1989, for a relatively long time, the land market, as the main means of consolidating farms, remained inoperative or operated on informal basis. However, since 2000, the land market has begun a consolidation process. This is not a unitary market; it is presented as a cumulative of small markets with distinct territorial characteristics.

BIBLIOGRAPHY

- FAO (Food and Agriculture Organization). (2004). *Agriculture and Rural Development in Romania*, FAO Project, TCP/ROM 0167 – unpublished.
- INS (Institutul National de Statistică). (2016). *Tempo Online Database*.
- Lipton, M., (2010). *Land Reform in Developing Countries: Property Rights and Property Wrongs*. London and New York: Routledge.
- Luca, L. (2014). *Piața funciară și securitatea alimentară în România* (402-412) în Otiman, P., I., Sima, E., Toderoiu, F., (coord.), *Dezvoltarea durabilă a economiei agroalimentare și a spațiului rural. Evaluări și direcții strategice*, Editura Academiei Române.
- Lup, A. (2014). *Agricultura socialistă a României, Mit și realitate*, Editura Ex Ponto, Constanța.
- MADR (Ministerul Agriculturii și Dezvoltării Rurale). (2004). *Strategia de dezvoltare durabilă a agriculturii*
- Popescu, M. (2016). *Agriculture Contribution to Economic Growth. A Prospective Study*, appearing in Editura Academiei Române.
- Popescu, M. (2001). *Lecții ale tranziției. Agricultura 1990-2000*, Editura Expert, București.
- Prosterman, R., Rolfes, L. (1999). *Review of the Legal Basis for Agricultural Land Markets in Lithuania, Poland, Romania* in Csaki, C., Lerman, Z., (eds), *Structural change in the farming sectors in Central and Eastern Europe*. http://www.eastagri.org/files/lithuaniaPOLANDromaniaRDI_099.pdf
- Rusu, M. (2002). *Land laws and related legal institutions to support development of land markets and farm restructuring in Romania* in Florian, V., Gavrilăscu, D., Giurcă, D., Rusali, M., (coord) *Restructuring and transition of agrifood sector and rural areas in Romania*, Editura Expert, București, p: 411-430.
- Steriu, V., Otiman, P., I., (coord.). (2013). *Cadrul național strategic pentru dezvoltare durabilă a sectorului agroalimentar și a spațiului rural în perioada 2014-2020-2030*, Editura Academiei Române, București.
- World Bank. (2003). *Land Policies for Growth and Poverty Reduction*. Washington, DC: The World Bank and Oxford: Oxford University Press.

THE IMPACT OF GRANTING SUPPORT SCHEMES ON THE FARM, IN THE PERIOD 2007-2015 USING DATA RICA

VLAD MIHAELA CRISTINA¹

Abstract: *This paper examines the impact of the subsidies, in the vegetable and animal sector, on farms, in 2007-2015. The impact can be monitor in terms of economic key indicators that provide insights into Romanian productive sector. Based on these data we can reveal evolutionary trends realistic and accurate, which can highlight the implications of the different support schemes applied in our country.*

Keywords: *subsidies, costs, revenues, holdings*

JEL Classification: H23, O38

INTRODUCTION

The introduction of the CAP in Romania caused a radical change of policy support and agricultural market in our country. Outside the gradual elimination of support schemes implemented by 2006, it also meant the functioning of the common market organization for most agricultural products and agricultural prices gradually adjust prices in the Single Market. Measures to support agricultural markets and producers' income include direct payments to farmers and subsidies arising from conditions common organization of the market, such as operation of intervention prices, the purchase of products from public funds to reduce surplus markets, export subsidies, import protection schemes,

The effects of adopting CAP measures are reflected directly on the allocation of resources (natural, human, material, financial) of agriculture, on farmers' income and the living standards of consumers. Any change in agricultural policies impact on prices of agricultural inputs prices and other monetary transfers are translated into changes in the value added of agricultural production and hence on farmers' income (1).

MATERIAL AND METHODS

For the 2007-2015 analysis were taken in to account the main data gathered by the Farm Accountancy Data Network (RICA). The Farm Accountancy Data Network is a statistical tool based on an annual survey, carried out according to the common methodology of the Member States of the European Union, on a micro sample of participating agricultural holdings in order to assess their incomes and their technical and economic activity. It was chosen to carry out their own calculations based on them, calculation of the economic indicators, in order to highlight the influences at the level of the agricultural holdings during this period. Agricultural holdings were grouped into six economic size classes, depending on the value of their standard output. Direct sectoral impact indicators analyzed: structure of agricultural production value, specific cost structure in crop production, structure of specific cost in animal production, net profit margin and income rate, current subsidies per hectare OR, structure of subsidies (2).

RESULTS AND DISCUSSIONS

The analysis regarding the percentage structure of the agricultural production, comprising both the vegetal and the animal sector, by economic size classes, in Romania during 2007 - 2015, shows the following (Table 1):

¹Researcher, PhD., Institute for Agricultural Economy and Rural Development, 61 Mărăști, District 1, Bucharest, email: cristina.vlad@iceadr.ro

✦ In the class with economic dimension 2 000- <8 000 euro: the share of the value of agricultural crop production ranged between 43,4 -51,3% (the average 47,3%) of the total, being lower by 0,8% in 2015, compared to the first year of the analyzed period; livestock production ranged between 48.7 - 55.1% (the average 52.7%), exceeding in 2015 0.8% the share in 2007.

✦ In the class with economic dimension 8000 - <25,000: the agricultural crop production represented 34.2 - 60.8% of the total (average 49.3%), being higher in the last year to be analyzed by 10.5% with that of 2007; agricultural livestock production held 39.2 -65.8% (50.7%), being 10.5% lower in 2015 compared to 2007.

✦ In the class with economic dimension 25 000 - <50 000 euro: from the total agricultural production, the agricultural crop production had a weight of 20.9 - 66.4% (average 55.9%), exceeding in year 2015 by 37, 9% on that at the beginning of the period; agricultural livestock production amounted to 33.6 -79.1% (average 44.1%), the share in the last year being 37.9% less than in 2007.

✦ In the economy class 50,000 - <100,000: the agricultural crop production represented 38,5 -81,4% (the average 72,2%) of the total, holding in 2015 a higher share by 35,9% comparative with that of the first year considered; livestock production oscillated between 18.6 - 61.5% (the average 27.8%) representing in the last year of the period 35.9% less.

✦ In the economy class 100 000 - <500 000 euro: the share of agricultural crop production in the total agricultural production oscillated between 58.5 - 90.5% (average 84.3%), exceeding in 2015 by 32% first year of analysis; the value of animal production was between 9.5 and 41.5% of the total, in the last year of the period being 32% lower than in 2007.

✦ In the economic size class \geq 500,000 euro: the agricultural crop production represented 41.2 - 80.7% (average 61.6%) of the total agricultural production, and in 2015 it was by 38.1% higher compared with that achieved in the first year of analysis; the share of livestock production oscillated between 19.3 - 58.8% (the average 38.4%), being 38.1% lower in the last year compared to 2007.

As a general remark, we can see that starting with the 2000- 8000 euro economic class, up to the 100 000 - <500 000 Euros, the value of the crop production has been increasing constantly (while decreasing the share of livestock farming).

In the economic size class \geq 500,000 Euro, there is a decrease in the share of agricultural crop production (accompanied by an increase in the share of livestock production), to some extent to the values registered in the class 25 000 - <50 000 Euro.

Table 1 The composition of agricultural production (vegetable / animal) on the economic size classes (%)

Economic size class	2000 < 8000 EUR		8000 - < 25000 EUR		25 000 - < 50000 EUR		50 000 - < 100000 EUR		100 000 - < 500 000 EUR		\geq 500000 EUR	
	VCP *	VLP **	VCP	VLP	VCP	VLP	VCP	VLP	VCP	VLP	VCP	VLP
2007	46.6	53.4	34.2	65.8	20.9	79.1	38.5	61.5	58.5	41.5	41.2	58.8
2008	51.3	48.7	60.8	39.2	55.5	44.5	81.4	18.6	80.5	19.5	55.2	44.8
2009	46.6	53.4	52.4	47.6	62.8	37.2	77.9	22.1	87.5	12.5	42.2	57.8
2010	44.9	55.1	52.3	47.7	63.1	36.9	77.0	23.0	86.5	13.5	51.2	48.8
2011	43.4	56.6	50.1	49.9	66.4	33.6	80.2	19.8	87.1	12.9	59.6	40.4
2012	50.5	49.5	50.4	49.6	56.8	43.2	73.5	26.5	88.2	11.8	70.1	29.9
2013	49.6	50.4	50.6	49.4	60.0	40.0	73.6	26.4	89.7	10.3	75.1	24.9
2014	47.5	52.5	48.1	51.9	59.3	40.7	73.5	26.5	90.3	9.7	80.7	19.3
2015	45.8	54.2	44.7	55.3	58.8	41.2	74.4	25.6	90.5	9.5	79.3	20.7

* Value of crop production, ** Value of livestock production

Source: own calculations based on data RICA (3)

Analysis of the structure of the specific cost to the production plant (seeds and seedlings, fertilizer, crop protection products, other specific costs of culture), the classes of economic size, expressed as a percentage (Table 2) show the following:

Economic size class 2000- <8000 euros: seeds and seedlings were 30.78 -40.31% (average 34.66%) of the total specific costs, accounting for 2015 of 6.87% less than share in the first year; fertilizers held between 27.38 to 38.15% (average 33.72%) of the total cost, exceeding last year with 10.77% share for 2007; the weight of the plant protection product ranged from 17.38% -26.13% of the specific, being 2015 3.34% higher than that of the first year; other specific cost category was represented at a rate of 7.69 -14.92% of total specific cost, which is lower by 7.23% last year compared to 2007.

Economic size class 8000 - <25 000 euros: the total specific cost seeds and seedlings were 32.73 - 45.36% (average 36.55%) of the total, ranging in 2015 with 10.12% under the share in the first year; Fertilizer category was represented in proportion 26,25 - 26 52% of the specific, exceeding last year with 10.27% figure in 2007; plant protection products held between 17.12 -23.27% 2015 having a higher percentage of 4.49% compared to that of the first year; other costs specific category held 6.63 -11.46% (average 10.26%), accounting last year for a smaller proportion of 4.64% of the total compared with 2007.

The economic size class between 25000 -50000 EUR: seeds and seedlings were 33.71 to 44.13% (mean 36.57%) of the total, and the weight 2015 was reduced from that of the first year 3.94%; fertilizers noted at a ratio of 28.65 to -38.28% (average 35.56%) of the total cost and in the last year of this analysis exceeded that of the 9.63% on 2007; plant protection products' share of 18.66 -21.35% (average 20.12%) of the total percentage of 2015 is very appropriate to that achieved in the first year of the period; other specific cost category was represented in proportion of 4.77 - 10.55% (average 7.75%) of the total holding period last year with 5.78% less than the share in 2007.

Economic size class 50 000 - <100 000: seeds and seedlings held between 31.47 - 40.39% (average 35.31%) of total specific cost, exceeding 2015 2.21% the proportion occupied first year; category fertilizers was 28.08 -39.71% (average 37%) of the total, registering a plus of 2.08% last year compared to 2007; plant protection products had a share of 14.78% -22.57% (average 20.10%) of the total cost, recorded in 2015, 7.79% more than in the first year; other specific costs have ranged from 4.04 -16.13% (average 7.59%) in total, last year lower as a share of 12.09% compared to 2007.

The economic size class 100 000 - <500 000: seeds and seedlings was recorded a weight of 32.54 to 36.25% (mean 33.81%) of the total, is reduced to 2015 to 1, 61% compared with the first year; fertilizers held 30.16 -42.36% (average 38.06%) of the total last year exceeding by 12.2% the proportion for 2007; the weight of the plant protection product was 18.36 -23.09% (mean 21.29%) of the total, more than 2015 of 4.18% over that achieved in the first year of the period; other costs specific category held 2.34% -17.11% (average 6.84%) of the total cost share in the last year of the period decreased by 14.77% compared with that in 2007.

Economic size class > = 500 000: seeds and seedlings held from 25.71 to 32.29% (average 29.04%) of the total, the proportion is higher by 1.81% in 2015 compared to the first year to be tested; fertilizers were 28.96 to 44.16% (mean 38.21%) of the total cost in the last year the weight of the upper 10.73% compared to that of 2017; plant protection products as a proportion varied between 19,02- 27.53% (mean 22.97%) of the total exceeding 8.51% in weight of 2015 made in the first year of the period; other costs specific category of registered shares of 2.60 -23.64% (average 9.78%) of the total cost, the latter being the last year of the period lower by 21.04% compared with that for 2007.

Table 2 Structure of crop production cost of the specific classes of economic size (%)

Specific crop Costs	Seeds and plants	Fertilizers	Crop protection	Other specific crop Costs	Seeds and plants	Fertilizers	Crop protection	Other specific crop Costs
Year	Economic size class 2000 <8 000 EUR				Economic size class 8000 - <25 000 EUR			
2007	40.31%	27.38%	17.38%	14.92%	45.36%	26.25%	17.12%	11.27%
2008	39.00%	32.25%	17.54%	11.20%	39.32%	31.78%	19.14%	9.75%
2009	36.17%	33.06%	19.97%	10.80%	37.69%	33.76%	17.97%	10.59%
2010	34.92%	34.52%	18.69%	11.87%	36.20%	33.58%	18.77%	11.46%
2011	32.96%	36.07%	17.82%	13.15%	35.03%	34.94%	19.35%	10.68%
2012	33.50%	33.99%	21.12%	11.39%	34.04%	34.88%	20.28%	10.80%
2013	30.78%	33.78%	26.13%	9.31%	32.73%	34.20%	23.27%	9.80%
2014	30.89%	34.25%	22.63%	12.23%	33.33%	35.72%	19.60%	11.35%
2015	33.44%	38.15%	20.72%	7.69%	35.24%	36.52%	21.61%	6.63%
Year	Economic size class 25 000 - <50 000 EUR				Economic size class 50 000 - <100 000 EUR			
2007	39.54%	28.65%	21.26%	10.55%	31.47%	37.63%	14.78%	16.13%
2008	44.13%	30.67%	18.66%	6.54%	40.39%	28.08%	21.89%	9.65%
2009	36.84%	36.66%	19.84%	6.66%	37.08%	35.93%	20.04%	6.96%
2010	34.93%	38.05%	18.70%	8.31%	35.48%	37.71%	20.07%	6.74%
2011	34.18%	37.76%	20.00%	8.06%	33.95%	39.47%	20.10%	6.47%
2012	36.22%	36.58%	19.20%	7.99%	37.25%	38.05%	18.85%	5.86%
2013	34.00%	36.14%	21.10%	8.77%	34.69%	38.33%	20.76%	6.21%
2014	33.71%	37.28%	20.95%	8.07%	33.79%	38.09%	21.84%	6.28%
2015	35.60%	38.28%	21.35%	4.77%	33.68%	39.71%	22.57%	4.04%
Year	Economic size class 100 000 - <500 000 EUR				Economic size class >= 500 000 EUR			
2007	34.37%	30.16%	18.36%	17.11%	28.37%	28.96%	19.02%	23.64%
2008	33.22%	36.26%	20.57%	9.95%	30.84%	35.99%	21.17%	12.00%
2009	36.25%	36.91%	19.19%	7.65%	27.16%	38.80%	23.50%	10.54%
2010	33.95%	38.44%	21.95%	5.66%	25.71%	34.79%	21.18%	18.33%
2011	32.95%	40.20%	21.84%	5.02%	28.72%	39.52%	23.83%	7.93%
2012	34.65%	39.72%	21.23%	4.40%	32.29%	41.02%	21.73%	4.95%
2013	32.54%	39.67%	23.09%	4.70%	29.30%	44.16%	23.45%	3.09%
2014	33.57%	38.84%	22.81%	4.78%	28.76%	40.97%	25.30%	4.97%
2015	32.76%	42.36%	22.54%	2.34%	30.18%	39.69%	27.53%	2.60%

Source: own calculations based on data RICA

Analysis on the structure of the agricultural production cost of the specific animal (feed herbivores and granivorous, other specific livestock costs) economic size class in Romania, during 2007-2015, Table 3, revealed the following:

➤ Economic size class 2000 - <8000 euros: Feed for grazing livestock were 43.8 to 77.2% (mean 65.2%) of the specific cost of the total weight of 2015 is 26.6% higher than that for the first year; feed for pigs and poultry held from 13.5 to 25.8% (average 18.5%) of the total, and last year the proportion was lower by 8.8% compared to 2007; category other specific costs weighed oscillating between 9.2 to 30.5% (average 16.3%) of the total, in 2015 it was lower by 17.9% compared to the first year.

➤ Economic size class 8000 - <25 000 euros: Feed for grazing livestock held a weight of 15.6 to 85.3% (average 71.6%) of the total cost, the last year of this period exceeded 66% that of

2007; feed for pigs and poultry, they represented a weight of 7.9 to 32.1% (mean 13.5%) of the total, reduced by 22.2% compared to the 2015 at the beginning of the period; category other specific costs represented 6.6 to 52.3% (average 14.9%) of the total holding period last year of a lower rate of 43.7% compared to the corresponding 2007.

↗ Economic size class 25 000 - <50 000: the share of feed for herbivores in the total specific cost varied between 8.7 to 87.4% (mean 71.4%), exceeding 2015 to almost 74% in the 2007; feed for pigs and poultry, held between 6.3 to 65.7% (average 16.8%) of the total with a lower rate of 56.6% last year compared to 2007; specific weight category of costs represented oscillations between 5.2 to 25.6% (mean 11.8%) of the total cost being reduced by 17.2% in 2015 to that of the first year of the review.

↗ Economic size class 50 000 - <100 000: Feed for grazing livestock were from 9.1 to 89.1% (average 74.2%) of the total cost, and in the last year of the period exceeded 79.5% the proportion taken in 2007; feed for pigs and poultry have ranged from 3.6 to 60.9% (mean 74.2%) of the total, reduced by 56.7% in 2015 compared to the first year of the period; category other specific costs held a proportion of 4.4 to 29.9% (average 12.7%) of the total, the latter being lower than last year considered over 2007 by 22.7%.

↗ Economic size class 100 000 - <500 000 euro: Feed for grazing livestock, represented a share of 13.7 to 83.2% (average 52.6%) of the total, in 2015 it exceeded 63.7% on the corresponding 2007; feed for pigs and poultry were 9.1 to 89.1% (average 28.6%) of the total cost, the proportion is lower by 23% in 2007; category other specific costs showed a variation between 4.8 to 48.2% (average 18.8%) of the total proportion of participation was lower by 40.7% in 2015 compared to 2007.

↗ Economic size class > = 500 000: Feed for grazing livestock share of the total cost was 4.4 to 12.9% (average 8.2%), exceeding by 1.8% last year in the corresponding period of 2007; feed for pigs and poultry held between 56.6 to 84.7% (average 72.4%), the proportion in 2015 is higher by 11.2% compared to the first year of analysis; other specific cost category was represented between 5.9 to 38.7% (average 19.4%) of the total weight is lower in the last year of the period by 13% compared to 2007.

Table 3 Composition of the production cost of specific size classes of economic animals (%)

Specific livestock Costs	Feed for grazing livestock	Feed for pigs & poultry	Other specific livestock Costs	Feed for grazing livestock	Feed for pigs & poultry	Other specific livestock Costs
Year	Economic size class 2000 <8 000 EUR			Economic size class 8000 - <25 000 EUR		
2007	43.8%	25.8%	30.5%	15.6%	32.1%	52.3%
2008	59.2%	25.8%	15.0%	74.8%	15.3%	9.9%
2009	61.7%	21.0%	17.3%	75.1%	12.2%	12.6%
2010	67.0%	14.3%	18.7%	75.3%	10.6%	14.1%
2011	65.7%	13.6%	20.6%	75.0%	9.8%	15.2%
2012	69.5%	19.4%	11.1%	80.0%	12.4%	7.6%
2013	72.8%	15.9%	11.3%	81.8%	11.7%	6.6%
2014	77.2%	13.5%	9.2%	85.3%	7.9%	6.8%
2015	70.4%	17.0%	12.6%	81.6%	9.9%	8.6%
Year	Economic size class 25 000 - <50 000 EUR			Economic size class 50 000 - <100 000 EUR		
2007	8.7%	65.7%	25.6%	9.1%	60.9%	29.9%
2008	54.1%	29.4%	16.5%	81.6%	3.6%	14.8%
2009	78.7%	7.9%	13.4%	78.8%	6.3%	14.8%
2010	81.8%	6.4%	11.9%	71.7%	10.5%	17.8%
2011	80.5%	6.3%	13.2%	78.0%	8.5%	13.5%

Specific livestock Costs	Feed for grazing livestock	Feed for pigs & poultry	Other specific livestock Costs	Feed for grazing livestock	Feed for pigs & poultry	Other specific livestock Costs
2012	82.9%	11.4%	5.8%	87.3%	7.0%	5.7%
2013	87.4%	7.5%	5.2%	89.1%	6.5%	4.4%
2014	86.3%	7.4%	6.3%	83.3%	10.9%	5.9%
2015	82.4%	9.1%	8.4%	88.6%	4.2%	7.2%
Year	Economic size class 100 000 - <500 000 EUR			Economic size class > = 500 000 EUR		
2007	13.7%	38.1%	48.2%	9.4%	70.4%	20.2%
2008	22.1%	56.6%	21.3%	5.3%	68.8%	25.8%
2009	48.1%	26.2%	25.7%	4.8%	56.6%	38.7%
2010	48.3%	27.7%	24.0%	4.4%	61.9%	33.8%
2011	43.2%	31.2%	25.6%	6.7%	64.8%	28.5%
2012	63.6%	29.4%	7.0%	9.4%	84.7%	5.9%
2013	73.5%	21.7%	4.8%	12.9%	81.0%	6.1%
2014	83.2%	11.4%	5.4%	9.3%	82.0%	8.6%
2015	77.4%	15.1%	7.5%	11.2%	81.6%	7.2%

Source: own calculations based on data RICA

Summary analysis economic indicators relating to the net profit margin (net income related to the value of agricultural production) rate and income (net income reported at cost) the economic size classes in Romanian agriculture during 2007-2015 revealed the following (table 4):

↗ Economic size class 2000 - <8000 EUR: net profit margin has variations in the 31.5 to 45.7% (mean 39%), being reduced by 3.9% in 2015 to the first year; income without subsidy rate ranged from 29.7 to 49.1% (average 41%), surpassing last year by 6.2% over the analysis for 2007; income subsidy rate ranged from 43.5 to 68.1 with% (average 55.7%), making 23% less than in the first year of the period.

↗ Economic size class 8000 - <25 000 EUR: net profit margin ranged from 12.4 to 57.1% (average 44.9%) was higher in the last year of the period by 28.2% compared with 2007; rate income without subsidies introduced limits between 4.5 to 70.2% (average 53.7%), and in 2015 exceeded 43.3% in the first year; income rate subsidies had variations between 12.1 to 93.1% (average 72.3%) is higher than 50% last year compared to 2007 found.

↗ Economic size class 25 000 - <50 000 EUR: the net profit margin were noted between the range 19.4 to 55.4% (mean 45.2%), exceeding 2015 to 21.7% in the first year one; income without subsidy rate ranged from 1.2 to 63.9% (average 45.2%), being the last year of the period increased by 43.9% compared to 2007; income rate subsidies had variations between 19.9 to 91.7% (average 68.2%) for 2015 to exceed 40.4% in the first year.

↗ Economic size class 50 000 - <100 000 EUR: net profit margin ranged from 11.5 to 58.1% (average 42.9%) is higher in the last year period by 24.6% compared to the corresponding 2007; rate income without subsidies introduced limits between 11.3 to 55.3% (average 31.1%), reaching in 2015 19.3% higher than in the first year; income subsidy rate ranged from 10.3 to 85.2 with% (average 59.2%), exceeding last year by 37.5% on the analyzed 2007.

↗ Economic size class 100 000 - <500 000 EUR: net profit margin ranged from 19.4 to 60.3% (average 42.1%), being 14% higher in 2015 than in the first year; income without subsidy rate recorded oscillations -6.6 to 23.4% (average 12.6%), exceeding the year analyzed by 9.2% over that of 2007; income subsidy rate ranged from 22.6 to 43.8 with% (average 34.6), exceeding 2015 by 6.4% compared to the first year;

↗ Economic size class > = 500 000 EUR: net profit margin ranged between 10.1 - 63.8% (average 33.2%), being the year 2015, 13.3% higher than in the first year; income without subsidy rate recorded variations between 14.5% -124.3% (average 28%), exceeding last year by 21.6% on

the period for 2007; subsidies income rate was between 8.7% -143.7% (average 48.2%) is 21.6% higher in 2015 that achieved in the early period.

Table 4 Net profit margin rate income rate income without subsidies, economic size class (%)

Economic size class	2000 - <8 000 EUR			8000 - <25 000 EUR			25 000 - <50 000 EUR		
Year	Net profit margin	Income rate	Rate of income without subsidies	Net profit margin	Income rate	Rate of income without subsidies	Net profit margin	Income rate	Rate of income without subsidies
2007	35.4	45.8	29.7	40.6	45.8	-4.5	19.4	19.9	1.2
2008	39.9	55.8	40.1	51.2	55.8	53.6	47.9	73.2	50.6
2009	37.9	53.2	38.7	54.1	53.2	56.2	42.8	59.5	36.6
2010	37.0	52.2	39.6	52.6	52.2	57.0	43.7	60.9	38.0
2011	39.6	57.6	44.1	51.6	57.6	66.0	49.6	76.6	52.7
2012	43.1	63.4	45.4	48.4	63.4	65.3	55.4	91.7	63.9
2013	45.7	68.1	47.1	47.3	68.1	70.2	55.1	89.4	60.5
2014	41.3	62.2	49.1	45.8	62.2	67.7	51.7	82.6	58.2
2015	31.5	43.5	35.8	12.4	43.5	52.3	41.1	60.3	45.1
Economic size class	50 000 - <100 000 EUR			100 000 - <500 000 EUR			>= 500 000 EUR		
2007	11.5	10.3	-11.3	21.1	22.6	-6.6	15.1	13.4	-11.7
2008	31.6	34.7	10.8	19.4	20.2	-5.4	63.8	143.7	124.3
2009	58.1	72.3	22.5	28.1	27.3	1.8	10.1	8.7	-14.5
2010	43.3	57.2	30.9	47.9	38.9	17.9	29.7	37.1	23.9
2011	47.3	67.2	40.7	54.4	41.5	23.1	38.2	50.9	32.4
2012	52.6	78.8	48.5	56.3	43.8	21.1	42.3	55.9	30.6
2013	54.3	85.2	55.3	60.3	45.6	23.4	37.3	47.1	24.6
2014	51.7	79.2	51.6	56.0	42.6	22.4	34.1	42.0	21.1
2015	36.1	47.8	30.6	35.1	29.0	15.8	28.4	35.0	21.6

Source: own calculations based on data RICA

Agricultural holdings that received the least current subsidies (without the investment), on the total period considered, are those of small economic size, respectively 2000-8000 euro, pocketing less than 1500 euro / ha UAA. 25000-50000 EUR Holdings group and more than 500,000 Euro received the highest subsidy, 1832 and 1896 respectively EUR / ha OR (Table 5).

Regarding the structure of subsidies, their share in total grants, can be seen in Table 6 that:

- share of total subsidies is decoupled payments in the majority in all economic size classes, reaching even 83% in 2000-8000 euro class;
- Animal weights exceeding the rate grant grants for culture;
- the share of subsidies is intermediate consumption, average total time of 17% for holding the economic size of up to 50000 Euros, while holding the economic size of over 50,000 Euros is the average total time of 57%.
- Subsidies for crops have the lowest share in total subsidies, reaching in 2014 the highest share of 18%.

Table 5 Current Grants (without the investment) per hectare or economic size classes in Romania, 2007-2015

Euro / ha OR

Year	Economic size class 2000 - <8 000 EUR	Economic size class 8000 - <25 000 EUR	Economic size class 25 000 - <50 000 EUR	Economic size class 50 000 - <100 000 EUR	Economic size class 100 000 - <500 000 EUR	Economic size class >= 500 000 EUR
2007	193.2	388.1	496.9	278.1	236.6	274.4
2008	160.3	165.6	188.9	154.8	159.1	276.5
2009	144.8	150.9	141.2	231.1	135.5	303.9
2010	144.2	168.5	158.9	144.4	141.6	161.4
2011	163.8	183.3	164.7	152.2	152.3	188.4
2012	186.3	214	202.2	182.2	174.7	211.4
2013	230.6	223.1	202.8	183.2	176.1	189.2
2014	142.8	171.8	167.4	165	156.6	172.6
2015	86.2	107.8	109.1	110	102.2	118.1

Source: own calculations based on data RICA

Table 6 Structure economic size classes subsidies in Romania, in the period 2007-2015 (%)

Year	Economic size class (1) 2 000 - <8000 EURO						
	Total subsidies without investment	Total subsidies for crops	Total subsidies for animals	Total subsidies to rural development	Grants for intermediate consumption	decoupled payments	other subsidies
2007	100%	1.9%	51.5%	0.0%	6.1%	25.3%	15.3%
2008	100%	1.2%	17.6%	1.5%	4.7%	38.0%	36.9%
2009	100%	0.2%	12.8%	1.5%	1.1%	48.0%	36.5%
2010	100%	0.0%	6.8%	5.3%	0.2%	54.6%	33.2%
2011	100%	0.1%	4.5%	12.5%	0.1%	60.8%	22.0%
2012	100%	0.1%	1.2%	17.7%	0.3%	63.0%	17.7%
2013	100%	0.0%	0.4%	30.9%	0.0%	59.3%	9.5%
2014	100%	0.2%	10.5%	4.3%	0.0%	83.6%	1.4%
2015	100%	0.3%	10.8%	0.7%	0.0%	82.6%	5.6%
Economic size class (2) 8000 - <25 000 EURO							
2007	100%	0.3%	24.1%	0.6%	0.3%	72.0%	2.8%
2008	100%	0.1%	16.3%	3.9%	0.2%	77.7%	1.7%
2009	100%	0.0%	6.6%	19.5%	0.1%	61.9%	11.8%
2010	100%	1.2%	8.2%	13.4%	0.6%	55.6%	21.0%
2011	100%	0.0%	16.9%	7.8%	0.7%	54.7%	19.8%
2012	100%	0.1%	17.0%	6.2%	0.6%	47.4%	28.6%
2013	100%	0.5%	16.0%	1.4%	1.2%	46.6%	34.3%
2014	100%	2.3%	21.0%	0.9%	5.6%	36.4%	33.7%
2015	100%	1.4%	74.0%	0.0%	6.3%	12.6%	5.8%
Economic size class (3) 25 000 - <50 000							
2007	100%	0.0%	19.5%	2.3%	2.6%	72.8%	2.8%
2008	100%	0.2%	12.1%	2.0%	1.8%	81.6%	2.3%
2009	100%	0.1%	10.9%	8.6%	0.5%	68.6%	11.3%

2010	100%	0.3%	13.6%	7.4%	1.3%	59.1%	18.2%
2011	100%	0.1%	13.5%	4.7%	1.7%	61.1%	18.8%
2012	100%	0.1%	15.4%	3.1%	2.6%	50.5%	28.3%
2013	100%	0.2%	11.0%	0.4%	3.3%	52.2%	32.9%
2014	100%	0.8%	26.2%	1.3%	6.9%	32.2%	32.7%
2015	100%	0.3%	76.6%	0.0%	4.8%	9.9%	8.4%
Economic size class 50 000 - <100 000 EURO							
2007	100%	0.0%	15.4%	2.4%	6.5%	71.6%	4.0%
2008	100%	0.6%	6.5%	4.4%	2.8%	83.3%	2.4%
2009	100%	0.0%	7.0%	4.1%	1.1%	76.0%	11.8%
2010	100%	0.0%	7.9%	4.3%	2.0%	65.7%	20.0%
2011	100%	0.1%	4.9%	4.1%	3.3%	66.1%	21.6%
2012	100%	0.3%	6.4%	2.3%	2.0%	55.6%	33.4%
2013	100%	0.3%	2.9%	0.9%	1.9%	75.7%	18.3%
2014	100%	1.7%	8.7%	0.3%	9.9%	39.3%	40.1%
2015	100%	1.5%	46.3%	0.0%	12.4%	18.0%	21.8%
Economic size class 100 000 - <500 000 EURO							
2007	100%	0.4%	3.4%	1.5%	12.2%	77.1%	5.3%
2008	100%	0.7%	2.1%	1.6%	5.4%	87.3%	2.8%
2009	100%	0.2%	2.8%	2.5%	2.2%	79.0%	13.3%
2010	100%	0.4%	2.0%	3.4%	3.8%	68.5%	21.9%
2011	100%	0.1%	1.2%	6.5%	4.8%	66.1%	21.4%
2012	100%	0.5%	1.5%	0.8%	4.3%	56.7%	36.0%
2013	100%	1.4%	2.9%	0.8%	5.9%	51.9%	37.0%
2014	100%	1.9%	14.7%	0.1%	8.6%	38.1%	36.7%
2015	100%	5.6%	23.5%	0.0%	19.7%	20.6%	30.6%
Economic size class >= 500 000 EURO							
2007	100%	0.2%	9.3%	3.9%	13.7%	66.4%	6.5%
2008	100%	0.0%	9.3%	6.2%	4.1%	78.5%	2.0%
2009	100%	0.2%	2.7%	5.6%	2.4%	73.5%	15.6%
2010	100%	0.6%	5.9%	6.9%	4.3%	56.6%	25.7%
2011	100%	0.0%	1.6%	22.5%	4.8%	53.4%	17.7%
2012	100%	4.3%	7.4%	0.2%	4.0%	49.8%	34.3%
2013	100%	11.0%	24.3%	1.0%	3.4%	22.9%	37.3%
2014	100%	18.0%	28.8%	0.0%	5.6%	21.9%	25.7%
2015	100%	3.0%	26.6%	0.0%	21.9%	17.9%	30.6%

Source: own calculations based on data RICA

CONCLUSIONS

In conclusion, we can say that direct support schemes for farmers practiced within the common agricultural policy, used as mechanisms to support their development by allowing beneficiaries own business plan or a program of short-term development, while assessing the level amounts to receive. Also providing advance payments provide financial capital to carry out specific activities in time fall campaign. Thus, they create opportunities to increase trade flow of material resources of farmers. Allocation of direct subsidies increase the quantities of products for market and stabilize farm income.

These aids are found in a significant weight in the specific costs (inputs) for crops and then the rate of interest on farm level. Moreover, in the analyzed period, it can be seen that the profitability of crops increases almost proportionally with an increase of the amount awarded acreage. We say almost directly proportional to the fact that the rate of return is directly influenced by the yield obtained per hectare of adverse weather conditions, the orientation of the crops with high yields manufacturer or subsidized better than the application of products on the market. The share of subsidies in total income varies from year to year, depending on the final results of the farm and the level of subsidies allocated.

BIBLIOGRAPHY

1. Iorga A. Thomas E.(2013). *Assessing self-consumption on the income in rural areas*. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 13 Issue 2, print ISSN 2284-7995, 185-188
2. Toma E. (2010). *Farm efficiency analysis in Romania Using FADN Methodolog*. Scientific Papers "Management, Economic Engineering in Agriculture and Rural Development", Volume 10 ISSUE 3, pages 333-337
3. Standard results - RICA Survey 2007-2008, Standard results - Survey RICA 2009-2010-2011, Standard results - Survey RICA 2012, Standard results - Survey RICA 2013, Standard results - Survey RICA 2014, Standard results - Survey RICA 2015, http://ec.europa.eu/agriculture/rica/database/database_en.cfm.

SUSTAINABLE RURAL DEVELOPMENT THROUGH TOURISM ACTIVITIES IN DOBRUGDEA'S RURAL AREA

Elena SIMA¹

Abstract: *The sustainable rural development of the Dobrudgean rural area requires reaching a balance between the need to preserve the rural economic, ecological and cultural space and the tendency to modernize the rural economic activity and life. The pleading for the promotion of tourism activities in the Dobrudgean rural area starts from the need for rural economical diversification. In general, no rural development program can be conceived in the absence of an essential role played by agriculture. The rural economy is more developed and more dynamic if it has a more diverse structure, and if the share of non-agricultural economy is higher. In this context, the paper presents the tourism potential of the rural localities from Dobrudgea and the development of a viable network of private small and medium-sized enterprises in the tourism sector. The volume of information in this paper resulted from the investigation of relationships that exist between the environmental and social factors at local level, making it possible to define the necessary mechanisms for the sustainable development of tourism activities.*

Key words: *rural development; rural tourism; tourism activities; tourism infrastructure; Dobrudgea.*

JEL Classification: Q01, L83, R58.

INTRODUCTION

Located in South-Eastern Romania, between the Danube and the Black Sea, Dobrudgea's territory is a historical and geographical province, that exceeds Romania's present boundaries. From the administrative point of view, in Romania it covers an area of 15,570 km², divided between two counties: Constanta and Tulcea, included in the South-East development region of Romania; it has 17 urban settlements (4 municipalities and 13 towns), 104 communes and 322 villages with a population of 884,406 inhabitants on January 1, 2016 (4).

In Tulcea county, 40.54% of its area (i.e. 3446 km²) is covered by the newest relief unit, represented by the Danube Delta and the lagoon complex Razim-Sinoe, with limited dwelling possibilities (5). Constanta county is the most urbanized city in Romania, marked by the presence of 3 municipalities, 9 towns and by the entire network of tourist resorts on the Black Sea shore (6). Taking into consideration the historical, the physical-geographic, the territorial-administrative, and the infrastructure conditions, together with the tourism regionalization research studies in the National Territory Development Plan, Section VI Tourism (2004), the researchers identified a significant tourism potential for Dobrudgea, which covers 59% of the area of Constanța county and 83% of the Tulcea county. The Dobrudgean tourism is dominated by mass tourism, with great potential for summer tourism, balneary tourism, recreational and leisure tourism, sport and nautical tourism, scientific and business tourism, cultural and historical tourism, cruise tourism, eco-tourism, rural tourism and agro-tourism. The main tourist attractions in Dobrudgea are the Danube Delta and the Black Sea Coast. Dobrudgea's territory represents a true reason for a travel in space, time and spirituality, where nature, history, creed and traditions are intermingled into a unique picture (1).

MATERIAL AND METHOD

The objective of this paper is to highlight the tourism potential of the rural localities from Dobrudgea and the development of a viable network of private small and medium-sized enterprises in the tourism sector. The methodology used is based on the quantitative data analysis regarding the main modalities to promote and stimulate tourism, supported by the rural development policy. The statistical data were completed by information from articles and studies published in specialty journals, as well as from reports and governmental and non-governmental documents.

¹ Scientific researcher, PhD, Institute of Agricultural Economics, Romanian Academy, Bucharest, elena.sima2008@yahoo.com

RESULTS AND DISCUSSIONS

The rural settlements with tourism potential in Dobrugea are located in two distinct areas:

- A compact area located in the wet regions of the river plain, delta, lagoon complex and seashore, with prevailing piscicultural specificity, which is used for the practice of mass summer tourism, balneary, recreational, sport, business, cruise and itinerary tourism;

- A hilly and plateau area with prevailing fruit-viticultural, apicultural and agro-pastoral specificity, where the rural tourism potential is used for the gastronomic, ethnographic, historical, religious and scientific tourism practice. (1)

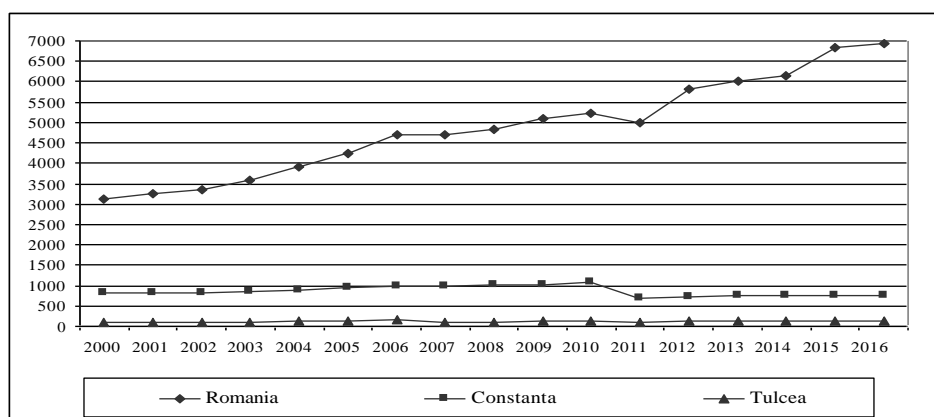
In most Dobrudgean villages with tourism potential, there are more than one reason for a trip, having in view one or more objectives (balneary, fishing, hunting, cultural, historical and religious, ethnographic and viticultural). Most rural localities have a complex tourism potential, and the differences among them result from the prevailing attractive elements. The isolated human settlements put into value the natural potential from the very next vicinity. (2)

Most tourism settings are found in the perimeter of Danube Delta, of the coast resorts and in the urban or rural localities located on the Black Sea Coast, as well as on isolated basis, depending on the potential resources claiming for their existence.

The improvement of the balance between the economic development of rural areas and the sustainable utilization of natural resources is an important objective of the National Rural Development Program (NRDP). The development of the rural space on non-agricultural basis strongly depends on a series of structural factors and on the regional context. Among the most important structural factors we can mention those regarding the transport infrastructure, the present public utilities at local level and the demographic dimension; in the category of regional factors, the following are of utmost importance: the development level of the area, the economic power of the urban centers in the region and the present economic networks. (8)

The clear and unequivocal infusion of the European Funds represents the most important source for tourism development and promotion in Dobrugea. Thus, in the period 2000-2016, at country level, the total number of tourist reception structures with accommodation functions increased from 3121 in the year 2000 to 6946 in the year 2016. In Dobrugea, the increase of the total number of the housing structures was more balanced (fig. 1).

Figure 1. Dynamics of total number of tourist reception structures with accommodation functions, in Romania, Tulcea and Constanța, in the period 2000-2016



Source: Tempo-online database, 2017

In the county Tulcea, in the statistical database there are 13 rural localities, providing for over 80% of the total number of present structures in the county (Table 1). Most localities are located in the Danube Delta Biosphere Reserve. The best known rural localities are *Crișan* and *Maliuc* located along the arm Sulina, *Nușăru*, *Mahmudia* and *Murighiol* along the arm Sfântu

Gheorghe, as well as the localitaty *Jurilovca* located on the bank of Razim lake. For tourism purposes, the helio-marine potential of the sea beaches from Sulina, Sfântu Gheorghe and Gura Portiței is also put into value.

Table 1. Evolution of the number of tourist reception structures with tourist accomodation function in the rural localities of Tulcea county, in the period 2011-2016

Crt. no.	Localities	2011	2012	2013	2014	2015	2016
1	Baia	:	1	1	1	1	1
2	Bestepe	:	:	:	1	1	1
3	C.A. Rosetti	:	1	1	1	1	1
4	Chilia Veche	:	2	2	2	2	2
5	Crișan	3	4	2	4	4	2
6	Jurilovca	32	28	29	29	29	29
7	Mahmudia	2	2	2	2	3	3
8	Maliuc	6	6	4	5	4	4
9	Murighiol	11	25	24	24	24	24
10	Nufăru	2	2	3	3	3	3
11	Sfântu Gheorghe	10	10	10	10	10	10
12	Somova	30	31	31	31	31	31
13	Valea Nucarilor	:	:	:	2	5	5
Total rural structures		96	112	109	115	118	116
Total county structures		111	136	138	141	140	138

Source: Tempo-online database, 2017

The Danube Delta was and remains an important tourism objective of our country, both for Romanian tourists and for foreign tourists. That is why the accommodation offer is diversified, several types of tourist reception structures existing (Table 2)

Table 2. Evolution of the number of tourist reception structures with tourist accommodation function by types of structures and rural localities from Tulcea county, in the period 2011-2016

Types of tourist reception structures	Localities	2011	2012	2013	2014	2015	2016
Hotels	Bestepe	:	:	:	1	1	1
	Crisan	2	2	1	2	2	1
	Mahmudia	2	1	1	1	2	2
	Maliuc	1	1	1	2	1	1
	Murighiol	3	4	4	4	4	4
	Somova	:	1	1	1	1	1
	Valea Nucarilor	:	:	:	:	2	2
Motels	Murighiol	1	:	:	:	:	:
Inns	Valea Nucarilor	:	:	:	1	1	1
Touristic villas	Jurilovca	29	26	26	26	26	26
	Murighiol	3	15	15	15	15	15
	Sfintu Gheorghe	9	9	9	9	9	9
	Somova	30	30	30	30	30	30
Touristic chalets	Jurilovca	1	1	1	1	1	1
Holiday villages	Nufaru	1	1	1	1	1	1
Campings	Sfintu Gheorghe	1	1	1	1	1	1
Tourist halting places	Maliuc	1	1	1	1	1	1
Tourist houselets	Jurilovca	1	:	1	1	1	1
Tourist boarding houses	Valea Nucarilor	:	:	:	1	1	1
Agro-tourist boarding houses	Baia	:	1	1	1	1	1
	C.A. Rosetti	:	1	1	1	1	1

	Chilia Veche	:	2	2	2	2	2
	Crisan	1	2	1	2	2	1
	Jurilovca	1	1	1	1	1	1
	Mahmudia	:	1	1	1	1	1
	Maliuc	3	3	1	1	1	1
	Murighiol	4	6	5	5	5	5
	Nufaru	1	1	2	2	2	2
Accommodation spaces on the river and sea vessels	Maliuc	1	1	1	1	1	1
	Valea Nucarilor	:	:	:	:	1	1

Source: Tempo-online database, 2017

The county Constanta has 8 rural localities in the statistical database, out of which 5 are located in the touristic seashore area, near the resorts that have the necessary infrastructure for housing and treatment, as well as multiple leisure possibilities.

The housing capacity and the tourism settings in the rural seashore area represent slightly over 20% of total capacities existing at county level (Table 3).

Table 3. Evolution of the number of tourist reception structures with tourist accommodation function in the rural localities from Constanța county, in the period 2011-2016

Nr. crt.	Localities	2011	2012	2013	2014	2015	2016
1	23 August	:	1	1	1	1	1
2	Agigea	:	1	1	:	1	1
3	Costinesti	131	157	154	146	154	154
4	Limanu	14	20	20	19	21	20
5	Mihail Kogalniceanu	2	2	2	2	2	2
6	Saligny	1	1	1	1	1	1
7	Seimeni	:	1	1	1	1	1
8	Tuzla	:	1	1	1	1	1
Total rural structures		148	184	181	171	182	181
Total county structures		679	738	745	746	755	761

Source: Tempo-online database, 2017

The greatest variety of the tourist reception structures is found in the commune Costinesti, with the villages Schitu and Costinești, as well as in the commune Limanu with the villages 2 Mai and Vama Veche (Table 4).

Table 4. Evolution of the number of tourist reception structures with tourist accommodation function by types of structures and rural localities in Constanța county, in the period 2011-2016

Types of tourist reception structures	Localities	2011	2012	2013	2014	2015	2016
Hotels	23 August	:	1	1	1	1	1
	Costinești	14	16	14	13	17	18
	Limanu	3	4	4	3	4	5
	Mihail Kogălniceanu	2	2	2	2	2	2
	Seimeni	:	1	1	1	1	1
Hostels	Costinești	10	12	12	13	17	18
	Limanu	1	7	6	7	7	7
	Saligny	1	1	1	:	1	1
Motels	Saligny	:	:	:	1	:	:
Touristic villas	Agigea	:	1	1	:	1	1
	Costinești	33	37	36	31	34	32
	Limanu	:	4	4	4	5	3

	Tuzla	:	1	1	1	1	1
Touristic chalets	Limanu	5	:	1	:	:	:
Bungalows	Costinești	63	80	80	78	78	77
Campings	Limanu	1	1	1	1	1	1
Tourist halting places	Limanu	1	1	1	1	1	1
Tourist houselets	Costinești	5	7	7	6	3	3
Camps for pupils and kindergarten children	Limanu	1	1	1	1	1	1
Tourist boarding houses	Costinești	:	:	:	:	1	1
Agro-tourist boarding houses	Costinești	6	5	5	5	4	5
	Limanu	2	2	2	2	2	2

Source: Tempo-online database, 2017

In the last years, besides the summer and balneary tourism, the changes of behavioural type in tourists have reduced the importance of mass tourism organized in favour of other forms, like the transit tourism, week-end or professional, scientific, business, cultural and sport tourism, which have added a series of other tourism objectives on the list, such as: Măcinului Mountains, Tulcea Hills, Niculițel, Babadag and Casimcea plateaux, Central Dobrudgea Plateau with the hill Alah Bair, Hârșova cliffs, calcareous massif from Cheia near the village Cheia from the commune Târgușor, the reef from Topalu, the Dobrudgea Gorges geological reserve, as well as the South Dobrudgea Plateau with the Fetii, Fântânița-Murfatlar cliffs, the fossil points Aliman, Cernavoda, Seimenii Mari and Credița, the seashore dunes from Agigea, the botanical reserve Valu lui Traian, Hagieni, Esehioi, Dumbrăveni forests, Limanu cave, etc.

The human settlements neighbouring these tourism objectives are known from ancient times and represent continuity elements on the Dobrudgean territory. The representative rural settlements in this respect are Isaccea – Noviodunum, Măcin – Arrubium, Turcoaia – Troesmis, etc from the county Tulcea, as well as Adamclisi – Tropaeum Traiani citadel and monument, Istria – Histria from the county Constanta.

The development of the entrepreneurial initiatives in rural tourism take place in the context marked by the significant increase, both in quantitative and qualitative terms, of the accommodation units in the rural area in recent years, due to individual investors and financing through the pre-accession and post-accession governmental programs (SAPARD, NRDP 2007-2013 and NRDP 2014-2020). In the Dobrudgean rural area, the effort to develop and promote tourism is completed by the support from organizations, following ANTREC example, supporting the rural suppliers of tourism services to penetrate the market, helping the rural communities to appreciate the importance of tourism and understand which advantages they can get from tourism.

The SME analysis in the Dobrudgean rural area reveals the low capacity to respond to the need to supply new jobs for the population in the countryside. The small-scale business development is well-known as the most important source of jobs or obtaining incomes in the rural space, both for the already developed economies, and for the developing ones.

Starting from the special natural qualities of the rural area, Dobrudgean's rural strategy should support the sustainable rural development as active economic growth factor, in order to alleviate rural poverty.

CONCLUSION

The old remnants of the different civilizations and cultures in Dobrudgean space outline the picture of a historical process, often violent and dramatic, in which different peoples and human races met, overlapped, intermingled or disappeared from the scene of history. This space between the Danube and the Black Sea was a bridge of ethnic, cultural and religious interferences and at the same time, a connection and a trade route between the peoples from the North and from the Mediterranean world in the South.

From the point of view of natural resources and of the anthropic tourism resources, Dobrugea is very well represented. The main tourist attractions are represented both by the natural reserves, the spas and balneary resorts, the hunting fund, as well as the religious, cultural-historical, ethnographic, folklore and gastronomy elements.

As regards the tourist reception structures with tourist accommodation function, Dobrugea's image is quite good, but in the future things could get better. The catering and treatment structures are better represented compared to the leisure and service supply structures, which are not sufficiently endowed from the technical and material point of view. These need massive modernizations and the introduction of new forms of leisure and recreation, as well as the expansion of the network of services.

Tourism is very closely linked to culture and civilization, an interdependence relation existing between these. By putting into value the natural, human and financial resources at its disposal, tourism generates economic and social effects leading to the economic efficiency increase in the rural area.

The manifestation of the tourism demand and its dynamics in Dobrugea are determined by a series of demographic, psychological, organizational factors, which play a decisive role in the different tourism segments. For a complex development of the Dobrudgian rural tourism, the potential clients should be better informed through mass-media and internet.

The unequivocal conclusion of the present paper is that sustainable rural development in Dobrugea was and still remains a very actual problem, that has not been fully solved up yet.

REFERENCES

1. Ionașcu, V., Ciangă, N., (2006), *The tourist regionalisation of Dobruđja*, Romanian Review of Regional Studies, vol. II, no. 3, p.81-86
2. Popescu, M., Urdea Cornelia-Maria, (2012), *Rolul turismului în dezvoltarea economiei spațiului rural dobrogean*, in "Economie agroalimentară și dezvoltare rurală în România, implicații ale Politicii Agricole Comune asupra securității alimentare", coord Otiman, P.I., Toderoiu, F., Sima, Elena, Editura Academiei Române, București, pp.539-547.
3. <http://www.mdrap.ro/studii-de-fundamentare-privind-patn-sectiunea-a-vi-a-zone-cu-resurse-turistice>
4. Tempo-online databasis, 2017, <http://www.insse.ro/>
5. <https://www.cjtulcea.ro/>
6. <http://www.cjc.ro/>
7. <http://www.afir.info/>
8. <http://www.madr.ro/>

THE IMPACT OF THE APPLYING OF FERTILIZERS ON GROWTH PRODUCTION AT THE NATIONAL LEVEL

RUXANDRA – EUGENIA POP¹

Abstract: *This paper aims to highlight the importance of applying and administering fertilizers to wheat production at national level. As far as the territory of our country is concerned, the regions on which the most important wheat production has been registered, along with the amount of fertilizers administered in the respective areas, as well as their type (nitrogenous, phosphatic, potassium, natural) fertilizers. Thus, using statistical models such as the Pearson correlation coefficient, Spearman's correlation coefficient, we can see concretely the link between the two variables analyzed (the production obtained and the quantity of applied fertilizer) and the nature of its intensity (low, medium, high). It is also desirable to know the most efficient types of fertilizer in order to increase wheat yield per hectare at national level in the context of the other key factors, components of the farm's macroeconomics.*

Key words: *fertilizer, wheat production, Pearson coefficient, Spearman coefficient, yield*

JEL Classification: *C 30, L11, Q13*

INTRODUCTION

Although agriculture is an important economic branch both at the European Union level and at national level, its share in GDP has decreased fourfold in the past twenty years, reaching 20% in only 4,4% in 2015, a minimum at historical level. At european level, France and Germany occupy leading positions in agriculture, especially if we refer to grain crops, technical plants, but also to livestock and viticulture.

It is known that one of the most important factors in increasing productivity in agriculture is the administration of fertilizers. As a synthesis, it can be said that the administration of fertilizers is the addition of mineral substances, thus supporting the needs of plant development. Depending on the particularities of the soil and the plants concerned, the timing and optimal amount of fertilizer is determined. Proper fertilizer management can provide productivity gains of up to 50%, and there are cases where this percentage can reach up to 80% in some crops.

Carbon, oxygen and hydrogen are indispensable elements for the normal growth and development of plants that they take from air and water. Also, plants need 13 essential minerals, nutrients or fertilizers, which plants normally take from the soil.

With the passage of time, depending on the continuous use of the soil, it loses its nourishing properties, requiring human intervention by applying specific chemical fertilizers, taking into account soil deficiencies.

On the territory of our country, the following fertilizer categories apply: chemical, nitrogenous, phosphatic, potashic and natural. We can outline a brief classification of these between:

- Nitrogen fertilizers: ammonium nitrate; urea; ammonium nitrate; calcium nitrate;
- Phosphate fertilizers: triple superphosphate; super phosphate;
- Potassium fertilizer: potassium chloride; potassium salt;
- Natural fertilizers.

MATERIALS AND METHODS

In the present paper, we want to analyze the impact of the quantity of fertilizers applied on the territory of our country on the production of wheat, processing the existing data on the National Institute of Statistics website, using - the following statistical variables are interpreted:

¹ ASC Pop Ruxandra – Eugenia, ICEADR, București, pop.ruxandra@iceadr.ro

- **Pearson correlation coefficient:** the statistical technique that measures and describes the degree of linear association between two normally distributed quantitative variables; this coefficient is calculated according to the formula (in the present paper it will be calculated to determine the relationship between the variables: the amount of fertilizer applied and the yield obtained):

$$R = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}}$$

Spearman ranges correlation coefficient: the statistical technique that can be applied to any type of variables does not require the assumption of the bivariate normal distribution of those two variables of interest (in the present case, the amount of fertilizer applied and the production obtained); it is calculated according to the formula:

$$r_s = 1 - 6 \sum_{i=1}^n D_i^2 / n(n^2 - 1)$$

Interpretation result: The interpretation of the Pearson coefficient obtained is done according to the empirical rules of interpretation as follows: Let R be the notation for the Pearson coefficient calculated, if:

- R ∈ [-0.25 up to +0.25] → there is no relation
- R ∈ (0.50 up to +0.50] ∪ (-0.25 până la -0.50] → weak relation
- R ∈ (0.75 up to +0.75] ∪ (-0.50 până la -0.75] → moderate relation
- R ∈ (1 up to +1) ∪ (-0.75 până la -1) → strong relation

The sign obtained from the Spearman coefficient calculation shows the direction of the relationship between the two variables studied. Thus, the + sign shows a directly proportional link, and the sign - shows an inversely proportional link.

- **The average production value** obtained and the average amount of fertilizer applied at country level;

RESULTS AND DISCUSSIONS

In order to analyze the link between the amount of fertilizer applied and the production of wheat obtained, we will define these two variables, taking into account the timeframe 2007-2015, depending on the county to which reference is made. Thus, in Table 1, we present the values of wheat production recorded in Romania between 2007-2015:

Table 1

WHEAT PRODUCTION (TONS) 2007 – 2016 ACORDING TO COUNTY										
Count y	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AB	50501	59527	40918	53902	67293	35078	58744	69786	66879	68362
AR	166651	221205	156820	224704	238710	218149	279840	318475	323487	407658
AG	69026	138555	119467	121863	178059	209675	145712	127911	125995	136381
BC	27684	53492	30371	42673	55738	39599	48959	43672	44756	54851
BH	134076	230427	117869	161948	230421	171839	243403	246371	332807	240400
BN	15770	16127	11218	8886	17160	9714	6874	8206	9612	9725
BT	42041	79165	59582	90678	79534	55913	72570	83156	74825	83140
BR	135388	271486	206557	275530	271431	227812	340669	269348	297203	362188
BV	42206	49763	53404	39130	55865	40860	49384	52907	37183	39412
BZ	56793	292228	201877	255550	182609	113057	292645	337849	342516	229241
CL	148760	626547	340226	364767	548869	395796	556005	504459	618397	613625
CS	28080	38236	44996	38014	33938	33182	37906	46977	36640	58609
CJ	37823	35196	31083	43387	35997	26988	31878	38414	39342	44024
CT	187405	697368	371216	474087	617393	544984	513406	584832	670293	743847
CV	51773	81507	73875	45868	90548	44498	60231	65135	62464	69768

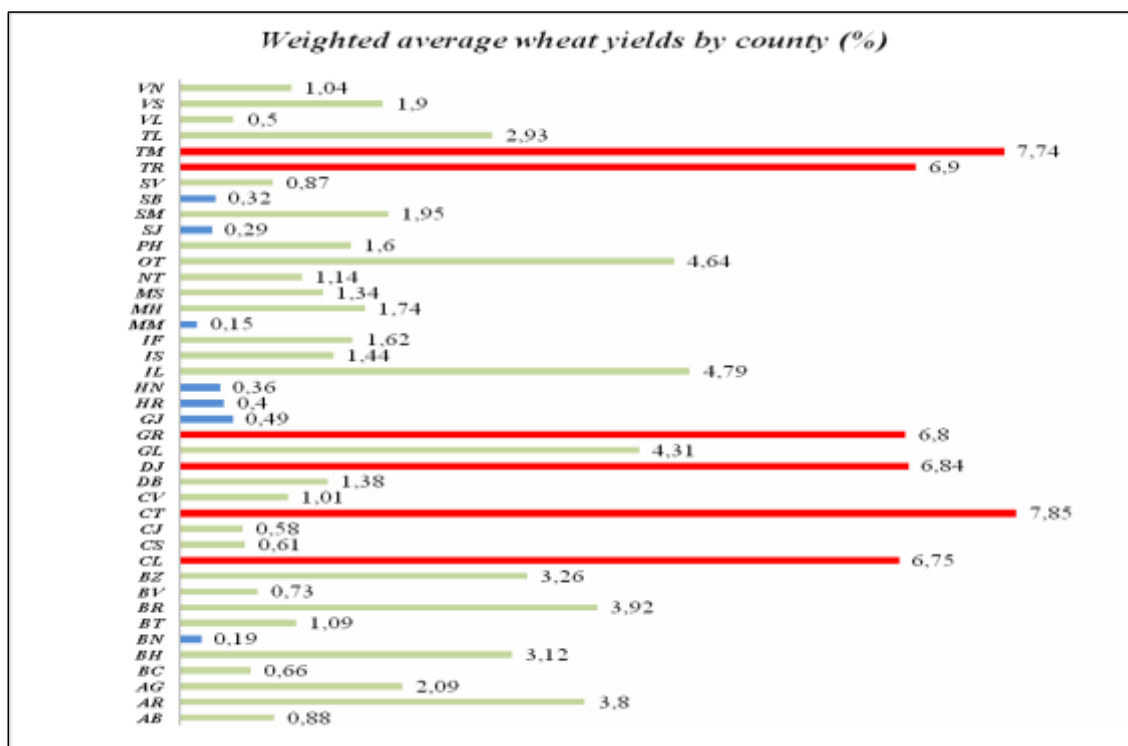
WHEAT PRODUCTION (TONS) 2007 – 2016 ACORDING TO COUNTY										
Count y	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
DB	45929	97589	83961	104687	129774	67776	104168	101491	90724	99573
DJ	122933	520404	428198	481311	539463	380004	496057	552481	569306	663827
GL	67346	201579	127618	176070	204172	55196	157947	198894 1	164967	235961
GR	98531	278518	225124	262589	289213	224889	3337822	330597	344170	289733
GJ	25917	38156	37267	33963	41387	19685	26402	27835	27668	29680
HR	19217	26703	24967	21222	36156	17497	21849	27083	31169	33941
HN	19086	27347	19448	20055	26870	15180	20685	23541	26946	31272
IL	111323	395985	229969	296191	417805	288589	454811	47223	526357	539688
IS	54216	107117	66604	108243	90352	70965	98154	122360	113838	139265
IF	19001	51022	32229	52100	58209	520426	80805	74025	78412	76387
MM	12432	16070	7093	5962	9894	6935	7508	8733	9781	9858
MH	29526	147682	136355	134670	161174	53814	121479	132742	128366	161045
MS	64262	93675	88936	77566	92086	48940	86699	99394	115422	111646
NT	39612	74879	64743	71524	83299	77902	78854	81372	85585	102081
OT	113160	426101	360474	306631	344439	267039	414747	467279	45445	440377
PH	39918	109625	104098	90780	125413	81867	131315	133173	136743	157447
SJ	20934	30907	12023	10889	17462	13816	18125	18291	19455	21505
SM	100153	100043	98275	108336	123983	121603	147736	152407	159479	163376
SB	17722	24369	21230	17552	20287	15115	21286	23471	21354	21022
SV	63045	67493	66097	46370	58364	31308	38646	49709	46051	58732
TR	188602	520412	398141	406998	604381	432909	524536	542536	522410	580409
TM	405200	424849	382332	373583	521072	457997	627736	582080	657714	660891
TL	48947	256859	104417	180134	214508	112178	263296	296435	294902	359148
VL	19356	25653	32818	43757	40434	25317	37505	41170	30212	30122
VS	68748	154286	136054	61533	94773	148100	147416	148776	143977	167527
VN	35353	72832	54576	78021	83055	43880	92527	80113	80569	85497
TOTA L	304444 6	718098 4	520252 6	581172 4	713159 0	576607 1	1029633 7	895075 6	755342 1	843124 1

Source: www.insse.ro

In order to have a profound picture of the evolution of the wheat production recorded in the period 2007 - 2016, according to the county, we present in Figure 1 their weights of the total production registered at national level, according to the year:

Thus, the rows marked in red represent the counties where the highest wheat yields have been recorded on our territory (Timiș, Constanța, Teleorman, Dolj, Giurgiu, Călărași), and the rows marked with blue represent the counties on the territory of which the highest recorded the lowest wheat yields (Maramures, Bistrita Nasaud, Salaj, Sibiu, Hunedoara, Harghita, Gorj).

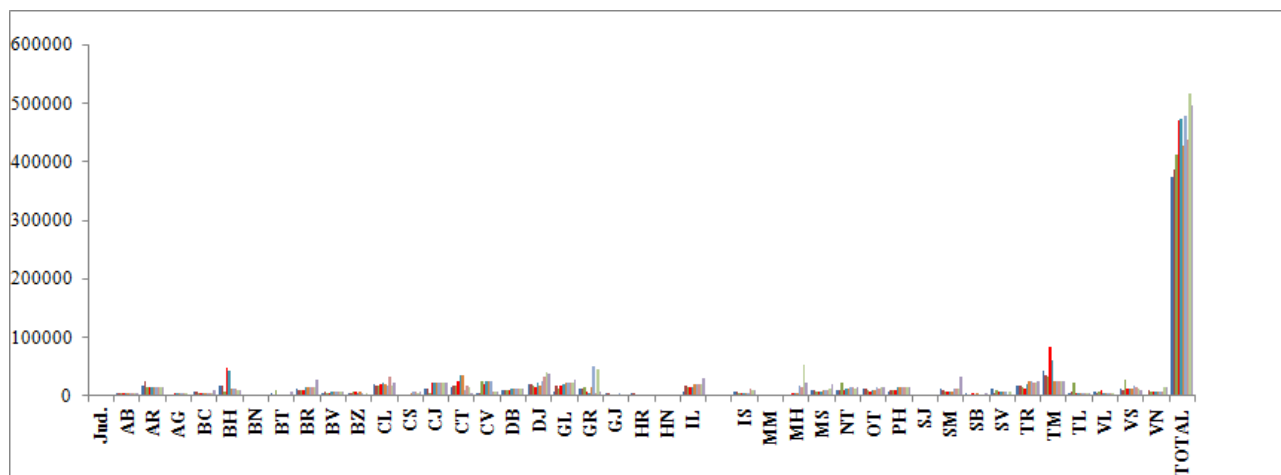
Figure 1 – Average production of wheat by county



Source: www.insse.ro

In order to have the other variable defined in order to continue the analysis proposed by the present paper, we present in the following figures the amount of fertilizers (chemical, nitrogenous, phosphatic, potashic and natural) applied by county in 2007 - 2016:

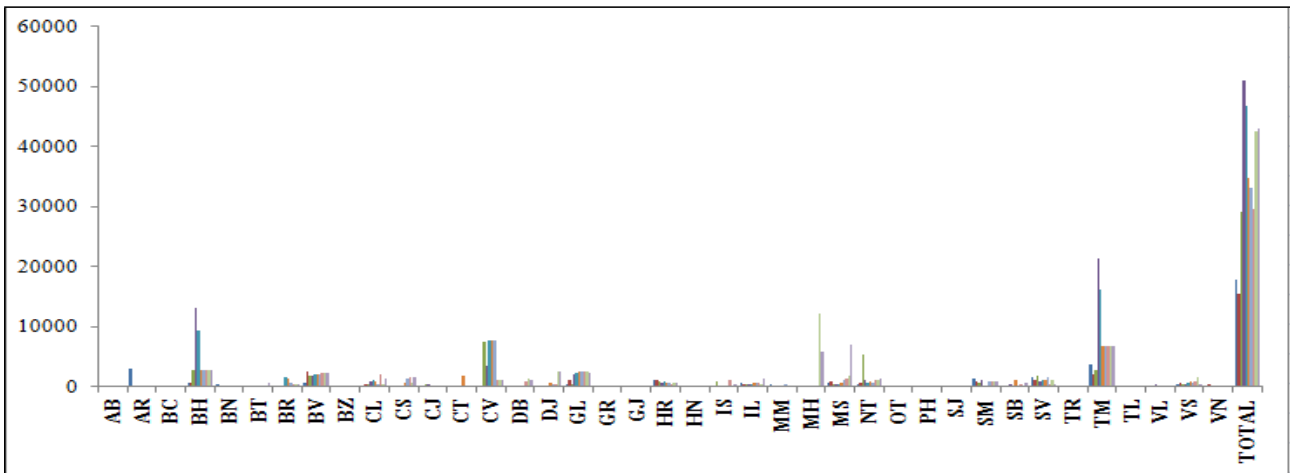
Figure 2: Amount of chemical fertilizer applied in 2007 - 2016 by county (tons of active substance)



Source: www.insse.ro, own calculations

It is noticed that the largest amount of chemical fertilizers was applied on the territory of Timis, Teleorman, Dolj, Cluj, Constanta, Giurgiu and Bihor. At the opposite pole, with the lowest amount of chemical fertilizers applied, there are counties such as Bistrita Nasaud, Hunedoara, Maramures, Salaj, Gorj, Harghita and Sibiu.

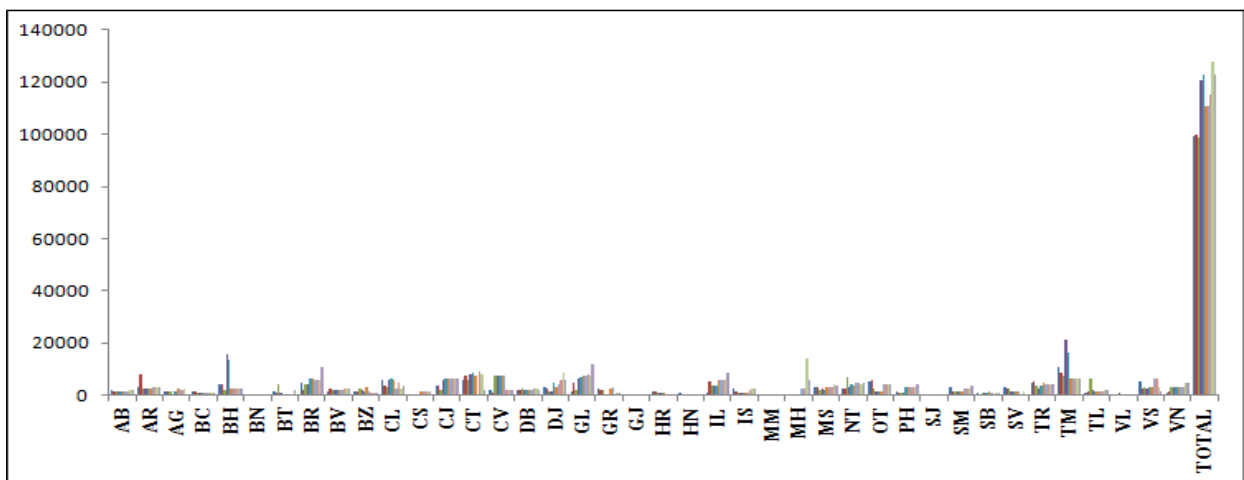
Figure 3: Amount of potassic fertilizer applied in 2007 - 2016 by county (tons of active substance)



Source: www.insse.ro, own calculations

In Figure 3 we observe the counties on which the highest quantity of potash fertilizers was applied during the analyzed period 2007 - 2016: Timiș, Bihor, Covasna, Brașov, Giurgiu and Mureș. In Mehedinți County, only in the last 2 years was applied a higher quantity of potash fertilizers than that applied in other counties throughout the analyzed period. The counties on which the least amount of potash was applied were: Gorj, Giurgiu, Olt, Prahova, Sălaj, Hunedoara, Tulcea, Bacau and Botosani.

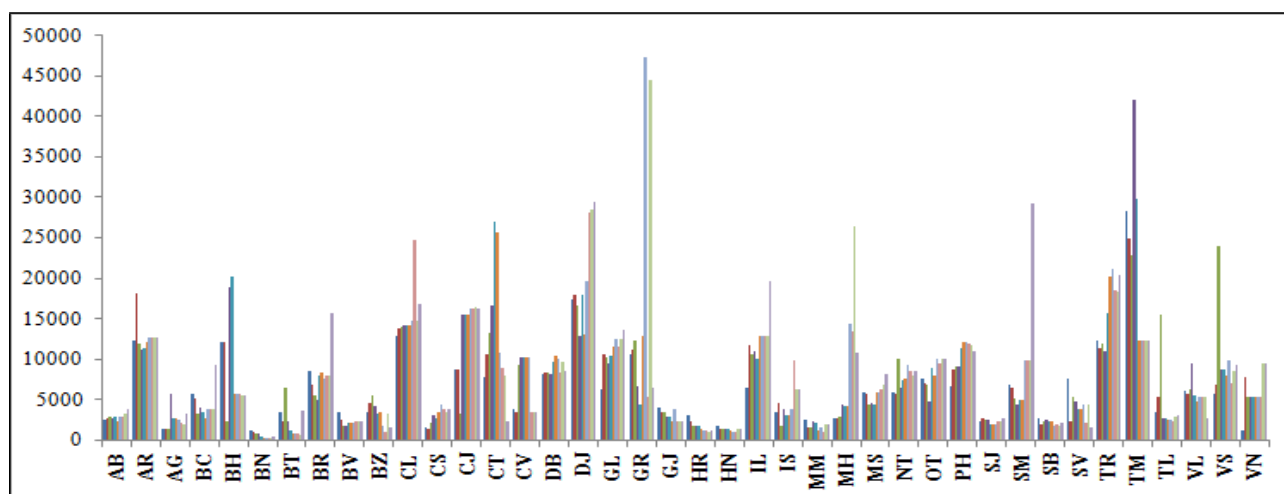
Figure 4: Amount of phosphatic fertilizer applied in 2007 - 2016 by county (tons of active substance)



Source: www.insse.ro, own calculations

Figure 4 shows the counties with the highest amount of phosphatic fertilizer applied during the analyzed period: Timiș, Galați, Constanța, Brașov, Bihor, Cluj and Ialomița. From processing the data taken from the National Institute of Statistics website, we mention the counties with the lowest amount of applied phosphatic fertilizers: Gorj, Valcea, Bistrita Nasaud, Hunedoara, Maramures, Salaj and Caras Severin.

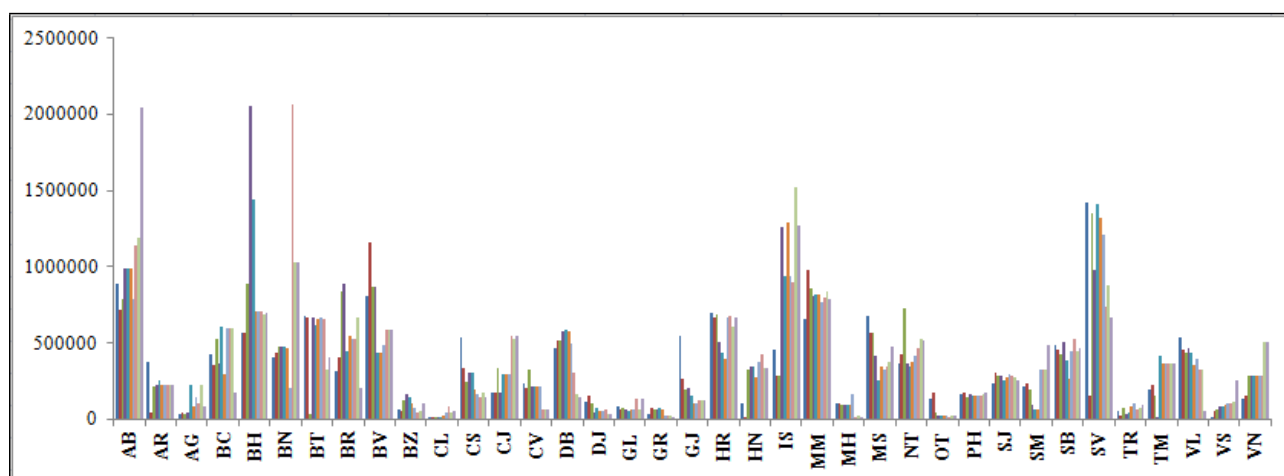
Figure 5: Amount of nitrogen fertilizer applied in 2007 - 2016 by county (tons of active substance)



Source: www.insse.ro, own calculations

Figure 5 shows the counties according to the amount of nitrogen fertilizer applied. The counties on which the highest amount of nitrogenous fertilizers has been applied are Timiș, Giurgiu, Dolj, Teleorman, Călărași and Cluj. At the opposite pole there are the counties: Bistrita Nasaud, Hunedoara, Harghita, Maramures, Sibiu, Botosani.

Figure 6: Amount of natural fertilizer applied in 2007 - 2016 by county (tons of active substance)



Source: www.insse.ro, own calculations

It is noticed that the largest quantity of natural fertilizers was applied on the territory of the Alba, Suceava, Iasi, Bihor, Maramures and Bistritza Nasaud counties. On the opposite side, with the smallest quantity of natural fertilizers applied, there are counties such as Călărași, Giurgiu, Olt, Teleorman, Dolj and Mehedinți.

Thus, taking into account the average yield of wheat obtained, on the one hand, and the average fertilizer amount, on the other hand, in the interval 2007-2016, we will calculate the interdependence of these variables using the Spearman and Pearson correlation coefficient, according to the formulas outlined in the *Materials and Methods* section using the Excel calculation program. In Table 2 we present the Pearson correlation and the Spearman ranks, in the range studied 2007 - 2016, of the variables studied, the production of wheat obtained on the one hand and the amount of fertilizer applied on the other, as well as its interpretation:

Table 2

PEARSON COEFFICIENT VALUES AND SPEARMAN RANGES CALCULATED FOR WHEAT YIELD VARIABLES / APPLIED FERTILIZER				
Studied correlation	Pearson value	INTERPRETATION	Spearman value	INTERPRETATION
Variables: wheat production / quantity of chemical fertilizer applied	<i>0,76</i>	Strong positive, linear relation	<i>0,77</i>	Direct, proportional relation
Variables: wheat production / quantity of potassic fertilizer applied	<i>0,22</i>	No defined link	<i>0,14</i>	No defined link
Variables: wheat production / quantity of phosphatic fertilizer applied	<i>0,64</i>	Strong positive, linear relation	<i>0,71</i>	Direct, proportional relation
Variables: wheat production / quantity of nitrogen fertilizer applied	<i>0,82</i>	Strong positive, linear relation	<i>0,79</i>	Direct, proportional relation
Variables: wheat production / quantity of natural fertilizer applied	<i>-0,48</i>	Weak, negative, nonlinear relation	<i>-0,57</i>	Inversely proportional relation

In Table 2, we observe the links between the variables studied, both in terms of their power and in terms of direction. The direction of the link between variables is given by the coefficient sign, a positive sign indicates direct proportionality, while the negative sign shows an inverse proportionality. Looking at the table, we note that in most cases the hypothesis is confirmed that in the counties over which larger quantities of fertilizers have been applied, a higher wheat production was obtained, especially in the case of chemical, potassium, phosphate and nitrogen fertilizers, and in the case of natural fertilizers, which are not necessarily vital for the production of wheat. Exceptions to this general rule are most likely due to the erroneous fertilization of wheat crops, which can only harm the production of wheat.

CONCLUSIONS

In this paper we have analyzed how the wheat yields produced on the territory of our country, depending on the county (variable 1), are influenced by the quantities of fertilizers (variable 2) applied in these regions.

Analyzing the data on the National Institute of Statistics website, and processing them, I noticed the high wheat yields registered in the counties: Timiș, Giurgiu, Constanța, Teleorman, Dolj and Calarasi. Besides the advantages offered by the pedoclimatic conditions held by the regions from which the counties are part, we have observed a parallel with the quantity of fertilizers applied on the territory of these counties. We list the counties with the highest quantity of fertilizers applied, depending on their type:

- Chemical fertilizers: Timiș, Bihor, Covasna, Brasov, Giurgiu, Bihor;
- Potassium fertilizers: Timis, Bihor, Covasna, Brasov, Giurgiu, Mures;
- Phosphatic fertilizers: Timis, Galati, Constanta, Brasov, Bihor, Cluj, Ialomita;
- Nitrogen fertilizers: Timis, Giurgiu, Dolj, Teleorman, Calarasi, Cluj;
- Natural fertilizers: Alba, Suceava, Iasi, Bihor, Maramures, Bistrita Nasaud.

At the opposite end, both in terms of production and in terms of the quantity of chemical fertilizers, phosphatic potassium, applied nitrogen, there are counties such as: Maramures, Bistrita Nasaud, Salaj, Gorj, Harghita, Sibiu, Hunedoara.

In order to confirm the premise that the amount of fertilizer applied directly influences the production of wheat obtained, we used the two statistically appropriate calculation methods to study the correlation between two variables: pearson coefficient and Spearman rank coefficient, using the Excel calculation program.

The values obtained showed, in most cases, that between the two variables studied there are strong, definite, linear and directly proportional links. The only case where we have obtained a weak, negative and nonlinear inverse link is that of the interdependence between wheat production and the amount of natural fertilizer applied.

Of course, the application of a considerable amount of fertilizer of whatever type is not sufficient; moreover, it can even destroy wheat production if it is not applied in the way and when it is needed. It is known that a fertilizer of wheat crops can pollute the groundwater, only harming this type of production.

In order to prevent these things, as a recommendation, it is preferable to resort to the assistance of a specialist or consultant in the field prior to the administration of fertilizers, whatever their type, or other innovative treatments for wheat cultivation. Thus, beneficial wheat yields can be made in an efficient, economical and environmentally friendly way.

BIBLIOGRAPHY

1. Voineagu V., Țițan E., Ghiță S., Boboc C., Todose D.; *Statistică. Baze teoretice și aplicații*; Ed. Economică, București 2007;
2. Pop, I., *Tehnologia Grâului*, Editura Printech București 2016;
3. Bolboacă S., *Curs statistic: Corelația și regresia liniară*, disponibil la <http://sorana.academicdirect.ro/pages/doc/MV2012/MVRom06.pdf>;
4. www.madr.ro;
5. www.insse.ro;
6. <http://ec.europa.eu/eurostat>.

AGRICULTURE ROLE IN SOCIAL-ECONOMIC RESILIENCE TO MAJOR ECONOMIC CRISES IN ROMANIA

MONICA MIHAELA TUDOR¹

Abstract: *The objective of this analysis is to investigate the capacity of agriculture to actively contribute to reducing vulnerabilities and the degree of exposure of Romania's economy to shocks caused by major economic crises. The role of agriculture, as economic and social resilience factor, is analyzed from the perspective of primary sector contribution to the attenuation of shock and to the recovery following the economic-financial crisis that started in 2008.*

The primary sector contribution to counterbalancing the negative effects on GDP and labour employment generated by the recent economic crisis, by increasing the turnover in agriculture and reasserting the role of occupational outlet, in the conditions of shortage on the labour market, represent a few arguments in favour of the assertion that Romania's agriculture is a system with relatively high resilience to shocks and at the same time a supplier of economic and social resilience for the entire economy.

Key words: *resilience; agriculture; economic crisis; Romania.*

JEL Classification: *O11, Q1, E24.*

INTRODUCTION

Given the importance of the primary sector (agriculture) in the economy and rural life, an analysis of this branch of national economy, from the perspective of its contribution to Romania's economic resilience, has been developed in this study. The objective of this part of research has in view the investigation of agriculture capacity to actively contribute to reducing vulnerabilities and the degree of Romania's economy exposure to shocks caused by major economic crises, such as the last global economic and financial downturn that affected our country as well. The role of agriculture, as economic resilience factor, is analyzed from the perspective of primary sector contribution to the attenuation of shocks and to the recovery after the economic and financial crisis that started in the year 2008.

MATERIAL AND METHOD

In the present paper we analyzed the economic resilience across counties, having in view the following parameters:

- *time to recover the decline of gross domestic product (GDP) at county level*, which expresses the capacity of the economies of Romanian counties to recover from external shocks, hence the economic resilience of the economic systems of counties (dependent variable);

- *variation of turnover in the primary sector*, on the one hand, and the *secondary and tertiary sectors*, on the other hand, in order to capture whether and to what extent agriculture has contributed to mitigating the shock and to recover from the crisis, at the level of different territorial units (independent variables). *The turnover of active enterprises* is an important predictor of the development level of the economy, regardless of the territorial aggregation level – national, regional, county level, etc. The trajectory of an economy on the curve of the economic cycle is decisively conditioned by turnover evolution in time;

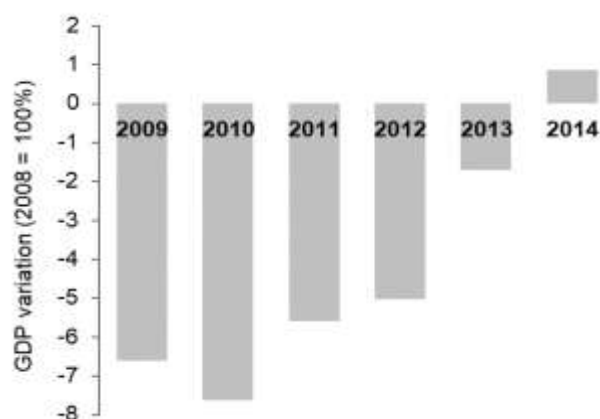
- *variation of the employed population during the stages of the recent economic and financial crisis* (strong decline: 2008-2010; recovery from crisis: 2010-2014), analyzed on a comparative basis – primary sector (agriculture) versus the rest of the national economy, so as to get a clear picture of the importance of agriculture as social security and stability supplier and in reducing the impact of shocks generated by economic contraction in the rest of the economy.

¹ Scientific researcher II, Ph.D, Institute of Agricultural Economics, Romanian Academy, Bucharest, e-mail: monik_sena@yahoo.com

RESULTS AND DISCUSSIONS

The last world economic crisis produced its effects on Romania's economy mainly after 2008, its implications being revealed by the contraction of gross domestic product by 6.6% in 2009 compared to 2008. The economic decline also continued in the next year, GDP value reaching 92.4% in 2010 compared to the year when the crisis started (Figure 1).

Figure 1. GDP evolution in Romania in the period 2009-2014

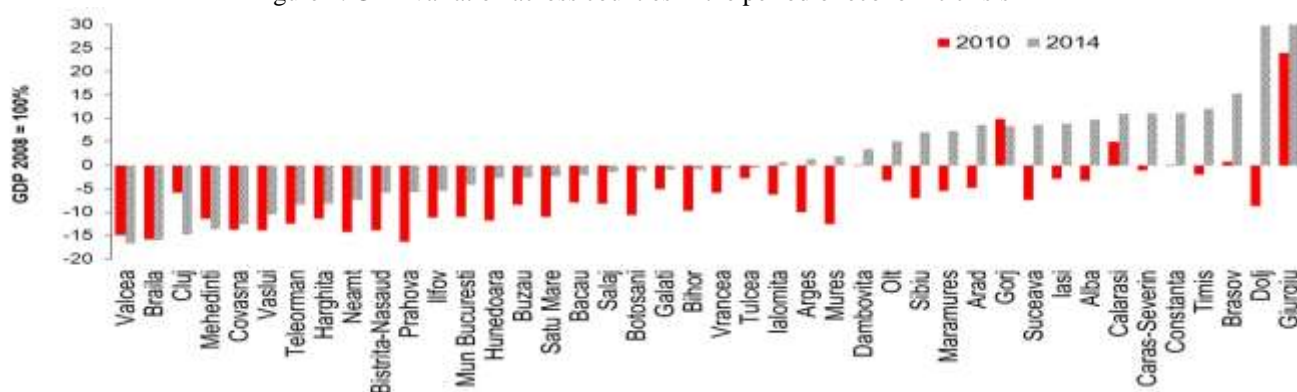


Source: own calculations based on NIS, TEMPO on-line and National Commission for Economic Forecasting data, <http://www.cnp.ro/ro/prognoze>.

The statistical data reveal that since 2011, Romania's economy has followed a slowly ascending trajectory, the year 2014 representing the moment of full absorption of the losses caused by the economic crisis. Across counties, both the incidence of economic depression and the recovery of GDP level from 2008 feature significant disparities, some counties being more affected by the crisis than the others, while their ability to get out of crisis has also varied significantly (Figure 2). The ranking of the 42 counties by the GDP annual average rate for the period 2008-2014 reveals that 23 county economies on the left side of Figure 2 have low resilience, not being able to recover the GDP losses from the crisis. Furthermore, in some of these counties (Vâlcea, Cluj, Mehedinți, Brăila), the economic decline was even stronger in 2014 compared to 2010, which was considered the peak year of the period of crisis. In the same period, the other 19 counties (placed on the right side of Figure 2) were able to recover from the decline caused by the crisis, thus being considered systems with relatively high economic resilience (Zaman & Georgescu 2015, p. 283).

The analysis of statistical data, across counties, reveals the existence of a statistically significant correlation between the magnitude of the economic decline due to the economic crisis (GDP variation at county level in 2010 compared to the year 2008) and the ability to recover to the GDP level from 2008. Thus, in the counties where the crisis had a lower impact, which thus proved to be more resilient to external shocks, GDP contraction was recovered faster.

Figure 2. GDP variation across counties in the period of economic crisis



Source: own calculations based on NIS, TEMPO on-line and National Commission for Economic Forecasting data, <http://www.cnp.ro/ro/prognoze>

It is stated in many circles, both by journalists and academics, that agriculture has represented the branch of the national economy with leverage effect, significantly contributing to counterbalancing the economic crisis effects upon the entire Romanian economy. We shall next try

to test the plausibility of these assertions that we put forward as hypotheses of this part of the study. The multiple linear regression method was used for our purpose. In our analysis, we shall consider the counties as functionally integrated subsystems from the economic and social point of view. The statistical data used in the analysis cover the period from the beginning of crisis until the recovery of economic performance gaps caused by the crisis and they are collected at the level of county administrative-territorial units.

In order to test the previously mentioned research hypothesis, we appreciate that the analysis of turnover by activity sectors, and mainly turnover evolution in time, enable us to test the primary sector contribution to the Romanian economy re-launch after the economic crisis. The territorial disaggregation of these indicators may provide significant indications of the relation between economic re-launch and agriculture.

The analysis, at national level, of the statistical data on the turnover structure of active local units reveals that throughout the last economic-financial crisis, the contribution of the primary sector of the Romanian economy to the total amount of revenues from the sale of goods, execution of works and provision of services increased significantly. Thus, while at the beginning of the economic crisis, agriculture accounted for only 1.22% of total turnover of enterprises from Romania, in the year 2012 this share reached 2.55% (Table 1). Simultaneously, the contribution of secondary and tertiary sectors to total turnover decreased.

Table 1. Structure of turnover from the local units, by national economic activities, 2008-2012

	-%-				
Activities of national economy	2008	2009	2010	2011	2012
Agriculture, hunting and related services	1.22	1.60	1.74	2.33	2.55
Forestry and forest operation	0.28	0.33	0.36	0.37	0.38
Fisheries and aquaculture	0.02	0.04	0.02	0.02	0.02
Total industry, constructions, trade and other services	98.47	98.02	97.89	97.29	97.06

Source: own calculations based on NIS, TEMPO on-line data

In real terms, these data reveal that during the economic crisis, the decline of the Romanian economy was mainly determined by the contraction of turnover in the secondary and tertiary sectors, while agriculture seemed to have an effect of counterbalancing the economic decline produced in industry, constructions and services.

The analysis of statistical data available in the territory, referring to turnover variation compared to the beginning of the economic crisis, creates a picture of how the main economic sectors are acting on GDP evolution. The multiple linear regression model reveals that GDP variation across counties (as dependent variable), during the economic crisis, is directly linked to turnover evolution (as independent variable) from the secondary and tertiary sectors, agriculture having the effect to partially offset the contraction of economic systems at county level.

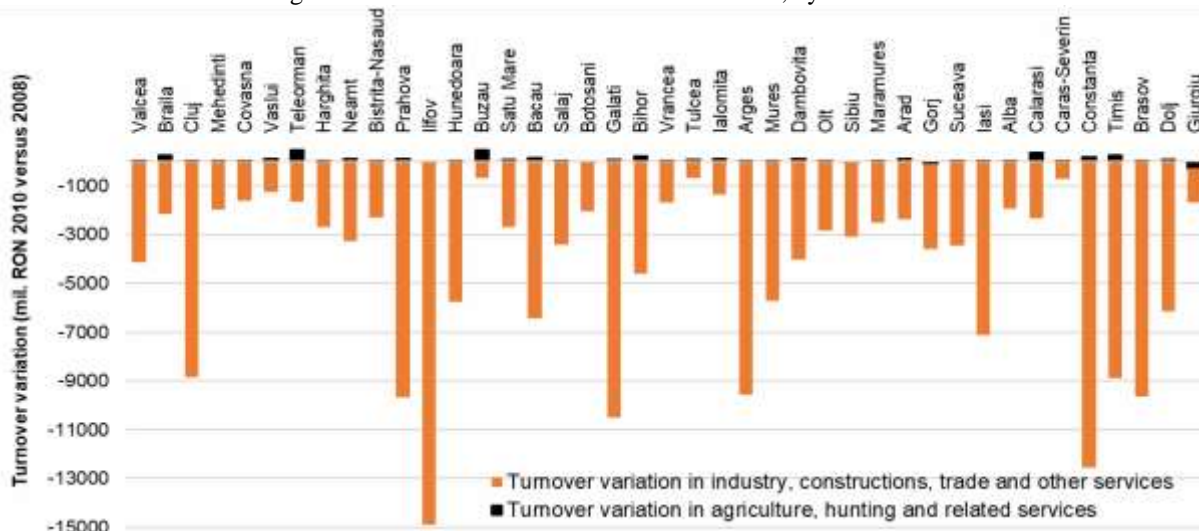
Thus, both in the peak year of the economic crisis (2010) and in the recovery period (2012 is the last year for which there are statistical data available by counties), the turnover of active enterprises in agriculture, hunting and related services was obviously higher than that in the year 2008, in all counties, except for Gorj. The average annual growth rate of turnover in the primary sector reached 20.5% in the period 2008-2012, only one county having a negative rate (Gorj), while in only six other counties turnover in agriculture increased by less than 10% on the average. For the remaining 35 counties of Romania, the average value of transactions with agricultural goods and services increased by 10 up to 50%. Thus, the analysis across counties reconfirms that agriculture had a positive contribution to national economy, counteracting the negative effects of the economic crisis.

On the other hand, the secondary and tertiary sectors, which have the greatest contribution to turnover creation at national level, continued to have, in the year 2013 (the last year for which data are available), values of sales of goods and services lower than those in the year when the crisis started, in most counties. For the period 2008-2013, the average annual turnover growth rate, cumulated for the secondary and tertiary sectors, was negative (-5%). At county level, only one of the 42 counties had a positive average annual growth rate of turnover in industry, constructions and

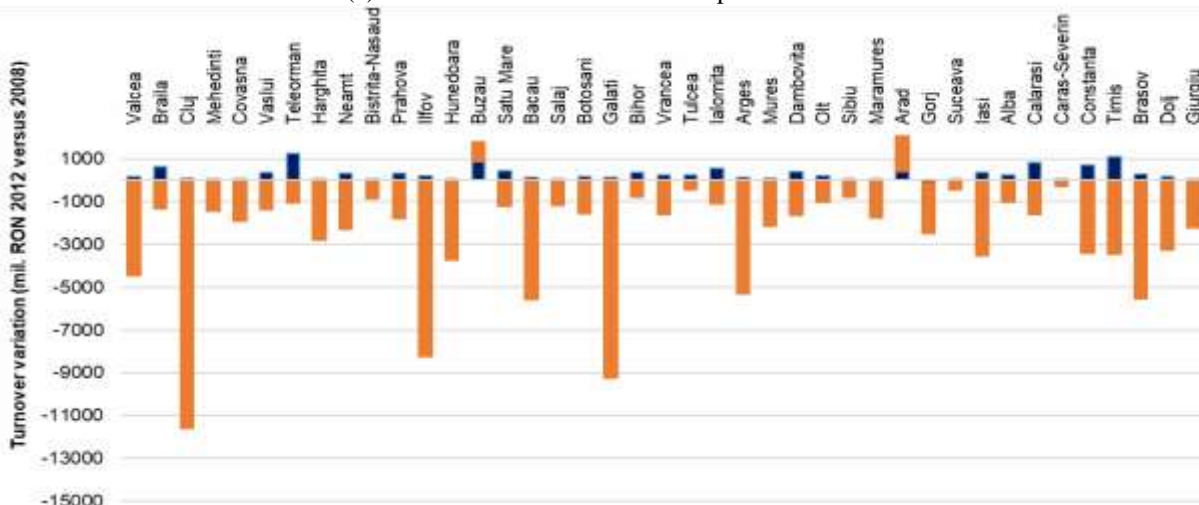
services (Arad), while for half of the counties, the annual decreases of turnover value in the secondary and tertiary sectors ranged from -5% to -15%.

The statistical data at county level reveal that in the peak year of the economic crisis (2010), the active enterprises in the secondary and tertiary sectors reduced their activity in all counties, while the turnover of enterprises in the primary sector stagnated or slightly increased in all the administrative-territorial units of the country (Figure 3a). Thus, the resilience to crisis of active economic operators in agriculture proved to be quite strong.

Figure 3. Turnover variation of local active units, by counties



(a) Turnover variation in 2010 compared to 2008



(b) Turnover variation in 2012 compared to 2008

Source: own calculations based on NIS, eDemos On-line and TEMPO on-line data

While the active enterprises in industry, constructions and services continue to recover the efficiency from the period 2009 – 2010, the primary sector continues to improve its capacity to produce economic value and its contribution to the recovery of the county GDP. The graphic illustration of the variation of turnover on local active units by activity sectors, for the year 2012 reveals, more clearly, the capacity of economic operators from the primary sector to follow a growth trajectory, which can also mobilize the other economic sectors to which they supply raw materials.

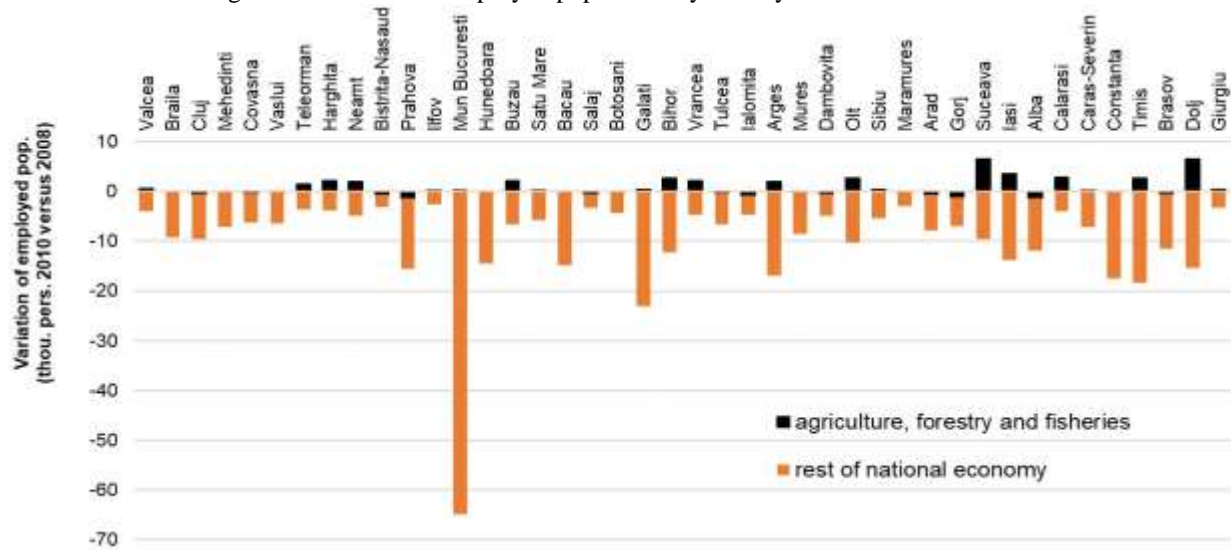
The primary sector has a stronger upward dynamic in the counties with higher economic resilience (the 19 counties that recovered before 2014 the GDP losses following the economic crisis, which are placed on the right side of Figure 3). It is worth mentioning that, for the other counties as well, with lower economic resilience, agriculture is the sector with turnover increases,

compared to the remaining business segment, whose turnover is decreasing. This confirms the contribution of agriculture to the improvement of the economic parameters of the economic systems of counties.

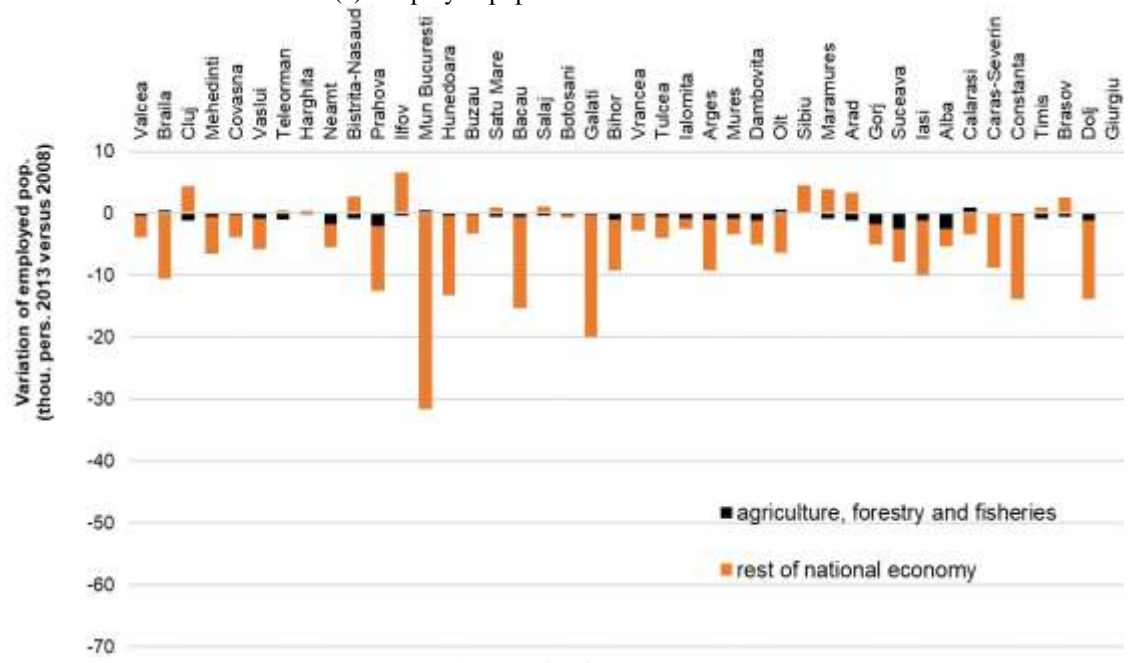
The increase of turnover in the primary sector of Romania's economy is associated to the increase of the insertion degree of agricultural production into the market. Thus, the share of the value of sold agricultural products and services in total value of agricultural production practically doubled in the period of economic crisis, from about 17% in 2008 to 38% in 2012 at national level.

Completing the analysis of turnover evolution with the analysis of employed population gives us the possibility to create an overall vision of the impact of economic recession at the level of Romanian counties and of their resilience to crisis.

Figure 4. Evolution of employed population by activity sectors and counties



(a) employed population in 2010 versus 2008



(b) employed population in 2013 versus 2008

Source: own calculations based on NIS, TEMPO on-line data

In this context, agriculture represented a high resilience system, not only from the perspective of its contribution to turnover, but also by the employment stability it provides to the active population. Thus, while in overall national economy, the volume of the employed population was down by 6.1% in the year 2010 compared to 2008, the population employed in agriculture

increased by 1.4%. The return of the active population to the primary sector is associated to economic regress. Yet, from social resilience perspective, the capacity of the primary sector to absorb the labour surplus released from other sectors constitutes a stabilization factor of the economic system and of settling down potential conflicts stemming from the lack of occupational opportunities. The downward occupational mobility, from the secondary and tertiary sectors to the agricultural sector, continued until 2012; in the year 2013, as the industry showed signs of recovery, the occupational mobility trend was reversed. However, the total volume of employed population remained by 2.5% lower in 2013 than in 2008, due to the contraction of labour market in the manufacturing industry and constructions, in particular (Zaman & Georgescu 2015, p. 289).

Under the impact of economic crisis, in the period 2008-2010, in the counties with high economic resilience, placed on the right side of the graph from Figure 4a, a greater labour transfer from the tertiary and secondary sectors to the primary sector can be noticed. In these counties, the faster economic recovery was due to the layoffs from industry, constructions and services, a process with higher intensity than in the counties with lower economic resilience, placed on the left side of the graph. The adaptive response of active population, materialized into the downward occupational mobility during the crisis, enabled a faster recovery of the economic system at county level, followed by the increase of labour demand in the secondary and tertiary sectors after 2010.

In the period of economic recovery, 2011-2013, although the counties with economic resilience recovered the GDP loss, the increase in the supply of jobs in the secondary and tertiary sectors did not follow the same pace as GDP, the number of employed persons being lower than that from 2008 in 15 out of the 19 counties (on the right side of Figure 4b), counties that recovered from the decline caused by the crisis. Out of the other 23 counties with low economic resilience, only 3 had favourable conditions for the increase of the volume of employed population, the transfer of labour from the primary primary sector to the other economic sectors having a lower incidence in these counties than in the counties with high economic resilience.

CONCLUSIONS

The agricultural sector contribution to counterbalancing the negative effects of the recent economic crisis on GDP and labour employment, by increasing the turnover value of agriculture and reaffirming the role of occupational outlet in the context of shortage on the labour market, represent a few arguments in favour of the statement that Romania's agriculture is a system with relatively high resilience to shocks and at the same time a supplier of economic and social resilience for the entire economy.

REFERENCES

1. Zaman, Gh, Georgescu, G (coord.). 2015, Dezvoltarea economică endogenă la nivel regional: cazul României, Expert, București.
2. *** National Institute of Statistics (NIS), e-Demos database, <http://edemos.insse.ro/portal/>
3. *** NIS, TEMPO on-line database, <http://statistici.insse.ro/shop/>
4. *** National Commission for Economic Forecasting data, <http://www.cnp.ro/ro/prognoze>

THE INFLUENCE OF MINERAL FERTILIZATION UPON PRODUCTION AND QUALITY OF SPRING BARLEY ON AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

VALERIA DEAC¹, FELICIA CHEȚAN², CORNEL CHEȚAN³, ALINA ȘIMON⁴,
FELICIA MUREȘANU⁵

Abstract: *In order to clarify some aspects of the spring barley reaction on the production and accumulation of the protein in grain, at different levels of fertilization, some estimates of this chemical component were made at 16 levels of fertilization with N: P: K in the period 2016-2017. The increase in protein content was achieved at the highest levels of nitrogen and phosphorus, even when potassium fertilizers were not used, but the highest protein content in grain accumulating at the level of N₆₀P₈₀K₀ was 11.78%. The highest yield can be attributed to the fertilization variant N₁₂₀P₈₀K₄₀, which confirms the negative relationship between production and protein content.*

Keywords: *climacteric conditions, quality, fertilization, spring barley, yield*

Classification JEL: Q 01, Q15, Q16

INTRODUCTION

Establishing a fertilization program is based on the relationship between the soil chemical structure and the productive potential of the spring mesh, the fertilizer problems have two essential aspects related to the destination of the crop, for beer or forage. It is known that generally higher nitrogen doses increase the content of protein in the bob, which is not desirable if the destination is brewing and desirable in the case of animal feed. Consequently, besides the many aspects related to the optimal doses of fertilizers (pre-plant, resistance to fall, soil moisture, roots system, etc.), we must also take into account the use of the crop. In addition to the genotype factor, a particularly important role in achieving higher, quantitative and qualitative barley productions has proper fertilization. Another important aspect in establishing an optimal fertilization plan is the short vegetation period, 90-120 days in case of spring barley, and the intense absorption rate of mineral substances. According to Maior (2005), nitrogen fertilizers increase grain protein content and protein yield at the surface unit by increasing grain yield. Phosphorus fertilizers influence protein production/ha only by increasing the grain yield and not the protein content of the grains (Maior, 2005). Potassium is one of the most important nutrients used in agriculture, which, in the conditions of high quality plant and quality objectives for consumers, is constantly increasing its effects and contributing to its realization.

From national or international experiences, it has been noticed that on soils with low N content, the use of moderate doses of fertilizers with this element leads to increased production but has little or no influence on the increase in protein content, the increase of which is influenced in a way significant only by the use of high doses with N.

¹ PhD.Eng. Deac Valeria, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA , e-mail: valideac2004@yahoo.com

² PhD.Eng. Chețan Felicia, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA , e-mail: felice_fely@yahoo.com

³ PhD.Eng. Chețan Cornel, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

⁴ PhD.Eng. Șimon Alina, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

⁵ PhD.Eng. Muresanu Felicia, SR I, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

MATERIALS AND METHODS

Research was conducted at ARDS Turda, in the long-term experiments NP (nitrogen and phosphorus fertilizer), on chernozem soil during the years 2016 and 2017.

Experiences have taken place in a five-year rotation; soybean-soybean-wheat-wheat maize and corn, is placed in randomized blocks with 25 variants in 6 repetitions.

The experimental factors and their graduations were: the year of culture: 2016 and 2017; phosphorus doses with five graduations: P₀; P₄₀; P₈₀; P₁₂₀ and P₁₆₀; Nitrogen doses with five graduations: N₀; N₃₀, N₆₀, N₉₀ and N₁₂₀.

The biological material used in this experience was represented by the Romanița cultivar created at ARDS Turda, with a wide range of spreading in the favorable areas of spring culture and mostly in the southern parts of the country. It is a medium-sized cultivar but with fairly good tolerance to fall due to sclerenchymatic tissue resistance and elasticity of the straw. The spikes are approximately 14 cm long, lax to semilax, slightly curved and light yellow in color. The beans are large, globular, golden yellow, with a MMB around 44-52 g and a good germ energy. The higher protein content of this variety, around 12.5%, involves some restrictions on fertilization, especially when production is for beer production. Due to the higher height of this variety, we recommend the use of moderate doses of nitrogen, especially on soils with good fertility, and if growth retardants are not used to avoid plant fall.

RESULTS AND DISCUSSION

The variance analysis (Table 1) reflects the very significant influence of fertilizer doses on the production of the spring barley production. Sample F shows that nitrogen fertilizers have the greatest influence and crop years do not significantly influence production; from the analysis of climatic data results that they were very close to favoring this culture.

Table 1. Variance analysis for grain production (kg / ha), spring barley, NP fertilization system (Turda 2016-2017)

Sursa variației	GL	s ²	Sample F
Years in culture (A)	1	7340	0.096
Phosphorus dose (P)	4	2224037	60.160***
Nitrogen dose (N)	4	87132290	2248.967***
AxP	4	373385	10.100
AxN	4	732975	18.919
AxPxN	16	468203	12.085***
Error A	5	76764	
Error P	40	36968	
Error N	200	38743	
Total:	299		

From the data presented in Table 2 it follows that in 2016, the best fertilizer variant was N₉₀P₈₀, and in 2017 N₉₀P₁₂₀.

Table 2. Production results (kg / ha) at different levels of fertilization obtained at spring marshland in the years 2016-2017

Year		2016		2017	
Fertilization doses		Production (kg/ha)	Witness (%)	Production (kg/ha)	Witness (%)
P ₀	N ₀	2847	100.0 (Mt)	3237	100.0 (Mt.)
	N ₃₀	4255	149.5	4467	138.0
	N ₆₀	5382	189.1	5282	163.2
	N ₉₀	5753	202.1	5889	181.9
	N ₁₂₀	6141	215.7	5541	171.1
P ₄₀	N ₀	3267	114.8	3439	106.2
	N ₃₀	4996	175.5	4478	138.3
	N ₆₀	5478	192.4	5321	164.4
	N ₉₀	6163	216.5	6481	200.2
	N ₁₂₀	6121	215.0	6379	197.1
P ₈₀	N ₀	3358	117.9	3341	103.2
	N ₃₀	4964	174.4	4965	153.4
	N ₆₀	6431	225.9	5475	169.1
	N ₉₀	6500	228.3	6220	192.2
	N ₁₂₀	5604	196.8	5920	182.9
P ₁₂₀	N ₀	3452	121.3	3360	103.8
	N ₃₀	5145	180.7	4684	144.7
	N ₆₀	5583	196.1	5572	172.1
	N ₉₀	6397	224.7	6687	206.6
	N ₁₂₀	5819	204.4	5905	182.4
P ₁₆₀	N ₀	3406	119.6	3417	105.6
	N ₃₀	4971	174.6	4574	141.3
	N ₆₀	6174	216.9	6293	194.4
	N ₉₀	6279	220.5	6762	208.9
	N ₁₂₀	5487	192.7	6529	201.7

DL (p 5%)

224

DL (p 1%)

295

DL (p 0.1%)

380

In spring crops, as with other crops, the protein content is closely related to the nitrogen dose and the protein content in all experimental variants is higher in 2016 compared to 2017 (Table 3). As it is known, the starch content of barley for beer should be between 55-60%, noting that it drops to variants with a higher protein content. Good results in terms of protein and starch content were obtained in the N₆₀P₈₀ fertilizer variant, which is even more economically efficient.

Table 3. Protein content and starch content (%) at different levels of fertilization obtained at spring marshland in the years 2016-2017

Year		Protein (%)		Starch (%)	
Fertilisation Dose		2016	2017	2016	2017
P ₀	N ₀	8.66	8.44	57.56	53.75
	N ₃₀	9.30	8.38	57.53	54.24
	N ₆₀	10.04	9.26	54.34	55.42
	N ₉₀	11.68	10.47	55.15	53.63
	N ₁₂₀	12.34	10.96	53.75	56.65
P ₄₀	N ₀	8.81	8.52	55.60	55.11
	N ₃₀	8.86	8.25	56.29	54.63
	N ₆₀	10.34	8.95	56.83	54.16
	N ₉₀	11.58	9.98	56.18	56.01
	N ₁₂₀	12.94	11.53	54.83	55.77

P ₈₀	N ₀	8.85	8.22	57.31	56.85
	N ₃₀	9.09	8.38	56.79	56.24
	N ₆₀	9.77	8.91	57.75	56.76
	N ₉₀	11.36	10.51	54.25	55.93
	N ₁₂₀	12.90	11.23	55.86	56.31
P ₁₂₀	N ₀	8.94	8.33	57.39	56.49
	N ₃₀	8.93	8.19	57.49	57.20
	N ₆₀	9.33	8.73	57.83	57.98
	N ₉₀	11.29	11.10	54.92	55.92
	N ₁₂₀	11.83	12.22	56.51	57.73
P ₁₆₀	N ₀	8.70	8.21	59.53	57.25
	N ₃₀	9.87	8.39	58.58	57.57
	N ₆₀	9.74	8.89	57.85	57.21
	N ₉₀	11.25	10.83	57.10	57.47
	N ₁₂₀	12.99	12.22	56.70	57.01
DL (p 5%)		0.82		2.84	
DL (p 1%)		1.09		3.76	
DL (p 0.1%)		1.41		4.96	

CONCLUSIONS

Recent changes in the climate require reconsideration of this crop, and in the years 2016 and 2017 there have been very favorable conditions in the Transylvanian Plain for obtaining high yields for the brewing of beer.

The largest outputs were obtained on agrofond N₉₀P₈₀, in 2016, the agrofond which is the most balanced in terms of nitrogen: phosphorus.

From the point of view of requirements for beer production, the most favorable agrofond was N₆₀P₈₀, - obtained between 8.91-9.77% protein and 56.76-57.75% starch.

BIBLIOGRAPHY

1. eac, Valeria, M. Ignea, Maria Ștefănescu, (2017). *Results of the research work performed at ARDS TURDA in the direction of rational use of fertilizers in long –term experiences*. Vol omagial 60 ani SCDA Turda
2. gnea M., (2017). *Year 2016, the rainy year of the last 60 years in Turda* Buletin informativ nr.24, Agricultura Transilvania, SCDA Turda..
3. aior C.L., (2005). *Contributions to Barley Cultivation Technology in the West of the Country, with a view to obtaining economically efficient yields with superior quality indices*. Ph.D. thesis, U.S.A.M.V. of Banat, Timisoara.

RESEARCHES REGARDING THE CONFIRMATION OF SUNFLOWER HYBRIDS BY INFLUENCE OF TECHNOLOGICAL VERIFICATIONS IN THE SOUTH WATER AREA OF ROMANIA

EREMIA FLORENTINA¹

Abstract: *The main purpose of this paper is to determine the best sunflower hybrids (*Helianthus annuus*) suitable for the southern part of Romania, which under different conditions of fertilization and technology will lead to the achievement of large and stable productions. The experience was located at INCDA Fundulea, on a uniform chernozem soil in terms of fertility and microrelief. The experimental module was of the trifactor type and was arranged according to the subdivision parcel method in three rehearsals. The cultivation of the plants was carried out under optimum conditions, specific to the culture area, in the non-irrigated version, the genotypes taken into study consisting of three hybrids: Performer, Barolo RO and PR64A89. The conclusions are to determine the associated influence of three crop factors, namely plant density, fertilization and hybrid influence on sunflower production under the climatic year 2013.*

Keywords: *sunflower, technological links, production, quality*

INTRODUCTION

Sunflower is one of the most important oily plant grown globally (13% of world oil production) and the most important oily plant in Romania. The oil extracted from sunflower achenes is semi-solid and is characterized by pleasant color, taste and smell, high content of vitamins (A, D, E, K) and aromatic substances. In addition, sunflower oil is very well preserved over a long period of time. The oil is extracted by pressing, with a normal yield of about 45%. At one hectare of sunflower, 900 to 950 kg of oil can be obtained at the level of current production, and the plant is thus very economical.

The oil can also be used to make the oleic acid needed in the wool industry, soap as an adjuvant in the manufacture of pesticides, as a boiling oil for paints. Phosphatides produced during the oil extraction process allow large-scale manufacture of lecithin, much appreciated in the food industry: bakery, chocolate, cake, and sausage.

Sunflower cakes are among the most valuable, given their high protein content (45-55%) and their richness in methionine. The high vitamin B content of the complex B. Sunflower contains more riboflavin than soy or peanuts and has a better phosphocalcic equilibrium compared to other cocoons.

High content in cellulose limits their use in feeding monogastrics. Crops from husked seeds do not have this inconvenience. Sunflower seeds can be consumed directly (roasted seeds) more widespread consumption patterns in the US, Scandinavian countries, some Mediterranean countries and Eastern Europe. The varieties intended for this purpose provide around 550 calories /100 g of consumed seeds.

Calidails can be used as feed, especially for sheep (containing 7% protein and up to 57% carbohydrates), assuming a nutritional value similar to medium quality hay. From the ground husks (pericarp), ethyl alcohol, furfural is extracted, or they can be used for the preparation of fodder yeast, a valuable protein feed for animals and birds.

The strain is very rich in potassium and can be used to produce potassium carbonate or other products. Stems are still used as a source of heat (locally or in the industry for the production of acoustic plates). The sunflower is also an excellent melliferous plant. On 1 ha of sunflower, 30-130 kg of honey (or 15-40 kg) honey / bee family).

From the agricultural point of view it is important that the sunflower releases the land early (end of August - beginning of September), allowing good ground preparation for the following wheat.

¹ Drd. Ing. Florentina Eremia – U.S.A.M.V. Bucuresti eremialflorentina89@yahoo.com

Sunflower spending is not too high: moderate nitrogen and phosphorus fattening, high potassium requirements, but abundant refunds; the costs for the seed are comparable to corn. Sunflower often accommodates, better than corn, on soils of medium quality and better supports water stress.

For cultivation technology (sowing, sowing, harvesting, etc.), sunflower does not require specialized agricultural equipment. At the same time, agricultural works, land preparation, sowing, chemical weed control, harvesting can be done without hindering works for other agricultural crops.

Among the inconveniences of sunflower is the susceptibility to disease, which implies very serious rotation restrictions, excluding monoculture and returning to the field earlier than 6 years. Difficulties of location after many plants with which it has common diseases and pests. Large water consumption and nutrients in the soil, which requires the fertilization of pre-cultures by applying higher doses of fertilizers.

In our country, sunflower has, among other cultures, a very important place. Due to economic importance and favorable conditions, sunflower will continue to hold a significant place in our country's agriculture. The average yield per hectare at national level is very dependent on the evolution of climatic conditions and the natural fertility of soils. Efficient use of natural resources for sunflower crops in order to achieve economically viable production requires rigorous zoning of hybrids, depending on their climatic resources and biological requirements.

MATERIAL AND METHODS

The experiments aimed to determine methods of increasing the productivity of sunflower crops in the climatic conditions in the southern area of Romania. To determine the optimal sunflower cultivation technology, it was investigated its reaction at different densities, on different fertilization agrofonds, with different hybrids, as well as the interaction of these factors. Also, the evolution of the sunflower quality indices was followed. Location of the experience, observations and determinations were made during the agricultural year 2013, with the following factors and graduations:

- Sunflower hybrid: a1 - Performer, a2 - KWS Barolo RO, a3 - PR64A89
- fertilization with nitrogen and phosphorus: b1 - unfertilized, b2 - N₁₀₀P₅₀, b3 - manure 20 t / ha (applied to the pre-culture)
- plant density: c1 – 50.000 plants / ha, c2 – 60.000 plants / ha

The experience was located at INCDA Fundulea, on a uniform chernozem soil in terms of fertility and microrelief. The experimental module was of the trifactor type and was arranged according to the subdivision parcel method in three rehearsals.

RESULTS AND DISCUSSIONS

The correlation of natural conditions with the biological requirements of sunflower culture has led to the delimitation of 5 areas of favorability:

- a) The Ist area comprises the areas of the Romanian Plain, the south of Dobrogea and the Plain of Oltenia. Featured Hybrids: Select, Festiv, Fundulea 206, Super, Alex, Florom 249, Justin, Performer, Florom 328, Turbo, Favorite, Wonder, Saturn, Top-75, Venus.
- b) The IInd area is represented by the Western Plain (Timis and Arad counties). Recommended hybrids: Felix, Select, Festiv, Florom 249, Alex, Romina, Rapid, Performer, Fundulea 206, Favorite, Lovrin 338 Timis, Wonder, Saturn, Top-75, Venus.
- c) The IIIrd area includes the non-irrigated areas in the North of the Romanian Plain and the Neirigian Plateau Dobrogea, being appreciated as a medium favorable for the sunflower culture. Recommended hybrids: Select, Super, Festiv, Fundulea 206, Florom 249, Turbo, Favorit, Romina, Rapid, Alex, Justin, Wonder, Saturn, Top-75, Venus.

- d) The IVth area is represented by the Western Plain (Bihor, Satu-Mare counties). Recommended hybrids: Select, Festive, Felix, Florom 249, Turbo, Favorit, Alex, Rapid, Romina, Timis, Wonder, Saturn, Top-75, Venus.
- e) The Vth area includes the Jijia Plain, Barlad Plateau and the Transylvanian Plain. Recommended hybrids: Festive, Super, Select, Felix, Fundulea 206, Florom 249, Alex, Rapid, Justin, Wonder, Saturn, Top-75, Venus.

The problem addressed included objectives that aimed to optimize the crop technology in order to obtain a maximum and constant production of sunflower, in the soil and climate conditions in southern Romania, also aiming to increase the economic efficiency and the protection of the environment.

The experimental scheme is of trifactor type, 3x3x2 form, arranged according to the subdivision parcel method, in three repetitions. The experimental results obtained were statistically processed using the variance analysis method (Ceapoiu, 1968).

The sunflower culture has been placed on a uniform land in terms of fertility and microrelief. The total area of the experience was 11760 m².

Total area for experimental parcel - 168 m²; and the yieldable area - 112 m². The precursor lath was wheat in all years of experimentation.

In order to organize the experience, a biological material consisting of 3 sunflower hybrids was used. The hybrids that constituted the biological material are part of the lists of creations from INCDA Fundulea and foreign (Pionier and KWS), which through genetic research on sunflower, obtained hybrids with notable performances, corresponding to the new requirements of the culture technologies and zoning. Cultivation was carried out under the conditions of the optimal crop-specific technology for the three hybrids.

The associated influence of hybrids, fertilization, and plant density on sunflower production in 2013 (Table 1, Fig. 1) determined a yield of 3.370 kg/ha using the PR64A89 hybrid by applying a N₁₀₀P₅₀ nitrogen dose density of 60.000 plants / ha, followed by the KWS Barolo RO hybrid with a yield of 3.183 kg/ha. The smallest sunflower production was obtained using the Performer hybrid, resulting in a production of 1.913 kg/ha, by applying a N₁₀₀P₅₀ nitrogen dose and a density of 50.000 plants/ha .

Regarding the hybrids, production growth is statistically assured in favor of the PR64A89 hybrid, but any of the hybrids studied can be cultivated, depending on the concrete conditions of each farm. Obtaining a sunflower production of more than 3.370 kg/ha is possible by applying a N₁₀₀P₅₀ nitrogen dose; non-application of chemical fertilizers results in a reduction in production of 470 kg / ha (Table 1, Figure 1).

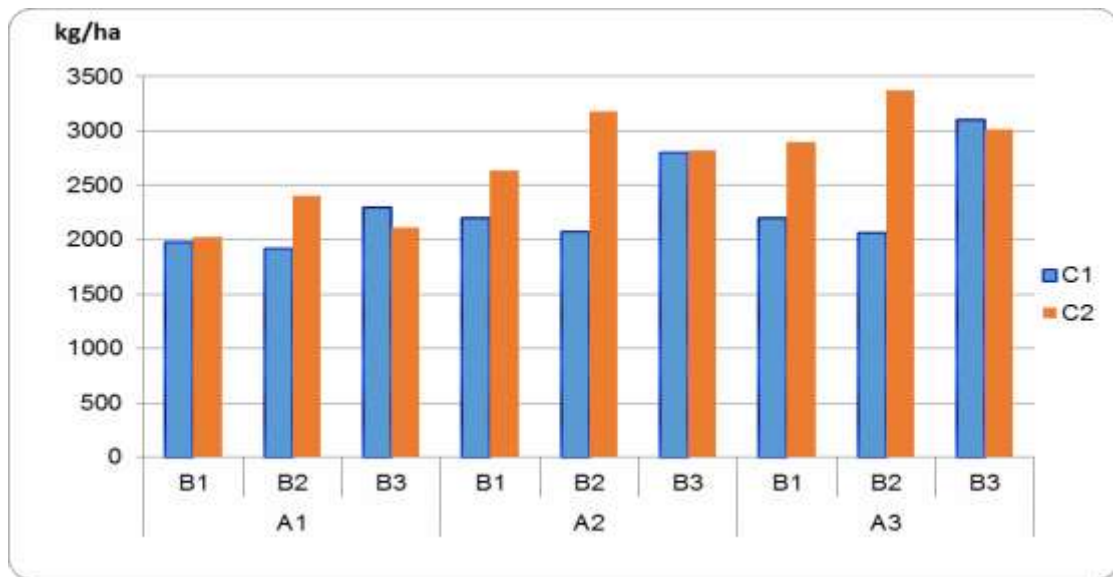
Table 1 Associated influence of hybrid, fertilization and plant density on sunflower production (average - in 2013) (kg/ha)

Varianta	Hibridul		Productia medie	
	C1	C2		
A1	B1	1980	2021	2001
	B2	1913	2406	2160
	B3	2296	2110	2203
A2	B1	2200	2633	2417
	B2	2073	3183	2628
	B3	2803	2816	2810
A3	B1	2203	2900	2552
	B2	2060	3370	2715
	B3	3100	3016	3058
Productia medie		2292	2717	2505

DL (P 5%) - 160.1 DL (P 1%) – 204.1 DL (P 0.1%)- 406.2

Source: personal calculation

Figure 1. Influence of hybrid, fertilization and plant density on sunflower production



Source: personal calculation

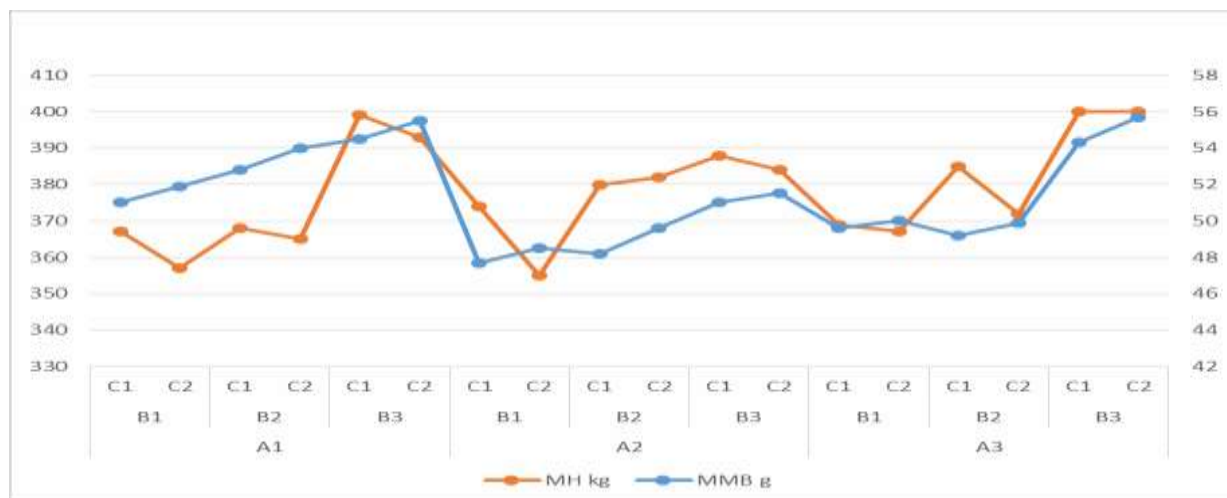
By comparing graduation averages, the mass of 1.000 grains (MMB) in sunflower is influenced by plant density and crop fertilization. Thus, the highest MMB values were obtained at a plant density of 60.000 plants / ha, on a fertilized basis with 20 t / ha manure (applied to the pre-culture), the MMB values obtained were 399.0 g at hybrid PR64A89 versus 388 g in the Performer hybrid (Fig. 2).

Regarding the to hybrids, although the production increase is statistically assured, the difference is relatively small so that any of the three hybrids can be taken in the culture.

The results obtained in terms of the hectolitre (MH) mass in sunflower crops show that the highest values were obtained at the plant density of 50.000 plants/ha, on a fertilized basis with 20 t/ha of manure, 56 kg on the PR64A89 hybrid, 55.5 kg for the Performer hybrid, and 54 kg for the KWS Barolo RO hybrid (Figure 2).

Regarding the reaction of the hybrids to the interaction of the studied factors, a similar behavior of the three hybrids is observed, the values of MMB and MH values being close..

Figure 2. Influence of hybrid, fertilization and plant density on MMB and MH at sunflower



Source: personal calculation

CONCLUSIONS

Under the conditions of 2013, the influence of the hybrid on sunflower production shows a relatively small differentiation of hybrids. From the data obtained, it results that the highest production of 3370kg/ha was obtained at the PR64A89 hybrid. The use of the Barolo RO hybrid produced a production of 3.183 kg/ha, compared to the Performer, which was 1.913 kg/ha, the difference being significant.

The influence of crop fertilization on sunflower production in the year 2013 by applying 20t /ha of manure to the previous crop yielded an average yield of 3.058 kg/ha for the PR64A89 hybrid compared with unfertilized control variant, which yielded 2.203 kg/ha. The production differences obtained are very significant or distinctly significant to the control.

The influence of plant density on sunflower production by using a plant density of 50.000 pl /ha resulted in a yield of 3.100 kg/ha in the PR64A89 hybrid compared to the control variant, the Performer hybrid with a production of 2.296 kg/ha. Plant density of 50 thousand pl/ha resulted in a significantly negative yield reduction of 804 kg/ha.

By analyzing the interaction of all the factors studied, we can notice a reduction in production of the three hybrids used (Performer, Barolo RO and PR64A89) in the non-fertilized version, with values statistically insured as very significant or significant, ranging between 200 – 1.457 kg/ha.

Regarding the reaction of the hybrids to the interaction of the studied factors, we can observe a similar behavior of them, the productions being comparable depending on the applied technological variant.

In conclusion, depending on the evolution of the climatic elements of the agricultural year and the applied crop technology, the variant for 2013 included the fertilization of the N₁₀₀P₅₀ culture, the density of 60 thousand pl/ha and the cultivation of the hybrid PR64A89 followed by KWS Barolo RO.

BIBLIOGRAPHY

1. Bileteanu, Gh., 2003, Phytotechnics. Ceres Publishing House, Bucharest, vol. 2, pp. 13-61;
2. ologan, I., Dornescu, A., 1981, Plant Breeding Course. Agronomic Institute "Ion Ionescu from Brad Iasi", p. 350.
3. Ion, V., Hălmăjan, H.V., 2001. Harvesting of sunflower, storage and preservation of the crop. Revista Cereale si tehnic, nr. 8 (pages 1-5)
4. Ion, V., Ion, N., Roman, Gh.V., Bucata, LI, Dumbravă, M., Iștoc, VA, 2004. The behavior of the Romanian sunflower hybrids in the 2002 meteorological conditions on the soil red-brown from the Royal Mill. Scientific papers, Series A, XLVI Agronomy, USAMV Bucharest.
5. on, V., Ștefan, V., Ion, N., Roman, Gh.V., Dumbravă, M., 2006. Data regarding the flowering of an assortment of foreign sunflower hybrids admitted for cultivation in Romania. Scientific papers, International Beekeeping Symposium "Sustainable Management of Bee-keeping Holdings in Accordance with EU Requirements", Tulcea, 7-8 September.
6. era, C., Sin, Gh., Toncea, I., 1989. Culture of sunflower. Ceres Publishing House, Bucharest.
- Laiu, C., 2003. Contribution of biological and technological factors to the formation of achene and sunflower oil production in ecological conditions in the Moldavian Plain. Doctoral thesis, "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine Iasi.
- 7.untean, L.S., 1997. Small phytotechnical treatment. Oil, Textile, Tuberculous and Root Plants, Vol. II, Ceres Publishing House, Bucharest.
- 8.untean, L.S., Solovastru, C., Morar, G., Duda, M.M., Vârban, D.I., Muntean, S., 2008. Phytotechnics. Academic Press Publishing House, Cluj-Napoca.
9. Petcu, Gh., Petcu, E., 2008. Technological guide for wheat, corn, sunflower. The Domino Publishing House.
10. Stefan, V., Ion, V., Ion, N., Dumbrava, M., Vlad, V., 2008. Sunflower. Alpha Publishing House MDN Buzău.
11. Tabara, V., 2009. Phytotechnics. Technical, Oil and Textile Plants, vol. I, Brumar Publishing House.
12. Vrânceanu, A.V., 2000. Hybrid sunflower. Ceres Publishing House, Bucharest.
13. ânceanu, A.V., Iliescu, H., Ionita, A., Popescu, Al., 2004. Agricultural technologies. Sunflower culture. GEEA

SECTION 3

RURAL DEVELOPMENT AND AGRICULTURAL POLICIES

PROFILES OF RURAL HOUSEHOLDS IN THE NORTH—EAST DEVELOPMENT REGION OF ROMANIA. CASE STUDIES

BRUMĂ IOAN SEBASTIAN¹,
BOHATEREȚ VALENTIN MIHAI²,
TANASĂ LUCIAN³

Abstract: *The rural household epitomizes the central socioeconomic unit of the vernacular village. The territorial resources, livestock and human capital shape the particular features of each place and zone. The present study relies upon field research, namely a questionnaire undertaken in 354 rural households across the counties from the North-east Development Region. The main conclusions highlight visible zonal differences among them, all with clear distinctive features that draw the traditional element of each zone.*

Keywords: *rural household, population, agricultural uses, type of land ownership, livestock*

JEL Classification: *Q 15, Q 24*

INTRODUCTION

From a historical point of view, the practice of agriculture in Romania has always contained a central component - ignored at times, annihilated on occasion, often left on its own - which has been holding and will hold as long as the traditional village exists. It is all about the rural household whose complex and multiple functions have enriched it across time and have also created the possibility of enlarging the family nuclei, thus stimulating the demographic course by providing the survival conditions, regardless of the hard times. It also meant a constant food supply, fodder, agro alimentary products for own consumption but mostly for supplying farmer markets and ensuring the raw materials in the food industry and light engineering. There is a stable tendency in minimizing the important role-played by this socioeconomic category, often misunderstood or belittled and also less adjusted.

First of all, the existence of roughly four million rural households as registered in the latest population censuses under the title of population households or in the agricultural censuses under the title of agricultural holdings without legal entity — with clear distinctions but also complementing the concept content through the inseparable triad: rural household, population household and agricultural holding without legal entity — call our attention upon its strategic importance, a guarantee of the Romanian state's existence and authority that recognizes the fact that over 90% of the country's area is actually rural area.

Secondly, approximately 85% of the country's agricultural area is private property which provides impressive agricultural lands by means of leasing, thus creating a private business environment in the Romanian agriculture, a pole that is currently developing and strengthening an agriculture of great productivity and growing profitability. Under the circumstances, about 55% of the country's agricultural area remains under the exclusive handling of the rural households.

Thirdly, the Romanian rural space secures the shelter and living conditions for roughly half country's population but, on the whole, there is no legal social protection guaranteed by the state for this social category. The population households have the mission of socioeconomic self-protection of all village inhabitants by providing the habitat and covering the basic vital needs of survival. Here are three strong arguments which entitle the actions of bringing into focus the role-played by the research, study and sustenance of the rural households which, commencing from tradition to modernism, can guarantee the maintenance, adaptation and involvement of the contemporary

¹ Brumă Ioan Sebastian, Senior Researcher, Iași branch of Romanian Academy, ICES „Gh. Zane”, sebastianbruma1978@gmail.com

² Bohateretț Valentin-Mihai, Chief Researcher, Iași branch of Romanian Academy, ICES „Gh. Zane”, bvmarfi@gmail.com

³ Tanasă Lucian, Senior Researcher, Iași branch of Romanian Academy, ICES „Gh. Zane”, lucian.tanasa@gmail.com

Romanian village and also develop novel poles of economic growth adjusted to the future across the Romanian rural space.

MATERIAL AND METHOD

The current study counts on an ample field research which assessed based on a questionnaire the state of the private agricultural household in the counties from the North-East Development Region of Romania. The questionnaire attended 21 different issues detailed through 136 indicators. The respondents were chosen from the category of households having relevant agricultural activities in their vernacular villages and communication capabilities ruled out of any immediate interest. On the whole, 354 questionnaires were filled, more precisely, 342 questionnaires were filled in the rural space: 59 in Bacău county (10 communes investigated), 52 in Botoşani county (19 communes), 30 in Iaşi county (16 communes), 57 in Neamţ county (11 communes), 46 in Vaslui county (11 communes) and 98 in Suceava county (33 communes). As a special note, a particular attention was given to Suceava county due to its unique features of the rural households: partly caused by the positive influences from the Austro-Hungarian Empire and, on the other side, generated by the non-cooperative character of the mountain and sub mountain regions under the communist regime.

Three types of relevant information have been selected in the study case of rural households, namely, the structure of the work force, the ownership model of the land used and the livestock, employing 24 analytical indicators. For the first time this study draws attention upon the special economic weight of the agricultural lands within the incorporated areas of the rural settings.

The data have been processed for presentations at commune or county level and also to provide a comparative analysis on the medium profile of the rural households under assessment. The aim was to overlap the particular features of the rural households under research in absolute sizes, in proportion to the households which provide content in the differences among the rural households within the counties.

OUTCOMES AND DISCUSSIONS

By selective processing and interpreting the data gathered in the field, based on the questionnaires applied regarding the state of 354 rural households from the six counties of the North-East Development Region, significant results have been obtained on four types of information (table no.1).

The first category introduces the family members' structure of the rural households studied. It was learnt that the number of the members from the families within the households studied varies between 2.93 persons (on average) in Iaşi county and 4.09 persons (on average) in Neamţ county, with an average on the studied batch by 3.57 persons. This aspect reveals a more vigorous demographic structure on household in the region than the national average, to which only two other counties within the Region come closer (Neamţ şi Botoşani). In connection to this matter we have noticed a high active work force — on average 1.86 agricultural workers on household, with differences between Iaşi and Botoşani counties by 2.13 agricultural workers and also between Vaslui and Neamţ counties by 1.59-1.68 agricultural workers, fact that outlines the existence of an active human potential to be more effectively involved in agriculture by proper measures and policies.

Contrary to some recent opinions often formulated, the rural households still have the human resources necessary for running the agricultural works.

The second aspect under study is represented by the type of agricultural land ownership. Noticeably, there is a general willingness for land tenancy with the express aim of self-farming. In view of the batch analyzed there is an average rented area of 14.31 hectares of agricultural land with large medium areas in the following counties: Vaslui (34.05 ha), close to the average from Bacău, Neamţ and Botoşani counties and with lesser areas in (4.28 ha) and Suceava (3.05 ha) counties. There is also a higher average of the agricultural area owned (3.18 ha per household) at the studied batch level, larger areas being registered in rural households from Vaslui (5.85 ha), Botoşani (4.00 ha) and

Suceava (3.29 ha) counties. In contrast, Iași, Bacău and Neamț counties register values ranging from 1.68 to 2.41 ha agricultural area per household on average. There is another significant aspect that is worth mentioning: the availability to lease land is rather low as the medium on batch registered 0.49 ha: very low values, under 25 acres in Bacău, Suceava and Neamț counties and a little over one hectare in Iași and Botoșani counties.

Consequently, it is noticeable the general trend for strengthening the agricultural holding without legal entity by attracting 82.4% of the agricultural lands by means of leasing. Thus, it is taking shape the positive tendency without legal entity based on the structure of the rural households, open to commercial agriculture.

Table no.1 Medium profiles of the rural households in the counties of the North-East Development Region of Romania

Indicator	County						Average on batch
	Bacău	Botoșani	Iași	Neamț	Vaslui	Suceava	
1. Structure of the labour force (no.)							
Family members, total	3.68	3.12	3.93	2.93	4.09	3.59	3.57
agricultural workers	1.78	2.13	2.13	1.68	1.59	1.90	1.86
2. Ownership type of the agricultural land (ha.)							
- private property	1.84	4.00	1.68	2.41	5.85	3.29	3.18
- giving on lease	0.01	1.14	1.09	0.25	0.42	0.03	0.49
- taking on lease	13.55	17.03	4.28	13.87	34.05	3.05	14.31
3. Used Land (ha.)							
- arable	10.98	19.62	4.10	12.41	11.62	3.81	10.42
built-up area*	0.21	1.35	0.22	0.39	0.22	0.60	0.33
irrigated	0.02	0.07	0.00	0.00	0.18	0.05	0.05
untilled**	0.00	0.23	0.00	0.00	0.00	0.00	0.00
- pastures	3.41	4.18	2.79	2.56	0.07	1.28	2.38
- hay fields	1.00	0.49	1.14	0.86	0.07	0.66	0.70
- vineyards	0.04	0.01	0.11	0.00	0.16	0.07	0.06
- orchards	0.03	0.04	0.43	0.07	0.22	0.02	0.13
- woods	0.15	0.01	0.15	0.01	0.04	0.00	0.06
- body of water	0.00	0.01	0.00	0.00	0.00	0.00	0.00
4. Livestock (per head)							
- cattle	6.47	5.56	2.70	5.60	1.30	5.05	4.45
milk cows	3.32	3.40	2.40	3.53	1.15	2.82	2.77
- sheep and goats	15.03	55.29	12.97	14.40	36.52	5.61	23.30
reproductive females	11.37	31.38	2.00	7.77	28.43	4.81	14.29
- swine	4.22	2.98	2.60	1.54	2.46	1.91	2.62
- poultry	21.00	28.94	45.73	14.21	36.87	34.31	30.18
- equines	0.31	0.85	0.33	0.18	0.24	0.21	0.35
- bee families (no.)	5.56	7.12	9.50	1.63	13.85	11.34	8.17

* The average built-up agricultural area of a rural household in Botoșani county has not been taken into account because there were households with very large agricultural areas declared as built-up areas which presented cause of suspicion for false data.

** It has not been calculated the average on the Region because the indicator, as an exception, shows a single state for a county out of six.

The third data category refers to the agricultural uses as found in the farming works operated by the rural households. From a medium perspective of the batch studied it results that a single household uses 10.42 ha arable land, 2.38 ha pastures, 0.70 ha hay fields, 0.06 ha vineyards and 0.13 ha orchards. The study reveals the existence of 600 square metres of forest on average, while the bodies of water are barely existent. The differences regarding the average on counties are quite significant: Bacău, Neamț and Vaslui counties have — on average per household — 11-12 ha farming arable land as opposed to Suceava and Iași counties which register 3.81 and 4.10 ha, while Botoșani county holds the first position by 19.62 ha farming arable land. There are high availabilities towards pastures, on average, especially in Botoșani (4,18 ha), Bacău (3,41 ha), Iași (2,79 ha) and Neamț (2,56

ha), while Suceava (1.28 ha) and Vaslui (0.07 ha) register low values. The fodder resources are complemented by hay fields, with a higher average in Iași, Bacău and Neamț (1.14 ha, 1.0 ha and 0.86 ha), as opposed to the lower average from Suceava, Botoșani and Vaslui. The fruit-growing and wine-growing potential is higher in the households from Iași (54 acres) and Vaslui (38 acres), while in the rest of the counties from the Region registers rather low values. Other three key quality aspects can be detected: the average built-up agricultural area per household is, in this batch, 33 acres with difference among counties, ranging from 21 to 60 acres (Bacău and Suceava), while the average irrigated area is rather insignificant (under 5 acres). Practically, there are no untilled lands except for some small areas in Botoșani county.

Based on the field researches done, it is possible to foretell the existence of a number of households open to a commercial agriculture focused on field crops and fodder resources and a rather low wine-growing potential.

The last category of information investigated refers to the average livestock in the rural households studied. The analyzed batch includes households of a dominant zootechnical profile, fact that boosted the medium profile of the household at county and region level, namely: 4.45 cattle of which 2.77 milk cows; 23.30 sheep and goats, of which 14.29 reproductive females; 2.62 swine; 30.18 poultry; 0.35 horses and 8.17 bee families. A great importance is given to breeding bulls, heifers and milk cows, with some small differences among counties ranging from 2,40 and 3,53 heads per household in Iași and Neamț county to a merely 1,15 head per household in Vaslui. There is also a growing interest in breeding sheep and goats in Botoșani (55.29 head/ household) and Vaslui (36.52 head/ household), registering surprisingly low values in Suceava, namely, 5.61 head/ household on average.

A positive note proves to be the favorable structure of the basic species for home consumption, as it follows: swine varying from 1.54 head/ household in Neamț county to 4.22 head/ household in Bacău county and poultry ranging from 14.21 head/ household in Neamț county to 45.73 head/ household in Iași county.

The decreasing interest towards horses has not gone undetected, registering on average values between 0.18 head/ household and 0.85 head/ household in Neamț and Botoșani, while maintaining a high number of bee families in counties such as Vaslui, Suceava and Iași and a moderate level in Botoșani and Bacău counties and a very low level in Neamț.

A singular aspect of the analysis and interpretation of the results obtained from field research is the high economic potential of the built-up agricultural lands usually located around the dwellings and various annexes (stables, sheds, storage houses, vegetable garden, vineyard, orchard, green house, etc.) of each rural household. These lands are characterized by a high productive potential, are fit for intensive and highly intensive agricultural activities, allow an efficient domestic workflow and boost, by intelligent use, the habitational environment of the human settlements. These lands are fit for vegetable growing, green houses or garden solariums, for growing medicinal and aromatic plants, for horticulture purposes, intensive fruit and wine-growing (especially table grape varieties) and special arboretum arrangements. The built-up spaces allow the breeding of small-waist fur species, different birds and honeybees, taking into account the importance of an apicultural flora all year round: flowers, herbs, flowering trees and shrubs.

The results of the analysis are impressive (table no.2): the average area of the built-up agricultural land per rural household in the batch analyzed is 3,280 square metres, exceeding by far the limit of 1,500 square metres as assessed by the community statistics and assumed by the National Institute of Statistics for defining the family gardens.

What happens with the difference of extra 1,780 square metres of built-up agricultural area per individual household on average as long as, statistically speaking, this land falls within the classification of agricultural land which, essentially, fits into the great agricultural farming but it does not have the same farming status as the field?

Table no. 2 The state of agricultural lands from the built-up areas of the communes analyzed in the counties from the North-East Development Region of Romania

County	Built-up agricultural area (% from total)	Average built-up agricultural area per household (square metres)	Built-up arable area from the built-up agricultural total (%)	Average built-up arable area per household (square metres)	Average built-up agricultural area per household from the batch (square metres)
Bacău	8.38	1,977	60.02	1,187	2,100
Botoșani	15.10	5,908	59.64	3,524	*
Iași	12.43	3,166	67.31	2,131	2,200
Neamț	17.91	4,293	59.97	2,574	3,900
Vaslui	7.11	3,003	72.96	2,191	2,200
Suceava	25.28	5,973	51.27	3,062	6,000
Average per analyzed batch	-	4,053	60.30	2,444	3,280

Note: the agricultural and arable lands from the built-up areas have been deducted through specific methods from the topographical documents of the communes analyzed (our calculations).

*) from medium has been eliminated Botoșani county because two rural households have declared large built-up areas, fact that was regarded as improbable data.

Consequently, the results of research are enlightening: the built-up agricultural area ranges from 7.11% in Vaslui county to 25.28% in Suceava; the average size of the built-up agricultural area is 4,053 square metres with wide varieties, from 5,973 square metres in Suceava county to 1,977 square metres in Bacău; the proportion of the arable area from the total of the built-up agricultural area is 60.30%, registering medium value varying from 51.27% in Suceava to 72.96% in Vaslui, while the average area of the arable land from built-up area (per rural household) is 2,444 square metres with medium values ranging from 3,524 square metres in Botoșani to 1,187 square metres in Bacău.

The results, previously introduced, are advocating the intensive and highly intensive use of the arable lands from the built-up areas of the rural settlements with the potential of achieving an economic boom if special programs are to be developed and implemented for this type of business and last but not the least if there is a political view and willingness.

CONCLUSIONS

By corroborating the four analysis criteria regarding the state of the average type of rural household in the counties from the North-East Development Region, the following profiles stand out:

- the rural household — following a trend with a medium growth rhythm, oriented towards commercial agriculture (mostly vegetable), having sufficient resources of agro-alimentary products for own consumption and surplus of active work force, also having high possibilities of taking land on lease with high fodder resources, livestock (cattle and sheep) fit for commercial production characteristic of the batch analyzed in Botoșani county, represents the profile of a dynamic rural household from the North-East Development Region of Romania tracing two main aspects: subsistence farming and sustainable commercial agriculture. This profile can be found in counties such as Bacău, Neamț and Vaslui as well;

- the rural household — following a conservative trend with a slower growth rhythm of contemplative nature, mainly oriented towards own consumption, having diminished livestock and land resources but still sufficient work force — characterizes ” the great expectations” attitude of Iași and Suceava counties. A possible explanation is to be found in the influence pole generated by the elevated cultural and educational level from the former capitals of Moldavia, rather prone to dynamic profitable low-risk businesses and also in the conservative inertia of the autonomous households characteristic of the Bukovina places where tradition governs as well as the property spirit, contemplative nature and the well-known pride of its inhabitants.

The two significant profiles of rural households as identified through field research undertaken in 90 communes from the counties of the North-East Development Region fall into two

different rural macro-zones: the first type of rural household characterized by a medium rhythm of development, a typical feature of the profound rural space and the second type of rural household characterized by a slower rhythm of development, based on the expectation attitude, a typical feature of the rural space with a strong urban vibe and major urban poles of attraction and influence.

These two type of rural households identified in the North-east region can co-exist and complement each other without hindering their growth pace, offering a fresh novel dimension to the businesses in agriculture. At the same time, the paradigm of the economic boom by drawing built-up arable land resources and implementing an intensive and hyper intensive agriculture can transform the Romanian villages into dynamic poles of socioeconomic development and metamorphosis of mentalities regarding the importance and purpose of the vernacular rural space.

BIBLIOGRAPHY

1. Bohateret V. M., Brumă I. S. (2014). *Regional Shifts in the Structure of the Agricultural Holdings between 2002-2010 in The Perspectives of Agriculture and Rural Development in view of the New Common Agricultural Policies 2014 – 2020*, Academia Română printing house, București
2. Bohateret V.M, Brumă I.S., (2015). *The Future of Rural Household in Romania in terms of the Agricultural Censuses*, the sixth edition of the international symposium Agrarian Economy and Rural development — Realities and Perspectives for Romania, ICEADR, ASAS București, ASE printing house, București
3. Brumă I. S., Bohateret V.M., Tanasă L., (2017). *Questionnaire Template ” The Condition of the Individual Agricultural Household”*
4. *** 2004. The General Agricultural Census from 2002, INS București
5. ***2004. The Census of Population and Dwellings from 2002, INS București
6. *** 2012. The General Agricultural Census from 2010, INS București
7. ***2013. The Census of Population and Dwellings from 2011, INS București
8. ***2017. The maps of the following counties: Bacău, Botoșani, Iași, Suceava, Neamț, Vaslui, scale 1:100.000, digital format, ANPI

THE MATERIAL AND HUMAN BASIS USED IN TOURISM AND AGROTOURISM IN TULCEA COUNTY

EUGENIA-DORINA CIOBANU(RĂDOD)¹,
RALUCA-ALEXANDRA NECULA²

Abstract:*The present article aims to identify, analyze and present the evolution, in recent years, of the technical-material and human basis used in the tourism and agrotourism in Tulcea County. In order to do that, the following indicators have been used in the analysis: the evolution of the tourism and agrotourism boardings from Tulcea County, the evolution of the tourist accommodation structures with lodging functions – from the rural area – Tulcea County, the evolution of the accommodation capacity, the evolution of the civil population sorted by national economy activities – Tulcea County, the evolution of the average number of employees sorted by national economy activities - Tulcea County and the evolution of the average number of employees from hotels and restaurants – Tulcea County. At the end of this analysis, we can conclude that the technical-material and human basis used in the tourism and agrotourism activity in Tulcea county is there, but is underdeveloped compared to the touristic potential of the area, that is not capitalized to its maximum capacity in the tourism and agrotourism activity.*

Key words: *tourism, agrotourism, Tulcea*

JEL classification: L83

INTRODUCTION

In this article we are going to analyze and present, with help from the indicators cited in the rows above, the evolution of the technical-material and human basis used in the tourism and agrotourism activity in Tulcea County, in the past 5-6 years.

The technical-material basis – or the tourist infrastructure - represents the sum of technical and urbanistic endowment necessary in order to insure the advertised good tourist services. Within the technical-material basis there are: the accommodation structures - the lodging and food service capacity, the recreation structures, the treatment structures (hydropathic tourism), as well as the network of services associated with tourism (tourist transport, special services).[1]

The development of the tourism industry is generating jobs – the human basis used in tourism. Taking under consideration the diversity of the tourism industry, we can talk about a multitude of activities that generate jobs: accommodation, rehabilitation, recreation, commerce, transport, inventory etc., plus the manpower that is activated in the sectors that supply the touristic enterprises.[2]

In Tulcea County, the build-up of modern structures amplified starting with 2001, so in the Danube Delta have emerged a multitude of villas that combine the area's tradition with everything that stands for the comfort and the conditions required for quality tourism.

However, the accommodation structures from this area are insufficient and that is why most tourists stay in the inhabitants's households or in tents.[3]

MATERIALS AND METHODS

In order to analyze the evolution of the technical-material and human basis used in the tourism and agrotourism activity in Tulcea County, we are going to use the following statistical indicators, appropriate for tourism: the evolution of the agrotouristic boards from Tulcea County, the evolution of the tourist accommodation structures with lodging functions – in the rural area – Tulcea, the evolution of the accommodation capacity from the tourist structures with lodging functions – in the rural area – Tulcea, the evolution of the civil population sorted by national

¹ PhD Student, University of Agricultural Sciences and Veterinary Medicine Bucharest, Bucharest, Romania, email: radoi_eugenia_dorina@yahoo.com

² Lecturer, Ph.D, University of Agricultural Sciences and Veterinary Medicine Bucharest, Bucharest, Romania, email: raluca_nec@yahoo.com

economy activities– Tulcea, the evolution of the average number of employees sorted by national economy activities – Tulcea County and the evolution of the average number of employees from hotels and restaurants – Tulcea County. The data used in this article has been taken and analyzed from the statistical data of The National Institute of Statistics.[4]

RESULTS AND DISCUSSIONS

Services and tourism are the main departments that have a high investment potential in Tulcea County, said the the specialists who attended the trade symposiums. Tourism is the only tenable source for local development.[5]

In Tulcea County, an important source of income that has been developed after 1990 is the agrotourism. Many locals, feeling the tourism potential that the Delta has to offer, as well as the lack of an organized tourism, of accommodations, have developed their own business by accommodating tourists in their households, by offering them more and more services, by adapting quickly to the market demands.[6]

In 2009, Tulcea’s Country Council drafts The Strategic Plan for Durable Tourism Development in the Danube Delta, the tourism activity thus becoming a primary development area in the county.[7]

In the purpose of developing the tourism activity, the Tulcea City Hall drafts the Development Strategy for the Tulcea Municipality 2014-2020. [8]

Also, The Local Development Plan GAL “ORIZONTURI 2012”, had the same objectives of developing the touristic area Tulcea – Danube Delta.[9]

Following those efforts the tourism activity has developed a lot in the last years in Tulcea County. The agrotourism being the most successful tourism form throughout the territory of this important tourism area in our country.

Agrotourism is defined by romanian authors as “the particular form of rural tourism with a higher degree of complexity, gathering the tourism activity itself (accommodation, services, recreation, etc), as well as the economical activity, usually agrarian exercised by the tourist’s hosts (the production activities, the manufacturing of agrarian products from the household and the merchandising of those products”.[10]

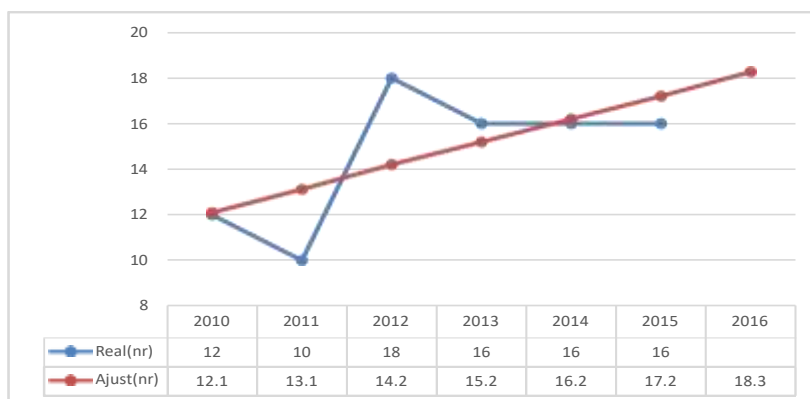
In the rows below we will present a short analysis of the existence and and evolution of the material and human basis used in the tourism and agrotourism activity in Tulcea County.

We note in the first phase that the number of agrotourism bords has increased a little in the last years, with an increase rate of 5.9%, from 12 units in 2010, to 16 units in 2015.

The largest number of agrotourism boards existing in the County was registered in 2012, when there were 18 units of this type operating in Tulcea.

Tabel 1. Indicatorii statistici ce caracterizează media pensiunilor agroturistice, din Tulcea, pe perioada 2010-2015

Valori	2010	2015	Extrpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(nr)	12	16	x	14.60	3.01	20.50	mare	5.9
Ajust(nr)	12.1	17.2	18.3	x	x	x	x	x



Grafic 1. Evoluția tendinței numărului de pensiuni agroturistice din Tulcea, pentru anul 2016 ($Y=1.028x+11067$; $R^2=0,41$; $r=0,64$)

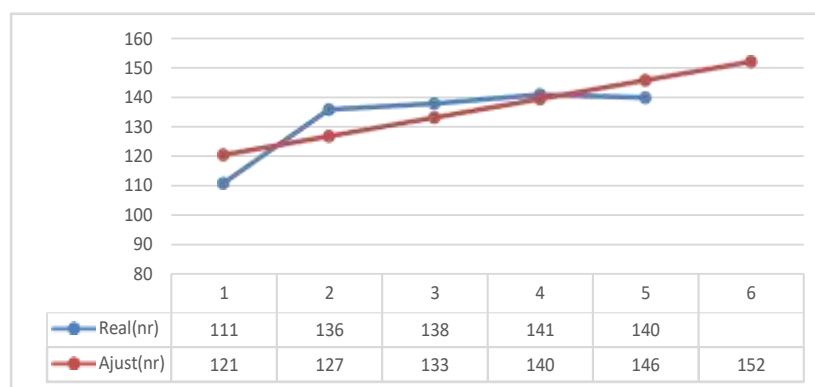
Also, the total number of touristic accommodating structures from Tulcea County has increased from 111 units existing in 2011 to 140 units existing in 2015.

Here also, in 2014 there were registered 141 tourist accommodations, the largest number in the analyzed years. It is observed that the annual increase in the analyzed years is 6% for the number of tourist accommodation structures with lodging functions from the rural area of Tulcea County.

This proves the evolution of the rural tourism and agrotourism that took place in the County between 2010-2015.

Tabel 2. Indicatorii statistici ce caracterizează media structurilor de primire turistică cu funcțiuni de cazare, din mediul rural - Tulcea, pe perioada 2010-2015

Valori	2011	2015	Extpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(nr)	111	140	x	133.20	12.56	9.43	mic	6.0
Ajust(nr)	121	146	152	x	x	x	x	x

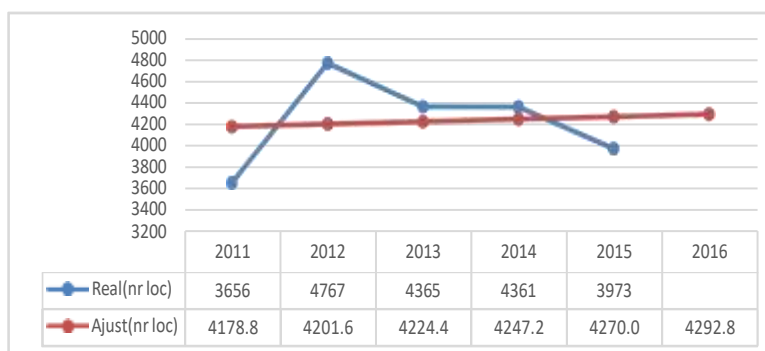


Grafic 2. Evoluția tendinței numărului de structuri de primire turistică cu funcțiuni de cazare, din mediul rural - Tulcea, pentru anul 2016 ($Y=6.3x+114.3$; $R^2=0,63$; $r=0,79$)

Obviously the lodging capacity in the tourist accommodation structures has increased compared to 2011, the County having in 2015 3973 accommodation places. Although over the years 2012-2014, there has been registered a decrease from year to year. In 2012 has been registered the highest accommodating capacity with a number of 4767 accommodation places, a number that decreases after that to up to 3973 places.

Tabel 3. Indicatorii statistici ce caracterizează media capacității de cazare în structurilor de primire turistică cu funcțiuni de cazare, din mediul rural - Tulcea, pe perioada 2010-2015

Valori	2011	2015	Extpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(nr loc)	3656	3973	x	4224.40	424.01	10.04	mijlociu	2.1
Ajust(nr loc)	4179	4270	4293	x	x	x	x	x



Grafic 3. Evoluția tendinței capacității de cazare în structurile de primire turistică din mediul rural - Tulcea, pentru anul 2016 ($Y=22.8x+4156$; $R^2=0,01$; $r=0,08$)

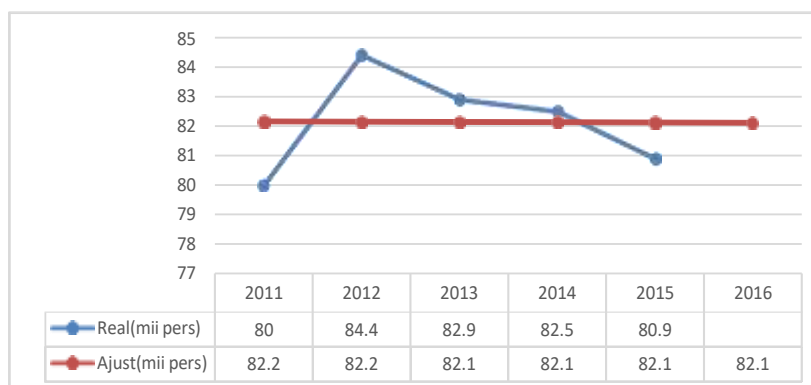
Moving on, we are going to analyze the human basis of the tourism activity in Tulcea County and the registered evolution from the last years.

In the table below we can also see a small increase of the tourism human basis.

So, the annual increase rate of the people who work in the tourism activity in the County is 8,47%, and of the employees in general, the increase rate has been of 0,3% per year.

Tabel 4. Indicatorii statistici ce caracterizează media angajaților din Tulcea, pe perioada 2010-2015

Valori	2011	2015	Extpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(mii pers)	80	80.9	x	82.14	1.73	2.10	mic	0.3
Ajust(mii pers)	82.2	82.2	82.2	x	x	x	x	x

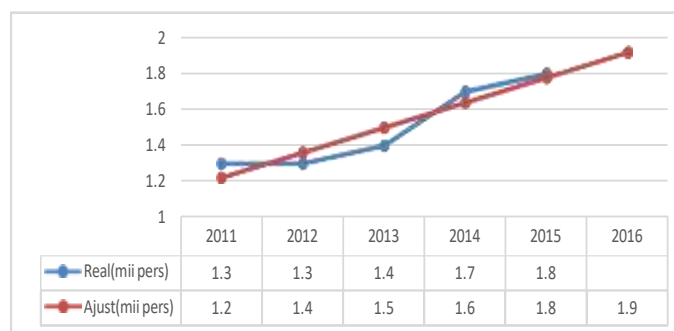


Grafic 4. Evoluția tendinței numărului de angajați din Tulcea, pentru anul 2016 ($Y=0.01x+82.17$; $R^2=0,01$; $r=0,07$)

In the chart below we can see the increase of the number of persons who have been hired in the tourism activity from 1,3 thousand persons in 2011, to 1,8 thousand persons in 2015.

Tabel 5. Indicatorii statistici ce caracterizează media angajaților din hoteluri și restaurante, din Tulcea, pe perioada 2010-2015

Valori	2011	2015	Extpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(mii pers)	1.3	1.8	x	1.50	0.23	15.63	mijlociu	8.5
Ajust(mii pers)	1.2	1.8	1.9	x	x	x	x	x

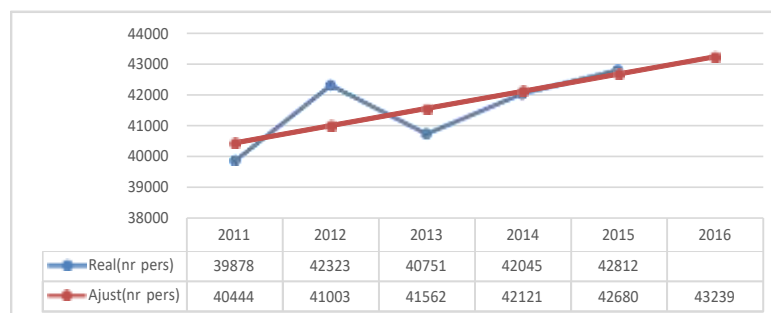


Grafic 5. Evoluția tendinței numărului de angajați din hoteluri și restaurante din Tulcea, pentru anul 2016 ($Y=0.14x+1.08$; $R^2=0,89$; $r=0,94$)

The employees average in Tulcea has also registered an increase of 1,8% per year between 2010-2015, which can be observed in the data below.

Tabel 6. Indicatorii statistici ce caracterizează media salariilor din Tulcea, pe perioada 2010-2015

Valori	2011	2015	Extpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(nr pers)	39878	42812	x	41562	1211	2.91	mic	1.8
Ajust(nr pers)	40444	42680	43239	x	x	x	x	x

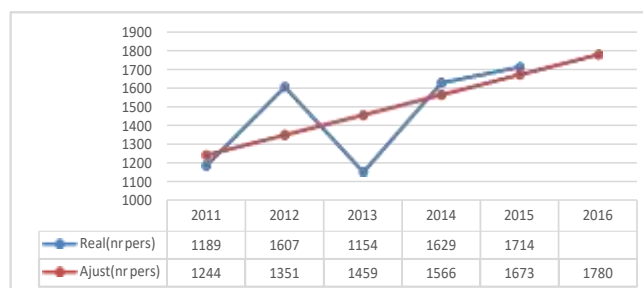


Grafic 6. Evoluția tendinței numărului de angajați din Tulcea, pentru anul 2016 ($Y=559x+39885$; $R^2=0,53$; $r=0,73$)

We can also see in the figures that show the average number of employees from hotels and restaurants an increase of 9,6%, through 2011-2015.

Tabel 7. Indicatorii statistici ce caracterizează media salariilor din hoteluri și restaurante din Tulcea, pe perioada 2010-2015

Valori	2011	2015	Extpr 2016	Medie	Stdev	Coef var(%)	semnf	Ritm anual(%)
Real(nr pers)	1189	1714	x	1459	265	18.20	mijlociu	9.6
Ajust(nr pers)	1244	1673	1780	x	x	x	x	x



Grafic 7. Evoluția tendinței numărului de angajați din hoteluri și restaurante din Tulcea, pentru anul 2016 ($Y=107.2x+1137$; $R^2=0,41$; $r=0,64$)

CONCLUSIONS

After all the data presented and analyzed above, we can conclude that the material and human basis of the tourism from Tulcea County has had in the first phase, starting with 2011, a considerable increase, then a small decrease starting with 2012, the year of 2015 bringing an increase again, which proves the fact that there is still a need to develop and diversify in order to provide a good quality tourism services.

Building new tourist accommodation units, upgrading the existing ones, hiring tourism qualified personnel, professional training for people who already work in this domain, promoting the tourism area nationally as well as internationally, are just a few of the action strategies that those involved in the tourism and agrotourism activity developed in Tulcea County need to follow.

The natural tourism potential of the area is extremely rich due to the existence of the Danube Delta, the Biosphere Reservation, unique in Europe, which provides multiple possibilities for development, capitalizing and the increase of the standard of living for the inhabitants in Tulcea County.

At the moment, this huge tourism potential is not capitalized at full capacity as the number of tourists is smaller than it could be in this important tourism area, one of the reasons being the technical-material basis, respectively the tourism infrastructure of the County which is poorly developed and the human resources used in this activity are unqualified or insufficient.

BIBLIOGRAPHY

- [1] Geografia turismului, accessible on-line at: http://www.unibuc.ro/prof/ene_m/docs/2014/noi/05_11_38_051_Geografia_Turismului.pdf, accessed in January 2017
- [2] Rolul resurselor umane în turism, accessible on-line at: <http://www.rasfoiesc.com/business/afaceri/turism/ROLUL-RESURSELOR-UMANE-IN-TURI95.php>, accessed in January 2017
- [3] Prezentarea Rezervației Biosferei, accessible on-line at: <http://www.creeaza.com/afaceri/turism/Prezentarea-Rezervatiei-Biosfe958.php>, accessed in January 2017
- [4] Institutului Național de Statistică, accessible on-line at: <http://statistici.insse.ro>, accessed in January 2017
- [5] România actualități, accessible on-line at: http://www.romania-actualitati.ro/serviciile_si_turismul_domenii_cu_mare_potential_in_tulcea-95178, accessed in January 2017

- [6]Info Delta, accessible on-line at: <http://www.info-delta.ro/traditii-in-dobrogea-28/>, accesed in January 2017
- [7]Plan strategic turism, accessible on-line at:
http://www.ddbra.ro/media/Plan%20strategic%20turism%20DD_Mai%202009.pdf, accesed in January 2017
- [8]Strategia de dezvoltare Tulcea, accessible on-line at:
http://www.primariatulcea.ro/files/anunturi/Strategia_Dezv_Tulcea_FINAL.pdf, accesed in January 2017
- [9]Plan de dezvoltare locala, accessible on-line at: <http://www.gal-orizonturi2012.ro/uploads/PDL/ORIZONTURI%20PDL.pdf>, accesed in January 2017
- [10]Brezuleanu S., Management agroturistic, Editura USAMV Iasi, Iasi 2006

THE INFLUENCE OF EUROPEAN FUNDS IN VISIBLE DEVELOPMENT OF RURAL AREAS - CASE STUDY, PLACE. CIUGUD, ALBA COUNTY

DUMITRU EDUARD ALEXANDRU¹

Abstract: *The situation in which the Romanian rural village presents itself is not at all happy, identifying a whole series of problems that may contribute to the worst phenomenon, namely the depopulation of the rural area, characterized by the migration of young people to the big urban centers and the birth rate to an extremely low level. This country-wide phenomenon, but with a more marked manifestation in rural areas, seems to be driven by poor living conditions, lack of jobs, including life perspectives, which make young people leave regions.*

Those who are involved in the development of these localities are almost non-existent, most often determined by the lack of funds necessary for the investments that could develop the locality or the region, which would then attract investors, thus creating jobs, which could facilitate leaving young people in rural areas.

With the involvement of local authorities by attracting European non-reimbursable funds, the conditions for a harmonious development of these settlements could be created, in which their youth would be the engine of their development.

Keywords: *The Romanian village, the young people from rural areas, the rural environment*

Classification JEL: *Q19*

INTRODUCTION

As defined in the Lisbon Agenda, rural space is defined as "one of the fundamental and defining values for Europe that must be preserved, cared for and promoted." Since then, since 1998, the European Union has focused on protecting such areas, so as to avoid the danger of their disappearance. One of the main arguments for the protection of rural space is represented by the fact that it represents the origins of the current society in which we live, and its eventual disappearance would amount to loss of identity as a country but also as a people.

The word "rural" comes from the Latin *ruris*, *ruris* referring to culture, fields, occupied territory, inhabited, arranged or worked by man. Rural includes all non-urban activities and comprises three essential parts, namely: administrative communities, strong population dispersion and collective services, and the special economic role of agriculture and forestry.²

In Romania, there are several localities that make a discordant note of the Romanian village, which is characterized by the fact that the population in the locality has an ascending trend due to the young people remaining in these localities. In this situation is also the village of Ciugud, 10 km from the city of Alba Iulia, and consists of six villages: Ciugud (residence), Drâmbar, Hăpia, Limba, Șeușa and Teleac.

Ciugud is the only commune in Alba County where the population is steadily growing. From 2,664 inhabitants, according to statistical data from the 2011 census, the population of the commune reached 3048 inhabitants, of which 96.49% are Romanian, indicating that 2.79% said ethnicity. From a confessional point of view, 86.84% are Orthodox, 4.48% Christians after the Gospel, 3.25% Baptists (3.25), and 2.13% Pentecostal. For 2.95% of the population, confessional membership is unknown.³

The main role in the development of rural areas lies with the local public authorities, which contribute to the economic agents in the area as well as to the population, who also play an essential role in the development of these areas.

Of the total area of the country, about 87.1% represents the rural space, made up of communes, as administrative-territorial units, and the component villages, inhabiting almost half of Romania's population. In rural areas, agriculture dominates the net as an economic activity, occupying about 70% of the workforce, while the non-agricultural sector is reduced especially to small

¹ ASC. Eduard Alexandru Dumitru: Research Institute for Agriculture Economy and Rural Development;

² Bold, I., Buciuman, E., Drăghici, N., Spațiul rural – definire, organizare, dezvoltare. Editura Mirton, Timișoara, 2003;

³ Information provided by Ciugud Commune City Hall;

commercial or production units as well as to the activities of local authorities or the subordinated institutions their.⁴

MATERIALS AND METHODS

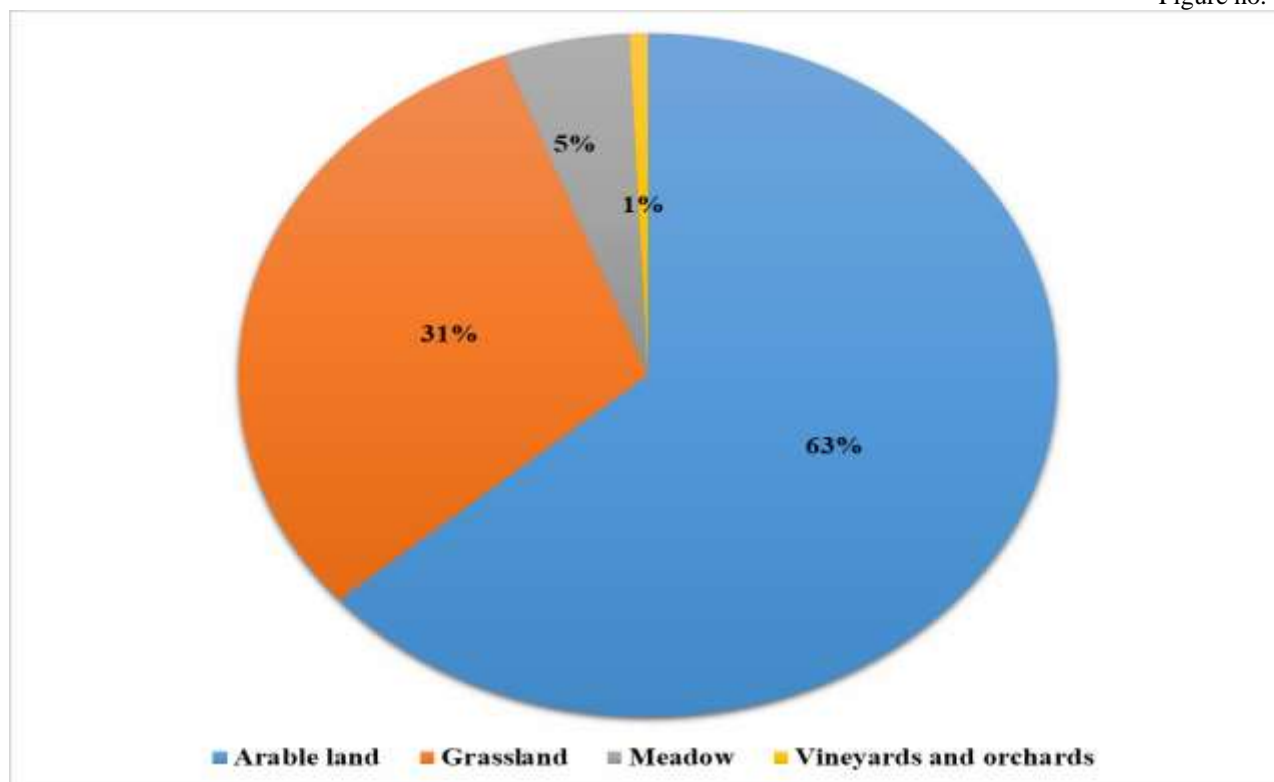
The research is based on information obtained from the processing of the data distributed by the National Institute of Statistics, but especially from the data obtained from the Ciugud commune in Alba County.

The information obtained will determine the evolution of the population in the commune, the economic situation of the locality, the social situation of the inhabitants of the commune.

RESULTS AND DISCUSSION

The Ciugud Commune in Alba County, comprising six villages: Ciugud (residence), Drâmbar, Hăpia, Limba, Șșeșa and Teleac, has an administrative area of 4376,98 hectares, of which the agricultural land is 3182 hectares.

Figure no. 1.



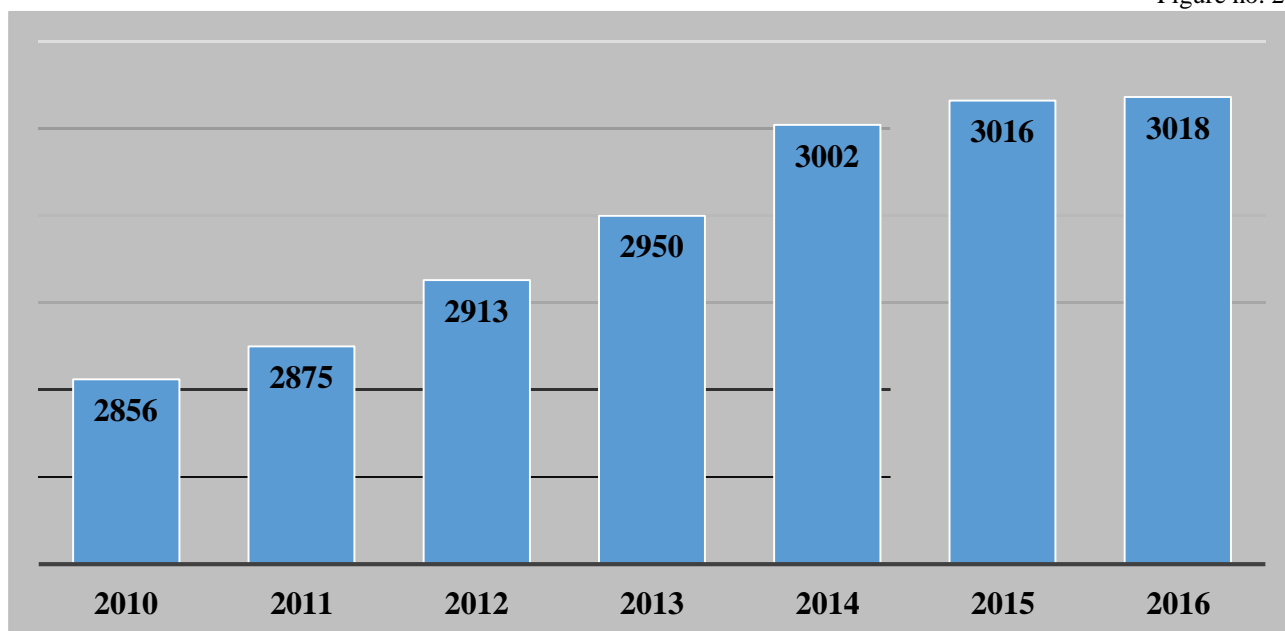
Source: processed data Ciugud Commune, Alba County;

Distribution of agricultural land according to the mode of use

Of the 3182 hectares of agricultural land, about 63% of it is arable land (2023 hectares), 31% is a pasture (977 hectares), and at the opposite is the meadows and vineyards and orchards with 5% (15 hectares) and 1% (23 hectares) respectively (Figure 1).

⁴ Unity and diversity in the Romanian village, Thematic publication no. 24, and II;

Figure no. 2.

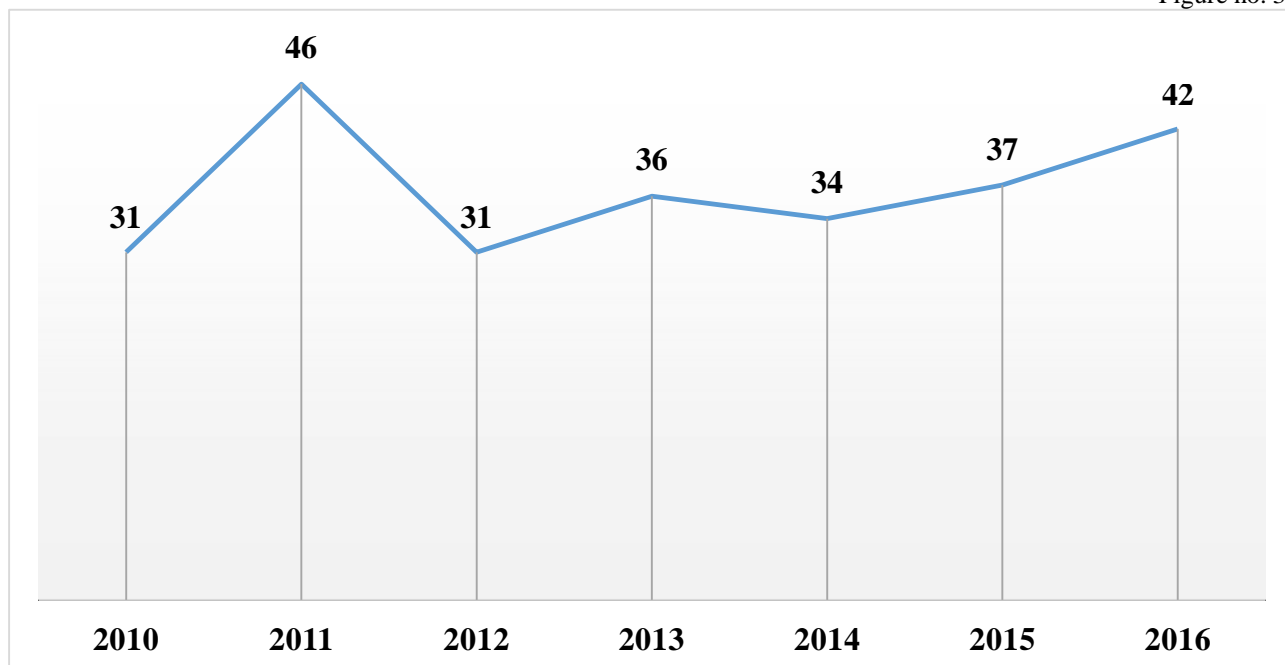


Source: processed data Ciugud Commune, Alba County;

Evolution of the number of inhabitants in Ciugud commune during 2010 - 2016

Regarding the evolution of Ciugud inhabitants, there is an ascending trend during the analyzed period of 2010, until 2016, so that if in 2010 the population of the locality was 2856 inhabitants, at the end of 2016 the population was situated around 3018 inhabitants. The most pronounced increase occurred between 2013 and 2014 when the population of the locality increased by over 1.7% (52 inhabitants) compared to 2013 (Figure 2).

Figure no. 3.

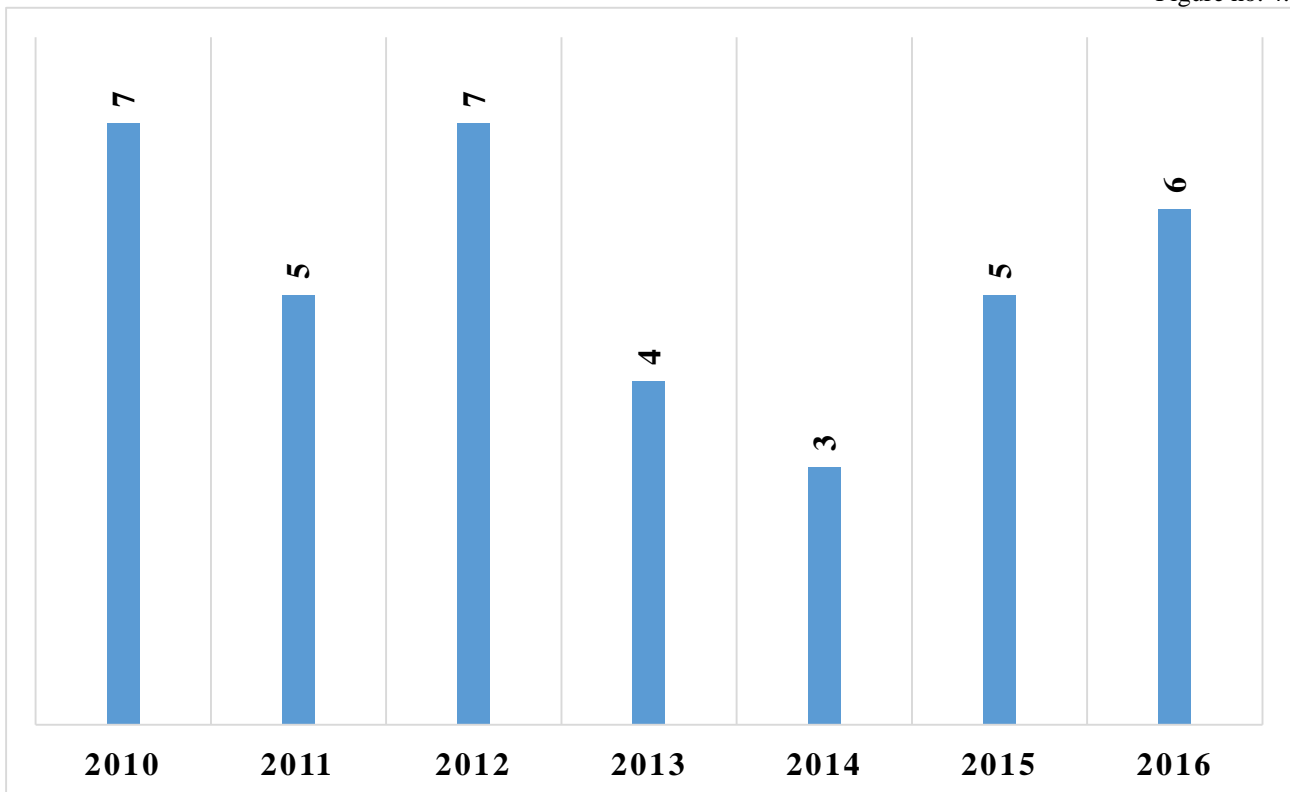


Source: processed data Ciugud Commune, Alba County;

Evolution of the number of deceased persons registered in Ciugud commune during 2010 - 2016

Evolution of the number of deceased persons shows an oscillating trend, with variations between 31 (reached in 2010 and 2012) and 46 registered in 2011, thus averaging 37 deaths per year in the Ciugud town of Alba County during the period 2010 - 2016 (Figure 3).

Figure no. 4.

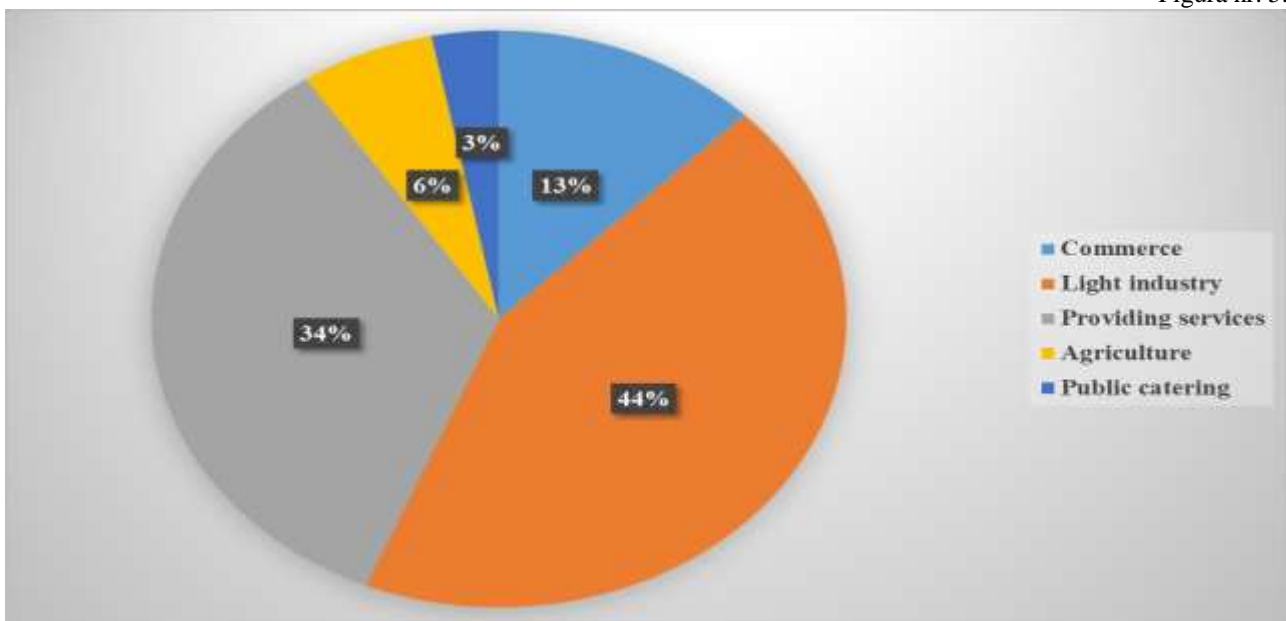


Source: processed data Ciugud Commune, Alba County;

Evolution of the number of social assistants registered in Ciugud commune, between 2010 and 2016

As regards the number of social assistants, it is extremely low compared to other localities in Romania. If in Ciugud County in Arad County the average number of social assisted persons in the period 2010-2016 is about 5 assisted in 3018 inhabitants, for example in Grindu in Ialomita County, the average number of them in the period 2010-2016 is about 52 assisted in a population of 2047 (in 2016), which means a number of social assistants 10 times higher (Figure 4).⁵

Figura nr. 5.



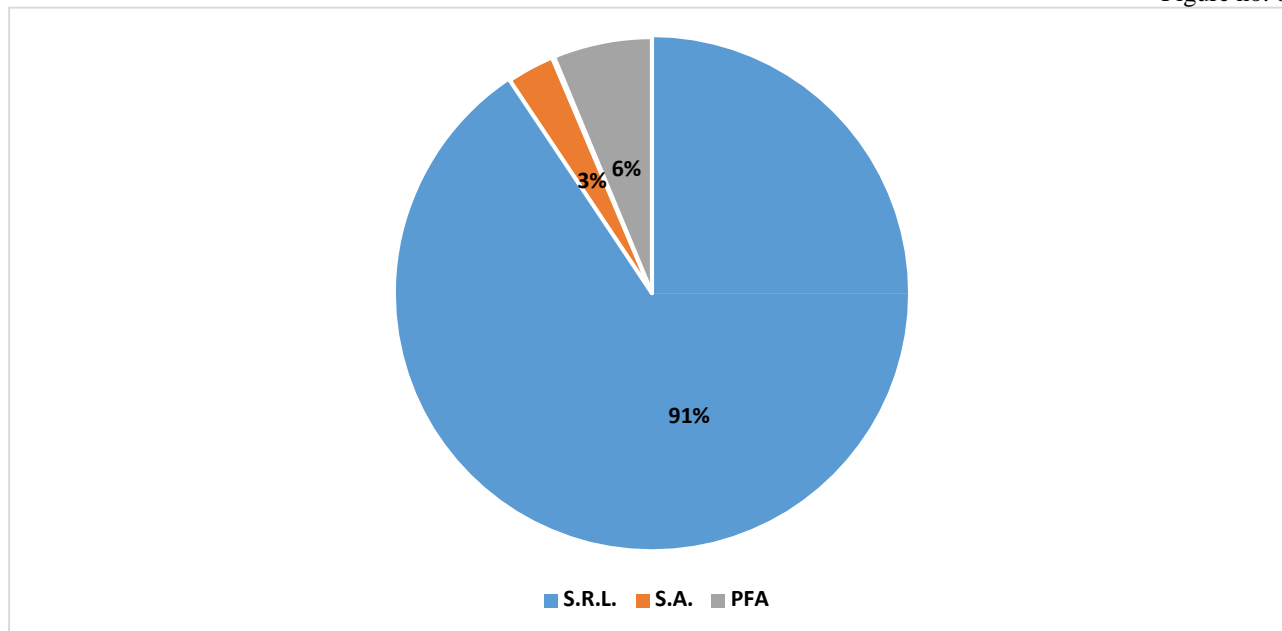
Source: processed data Ciugud Commune, Alba County;

Distribution of economic agents by field of activity

⁵ Analysis of the situation of Romanian Village - case study Grindu commune, Ialomita County;

From the economic point of view of Ciugud, this seems to be a diversified one in which the activities in the light industry predominate, accounting for 44% of the total number of economic agents, followed by 34% of the services. At the opposite end, there are business activities (13%), agriculture (6%) and catering (3%). It should be noted that, unlike the localities in southern Romania, which predominantly focus on agriculture and trade, in this case they are oriented towards light industry (Figure 5).

Figure no. 6.



Source: processed data Ciugud Commune, Alba County;

Distribution of economic agents by legal form

Analyzing the distribution of economic agents according to the legal form they have chosen, it is found that the most common legal form is that of S.R.L. in proportion of 91% of the total companies in the locality (Limited Liability Company), followed by P.F.A. with 6% (Authorized Individuals), and by S.A. of only 3% (Joint Stock Companies). It should be noted that there are no economic agents in the legal form of family enterprises which, by not offering serious advantages to other legal forms, do not encourage the choice of this kind of legal form through which the activities that would engage all family members in a business (Figure 6).

CONCLUSIONS AND RECOMMENDATIONS

The upward trend observed in the evolution of the population of Ciugud in the period 2010-2016 can be attributed to the emergence of jobs especially in different sectors such as agriculture, such as those in the light industry, which manage to provide over 700 places Work of the inhabitants of Ciugud commune, materialized in an industrial park in which more than 20 investors came. Ciugud is also known to be the highest-absorbed European fund, worth more than 16 million euros.⁶

Through its national funding programs, Ciugud has implemented a series of projects aimed at rehabilitating a 400,000-euro gymnasium, introducing the sewerage network in the commune's industrial area (400,000 euros), and renovating 4 homes worth around 900,000 euros.

Also, in order to keep the population in the locality or to attract from other areas, an important role is also the creation of appropriate living conditions, so that through a project financed by the European Agricultural Fund for Rural Development (EAFRD measure 322 of the NRDP 2007-

⁶ processed data Ciugud Commune, Alba County;

2013), over 7 million euro were accessed, with 42 km of sewerage for 9 villages, served by 2 modern treatment plants. The same project introduced the water supply network in 3 villages on a length of 40 km and 8 km of public streets were asphalted.

By measure 125 of the NRDP 2007-2013, over 2 million Euros have been accessed through which 26 km of agricultural road has been arranged and paved, contributing to an increase of the agricultural activity by 80%, and arable land has grown almost entirely.

The traditions play an extremely important role in the cultural development of the localities, and in this sense investments have been made in modernizing and endowing the Ethnographic Exhibition of Ciugud commune.

In order to facilitate the payment of citizens' fees and contributions to the local budget, a system has been created which, by simply accessing and authenticating on the municipality's website, can pay for the state.

Also, the investments continued in the infrastructure of the locality, namely in the village of Șeșea where the first wind power station in the county was built, which provides the necessary current for public lighting of the locality (through the EEA Financial Mechanism and the Government of Norway), but also in recreation and playing for children on a 1 hectare area.

Practically, investments made in the locality could attract investors, whether foreign or Romanian, which generated jobs for the local population, creating optimal facilities for young people to set up a family. This can be noticed especially by the ascendant trend registered by the number of inhabitants in Ciugud commune in Alba County.

The great majority of the problems encountered and complained by the local public authorities refer to the bureaucracy and the lack of co-financing of the projects through the European funds, but once these obstacles have been overcome, the revitalization of the localities in the rural area is almost guaranteed, and this has to be correlated with a good vision in terms of future investments.

BIBLIOGRAPHY

1. Bădescu, I., Cucu-Oancea, O., Șișeștean, G., 2009. *Tratat de sociologie rurală*. Institutul de Sociologie al Academiei Române, Editura Mica Valahie, București.
2. Bold, I., Buciuman, E., Drăghici N., 2003. *Spațiul rural – definire, organizare, dezvoltare*. Editura Mirton, Timișoara. P. Nistoreanu, (2006), *Ecoturism și turism rural*, Editura ASE, București;
3. Brînzan, O., 2007. *Dezvoltare rurală*. Editura Universității Aurel Vlaicu, Arad.
4. Doltu, C., 2011. *Mediul rural între supraviețuire și oportunități de afaceri*. Editura Expert, București.
5. Dona, I., Dobre, C., Gergely, S., 2005. *Dezvoltare rurală*. Universitatea de Științe Agronomice și Medicină Veterinară, Facultatea de Management, Inginerie Economică în Agricultură și Dezvoltare Rurală, București.
6. Date statistice furnizate de primăria localității Ciugud, din județul Alba;

EVALUATION OF ROMANIA'S POTENTIAL FOR PRODUCING RENEWABLE ENERGY FROM AGRICULTURE AND FORESTRY

ELENA ȘURCĂ¹

Abstract: *Renewable energy production is an alternative to traditional energy resources that are being depleted, these new resources will gradually replace the exhausting energies by combining the three main features of the present century, so that sustainable development, energy security and environmental protection become defining elements in terms of renewable energy production.*

The energy sector communicates and is closely linked to the economic sector, the defining resource with a major influence on the economy being oil, where its exhaustion and other natural energy resources would lead to economic and political instability, which is why it is necessary to highlight the possibility of substitution exhaustible resources through different sources of renewable energies: solar, wind, microhydro, geothermal and biomass.

In view of the above, we will highlight Romania's potential in the production of renewable energy from biomass, the materials provided by the agricultural sector and the forestry sector, but also the energy consumption in agriculture and forestry, as well as the type of biofuel used (liquid or solid), which draws a parallel between the two categories of biofuels obtained from the same resource.

We will also highlight Romania's position in the European Union in this field, highlighting the national and European objectives on this issue.

Key words: *renewable energy, biomass, energy security*

JEL classification: *Q23, Q42*

INTRODUCTION

Renewable energy from different sources comes as a response to all the world's problems with the depletion of natural resources. Over the last three decades, developed countries of the world are looking for solutions to this problem and admit that they face a major challenge that directly affects the lifestyle of man.

The increase in energy consumption has increased with the demographic increase of the population on the globe, which accelerates the pace of increase in the exploitation of natural resources.

The idea of renewable energy has been easily adopted and developed from year to year, so that major changes in the use of the amounts of energy from renewable sources can be observed. According to specialized sites, the amount of renewable energy produced in the European Union increased by 73.1% in 2015 as compared to 2005, representing an average increase of 5.6% per year and 184% over the year 1990 with an average annual growth rate of 4.3%. Total energy production from renewable sources was about 205 million tons of oil equivalent (TOE) in 2015 for the European Union accounting for 26.7% of the total primary energy used from all sources.

According to statistics, the most important source of renewable energy in the EU's 28 Member States is that of solid / liquid biofuels and waste from renewable sources, defined as "direct or indirect biofuels produced from biomass" where biomass represents : "the biodegradable fraction of agricultural and vegetable residues (forest and wood products), residues from related industrial sectors and energy crops", this source of renewable energy represented approximately 63,5% in 2015, of renewable energy production.

At national level, the amount of renewable energy from different sources has evolved, from 2005 to 2015 it increased by 32.5%, from 4,594 (TOE) to 6,090 (TOE), of which the largest source energy is supplied by biofuels and waste from renewable sources, representing 61.9%, followed by hydropower 26.5% being well above the European Union average of 16.5%, wind energy holds a national share of 8.8% in in terms of renewable energy, this is below the European Union average of

¹ *Asistent Cercetare ICEADR - email: surca.elena@iceadr.ro*

11.1%, solar energy accounts for only 2.3% being below the EU average of 6.1% on the last place is geothermal energy with only 0.5% under U.E. of 3.2%.

There are significant differences from one country to another in terms of the supply of renewable energy from different sources, highlighting the country's natural and climatic conditions. For example, countries such as Cyprus and Malta receive renewable energy from solar energy, with this type of energy accounting for a majority share of 66.8% and 83.1% of the total renewable energy produced in the country. In other countries where the mountainous relief prevails (Sweden, Austria, Slovenia, etc.), renewable energy is largely obtained from hydropower, this type of energy represented more than one-third of the renewable energy production in Montenegro, Turkey, Macedonia, Serbia, Norway and Albania, where the share reached almost 90%. Where there are active volcanic processes, renewable energy production is most likely derived from geothermal sources, with the best example being Italy where 23.2% of energy production is obtained from this source. In terms of wind energy, Denmark (34.4%) and Ireland (57.6%) stand out.

Although each type of renewable energy meets certain environmental and climatic conditions, we can state that at European level, agriculture and forestry play an increasingly important role in the supply of organic matter (biomass) in the production of renewable energy, in the year 2015 the production of solid biofuels from agriculture and forestry was 91 million tons of oil equivalent, 5.9% more than the energy produced in 2010 and 4.8% more than in 2014.

According to the current European legislation on the use of energy from renewable sources, adopted by co-decision (Directive 2009/28 / EC, repealing Directives 2001/77 / EC CE and 2003/30 / EC) on 23 April 2009, set the following objectives:

By 2020, the European Union's energy consumption should come from 20% renewable energy sources and all Member States must ensure that by 2020, 10% of transport fuels come from renewable sources.

MATERIALS AND METHODS

One of the methods used in the work is the quantitative and qualitative analysis of statistical data provided by various national, European, or world-wide specialized sites. Analysis of existing legislation on the use of renewable energy at both national and European level, highlighting the current political framework on this subject, in particular reports and regulations of the European Commission's Directorates-General for Renewable Energy, as well as analysis of existing documents Specialty literature.

I will also use the comparative analysis highlighting the main renewable energy producing countries from the two sectors, agriculture and forestry, compared to Romania.

RESULTS AND DISCUSSIONS

Primary energy obtained from biomass and renewable waste in 2015 was 130 million toe in the 28 EU Member States (representing 63.4% of total renewable energy) as can be seen in Table 1, resulting from solid biofuels (Table 2) and liquid biofuels (Table 3) used in transport, agriculture / forestry and related services.

For the year 2015, the largest share of primary energy production from renewable sources in agriculture and forestry as biomass and renewable waste from the total European Union is held by Germany, according to Table 1, it can be seen that this country holds the highest share (20.15%), followed closely by France (10.7%) and Italy (8.25%).

Table no. 1
Primary energy production from renewable sources in agriculture and forestry
Biomass and renewable waste

Thousands of tons of oil equivalent - TOE

Country / year	2013	2014	2015
European Union (28 countries)	125776	125229	130201
Belgium	2369	2252	2163
Bulgaria	1187	1171	1247
Czech Republic	3631	3793	3863
Denmark	2016	1922	2222
Germany	23860	25493	26229
Estonia	1075	1132	1223
Ireland	303	338	333
Greece	1073	1098	1178
Spain	6761	7036	7009
France	14418	13263	13931
Croatia	1511	1432	1584
Italy	10640	9973	10740
Cyprus	18	20	19
Latvia	1876	2188	2158
Lithuania	1186	1261	1359
Luxembourg	73	93	85
Hungary	3110	2793	3034
Malta	2	3	3
Netherlands	3788	3917	3971
Austria	5302	5079	5401
Poland	7252	7169	7473
Portugal	3099	3136	3104
Romania	3824	3772	3698
Slovenia	652	563	620
Slovakia	987	1014	1203
Finland	8758	8869	8750
Sweden	10633	10245	10480
United Kingdom	5852	6205	7126

Table no. 2
Solid biofuels (excluding coal) from biomass and renewable waste

Thousands of tons of oil equivalent - TOE

Country / year	2013	2014	2015
European Union (28 countries)	90347	87229	91443
Belgium	1389	1104	1171
Bulgaria	1122	1087	1160
Czech Republic	2769	2842	2954
Denmark	1426	1308	1590
Germany	10902	11425	12062
Estonia	1067	1122	1209
Ireland	183	210	202
Greece	847	869	952
Spain	5205	5161	5260
France	10360	9078	9661
Croatia	1465	1375	1532
Italy	7448	6539	7340
Cyprus	5	7	7
Latvia	1752	2046	2009
Lithuania	1041	1117	1205
Luxembourg	46	66	55
Hungary	2683	2363	2511
Malta	:	:	:
Netherlands	1202	1290	1364
Austria	4718	4227	4474
Poland	6837	6180	6268
Portugal	2662	2671	2603
Romania	3657	3646	3621
Slovenia	616	533	590
Slovakia	769	760	890
Finland	8082	8117	7901
Sweden	9211	8923	9129
United Kingdom	2884	3165	3824

Table no. 3
Liquid biofuels obtained from biomass and renewable waste

Thousands of tons of oil equivalent - TOE

Country / year	2013	2014	2015
European Union (28 countries)	12743	13982	13661
Belgium	462	577	392
Bulgaria	47	68	60
Czech Republic	228	261	216
Denmark	20	19	13
Germany	3156	3597	3319
Estonia	:	:	:
Ireland	22	24	24
Greece	138	142	134
Spain	877	1318	1235
France	2419	2541	2519
Croatia	30	31	15
Italy	549	614	682
Cyprus	2	:	1
Latvia	60	67	61
Lithuania	118	112	114
Luxembourg	:	:	:
Hungary	305	306	377
Malta	1	1	1
Netherlands	1,482	1,520	1,440
Austria	231	381	445
Poland	700	745	936
Portugal	274	301	321
Romania	147	166	157
Slovenia	2	:	:
Slovakia	148	147	149
Finland	365	406	473
Sweden	457	311	276
United Kingdom	504	390	301

Source: Eurostat; June 2017; European Commission - DG Energy; Sankey diagram dataset - annual data

At the national level, out of the total of 238,397 thousand hectares, the sum of Romania's surface, 61,4% is represented by the agricultural area and 28,3% of the area covered by forests and other lands with forest vegetation, in 2015, about 3.7 million toe from biomass and renewable waste, in this context we can see that Romania held 2.8% of the total biomass and renewable waste obtained at European level, being on the 11th place, with the smallest amount of biomass and renewable waste being Malta with only 3000 tons of oil equivalent.

From biomass and renewable waste obtained from the forestry sector, mainly biofuels are obtained, which are defined according to national and international normative documents as the most easily obtained from biomass with vegetal source, from which can be obtained sawdust (briquettes), straw, etc. by transforming cellulosic waste, they can be used in thermal plants and thus can successfully replace coal which is considered a polluting fuel.

Biomass and renewable waste produced from the agricultural sector mainly produce liquid biofuels, characterized by biodiesel and bioethanol. Obtaining biodiesel is made from oilseeds and can replace all or part of the use of petrodiesel, it can also be mixed with diesel oil. The process of producing bioethanol is a little more complex, it can also be obtained from the agricultural sector in cereal plants, but also from the pulp sector, called second-generation bioethanol.

Thus, considering both table no. 2 and Table no. 3, we can see that from the same biomass and renewable waste source the different amounts of liquid and solid biofuels are obtained, out of a

total of 130 million toe obtained in 2015 at European level, 91 million toe biofuels solids, (2%) and 13 million tons of liquid biofuels (10%), the remaining 19.78% of biomass and renewable waste being lost to biofuel production. At national level of 3698 thousand biomass toe, are produced 3521 thousand toe of solid biofuels and 157 thousand toe of liquid biofuels.

In order to determine Romania's potential for biomass production, we divided the country into eight regions according to table no. 4, where the potential of biomass, regions and total is highlighted.

Table no. 4 Potential of areas in biomass production

No.	Areas	Forest biomass 1000 t/year TJ	Wood waste 1000 t/year TJ	Agricultural biomass 1000 t/year TJ
I	The Danube Delta	-	-	-
		-	-	-
II	Dobrogea	54	19	844
		451	269	13,422
III	Moldavia	166	58	2,332
		1,728	802	37,071
IV	Carpathian	1,873	583	1,101
		19,552	8,049	17,506
V	Plateau of Transylvania	835	252	815
		8,721	3,482	12,956
VI	Western Plain	347	116	1,557
		3,622	1,603	24,761
VII	Sub Carpathian	1,248	388	2,569
		13,034	5,366	40,849
VIII	Southern Plain	204	62	3,419
		2,133	861	54,370
Total		4,727	1,478	12,637
		49,241	20,432	200,935

Table no. 5 Biomass Energy Potential for 2030

Parameter	M.U	Technical	Economic
a) Plant biomass			
Thermal / electrical energy	TJ/year	471000	289500
	1000 toe/year	11249	6915
b) Biogas			
Thermal / electrical energy	TJ/year	24600	14800
	1000 toe/year	587	353
c) Urban waste			
Thermal / electrical energy	TJ/year	22800	13700
	1000 toe/year	544	327
Total	TJ/year	518400	318000
	1000 toe/year	12382	7595

Source: INL ICEMENERG; Study on the assessment of the current energy potential of renewable energy sources in Romania (...), Identifying the best locations for developing investments in unconventional energy production (synthesis)

We find that the Sub-Carpathian region has the greatest potential in obtaining wood waste and forest biomass, with regard to the biomass obtained from agriculture, we can see that the South Plain Region is highlighted, recording the largest quantities. The total amount of biomass is of 18,842 thousand tons or 270,608 terajoule representing, by the conversion process, 6463 thousand tons of beer by 74% more than in 2015. Thus, by 2030, according to the National Institute of Research and Development for Energy (ICEMENERG Bucharest), the plant biomass obtained from the forestry and agricultural sector will produce a thermal / electric energy of 11249 thousand TOE/ year equivalent to 471000 terajoule /year.

Analyzing figure no. 1, where the geographical distribution of the vegetal biomass resources is presented, we can see that the richest counties of forest resources for the purpose of energy production are: Suceava (647 thousand cubic meters representing 66.03% of the total biomass resources obtained at county level), Harghita (206.5 thousand m³ / 70.81%), Neamt (175 thousand m³ / 20.59%) and Bacau (132 thousand m³ / 12.64%). At the opposite pole with the poorest counties on this type of resource are the counties located in the south of the country: Constanta (10.4 thousand mc / 0.58%), Teleorman (10.4 thousand mc / 0.84%), Galați 10 thousand cubic meters / 0.67%) to mention is that in these counties the agricultural resource predominates.

The richest counties from the point of view of the agricultural resource used as biomass in energy production are Timis (1432 thousand tons / 98.6%), Călărași (934 thousand tons / 98.9%) and Brăila (917 thousand tons, 99.15%). At the opposite pole with the poorest counties on this type of resource are the counties: Harghita (41 thousand tons) Covasna (73 thousand tons), Brașov (89 thousand tons) although at the county level the type of agricultural resource predominates, the obtained quantities are the smallest country-wide.

Figure no. 1 Romanian Energy Potential in Biomass Production



STRONG POINTS	WEAK POINTS
<ul style="list-style-type: none"> ✓ Existence of large areas of unused agricultural land or degraded land for classical crops that can be used for the establishment of energy crops ✓ Existence of large quantities of agricultural residues from classical cultures usable for energy production ✓ Growing demand for thermal energy by reducing emissions related to energy deployment / use ✓ Preoccupation of public authorities for the use of building heating solutions using renewable energy, especially biomass ✓ Existence of certain associations of forest entrepreneurs ✓ The emergence of clusters (Green Energy, ProWood, RegioFA, RenErg etc) that promote technological and innovative transfer in the field of renewable energy / biomass. ✓ The current existence of Norwegian funds with application domains - RES use ✓ The Structural Funds provide for all the funding areas provided as eligible actions to increase energy efficiency and renewable energy production. ✓ Higher education institutions / research with research platforms dedicated to renewable energy eg: - Transilvania University of Brasov; 	<ul style="list-style-type: none"> ✗ Excessive use of wood waste for non-energy industrial applications; ✗ Reduced woodland areas with sustainable management to provide an important amount of wood biomass; ✗ The difficulty of organizing biomass feedstocks for medium / long term biomass for high power projects; ✗ Reduced market for biomass products: briquettes, pellets - necessary for individual heating applications for dwellings; ✗ Lack of an implemented system for the collection of agricultural waste for biomass. ✗ Lack of studies - potential analysis of biomass by type at regional level ✗ Hard access to high performance technologies (such as high efficiency cogeneration) for biomass use due to high prices ✗ Insufficient funding for biomass use projects; ✗ Lack of funding lines to support the establishment of energy crops; ✗ Stop the "Green House" national programs devoted to the transition to heating systems using RES / biomass; ✗ Lack of training and certification programs for installers of renewable energy systems; ✗ Low level of staff training in town halls to identify and promote projects for the use of local biomass resources.

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ✓ The ever-increasing price especially for natural gas will lead the consumer towards the use of biomass ✓ Establishment of energy crops on unused land, which can support this area ✓ Possibility of occurring in the big cities of biomass thermal energy production systems that can be occupied by a neighborhood or block of buildings ✓ The development of the economic environment will increase the demand for biomass necessary for industrial processes ✓ Promotion of public-private partnerships for the implementation of pilot projects on the use of biomass ✓ Developing technologies in the use of biomass ✓ National support programs from European funds for the establishment of energy crops ✓ Increasing the interest of local and foreign investors regarding a possible investment in the production and / or use of biomass-biofuels ✓ The emergence of national programs dedicated to supporting the transition to individual or collective heating systems using biomass 	<ul style="list-style-type: none"> ✗ Increased use of wood waste for non-energy industrial applications; ✗ Medium-term non-tariffing in Romania of the prices of electricity and natural gas at European levels will not allow the realization of investments in biomass projects; ✗ Prevalence of export of raw or processed biomass on domestic use (eg export-oriented pellet market); ✗ Further reducing the number of centralized heat distribution systems in cities; ✗ The non-allocation by the central authorities of the necessary funding for programs to promote the use of biomass ✗ Limiting access to state-of-the-art and state-of-the-art biomass technologies due to the high investment value; ✗ Lack of a coherent policy and government strategies to promote the use of local resources for energy production.

Source: Local Action Plan for Bioenergy / Biomass 2014-2020 - Central Region

With the issuance of European Directive 2009/28 / EC, Romania has set ambitious targets for renewable energy for 2020, and in order to achieve these targets, a number of strategic documents have been issued as follows:

- Romania's energy strategy for the period 2007-2020 - approved by GD no. 1069/2007, which has as a general objective the satisfaction of energy both presently and in the medium

and long term with the lowest price. The strategic objectives being given by energy security, sustainable development, environmental protection and competitiveness.

The energy strategy highlights the need for large-scale exploitation of biomass yields that cover about 50% of total energy sources at national level.

➤ Law 220/2008 on the Promotion of the Production of Renewable Energy

This law creates a legal framework for expanding the use of renewable energy sources by setting sustainability criteria for biofuels and bio liquids obtained from biomass, reducing environmental pollution by reducing emissions of greenhouse gases and greenhouse gases, stimulating sustainable local development and regional development and the creation of new jobs for the processes of capitalizing on renewable energy sources.

CONCLUSIONS

Romania is able to develop production systems for all types of renewable energy, depending on the specificity of each geographical area in the country, but the greatest potential in the production of renewable energies is held by: biomass with 65%, wind energy 17%, energy solar 12%, 4% hydrothermal and 2% geothermal and 2% geothermal.

Biomass is the main fuel in the countryside, it has wide uses but it is mainly used in space and water heating, but this renewable energy source covers about 7% of the primary energy and reaches about 50% of Romania's renewable resources potential, this is an important solution for the production of thermal energy through cogeneration technologies, being also the most convenient solution from a financial point of view.

If all the estimated biomass quantity shown in Figure 1 could be used energetically, Romania could meet the Union 2020 target for renewable energy use.

The use of biomass at national level should be promoted and developed, especially in areas that have potential for this type of resource, national legislation on this area should be clearer and the Romanian state should support action on to the use of biomass both thermally and electrically.

This paper cannot explain enough the necessity of using renewable energies at national level, but it may increase your interest in this topic.

BIBLIOGRAPHY

1. DG Agriculture and Development / Statistics Eurostat rural energy
2. Directive 2009/28 / EC, repealing Directives 2001/77 / EC and 2003/30 / EC
3. Ec. Vac Sebastian-Călin, Summary of PhD thesis "Economic and Financial Feasibility of Renewable Energy Resources" Faculty of Agriculture, USAMV Cluj
4. Grigore Marin, Solid biofuels - production and properties. Manual for the Use of Solid Fuels Manufacturers, Chisinau 2016 - ISBN 978-9975-166-2
5. National Institute of Wood, www.inl.ro
6. National Institute for Research and Development for Energy - ICEMENERG Bucharest <http://www.icemenerg.ro/>;
7. Local Action Plan for Bioenergy / Biomass 2014-2020 - Centre Region
8. Study on the assessment of the current energy potential of renewable energy sources in Romania (...), Identifying the best locations for developing investments in unconventional energy production (synthesis)
9. *** http://ec.europa.eu/eurostat/statisticsexplained/index.php/Renewable_energy_statistics
10. *** <http://ec.europa.eu/eurostat/web/energy/data/database>
11. *** http://www.europarl.europa.eu/ftu/pdf/ro/FTU_5.7.4.pdf

SUGAR MARKET IN THE EUROPEAN UNION AND ROMANIA. STUDY ON PRICE DEVELOPMENTS

ȘURCĂ DANIELA-ELENA¹

Abstract: *This paper is based on analysis of the sugar market at national and European level on the development of prices for the sugar market which will analyse the problems leading to stagnation and imbalance national sugar production, try solving the problems identified at national level taking as examples beet farms in Europe for analysing prices. Through sugar market perspectives we have identified the proposed strategy for market development, her objectives and factors affecting the price of sugar in Romania, evolution of prices and consumer price indices.*

Key words: *demand, production cost, supply, consumer price, the sugar market.*

JEL Classification: *Q10, Q13, Q18*

INTRODUCTION

World sugar production exceeds 115 million tons and is located in growing areas of raw materials: beet and cane sugar.

Beet production area is specific for the temperate zones, is located in Europe and North America, but also in the southern hemisphere. The biggest production is owned by Europe, yields per hectare is about three times higher in East than in the West.

Demand annual sugar Romania is about 700,000 tons and production in our country is about 135,700 tons of sugar (raw) of beet sugar which are intended to obtain 430,000 tons of refined sugar while the annual consumption nationally is about 685,700 tons of white sugar. The difference between what is produced in the country and annual consumption, is at least 120,000 tons of white sugar, which is provided by the European Union through imports.

With a low production, Romania needs massive imports of raw sugar to ensure national consumption, our country entered the new system to reduce the quotas only in 2008-2009, and gave up to 44,752 tons of sugar.

European Union agriculture ministers have formally adopted in 2006 a reform of the European sugar sector. The old system which had remained unchanged for 40 years, was thus aligned with the rest of the Common Agricultural Policy (CAP) reforms. Following the reform of the minimum price was reduced by 36% from 631.9 to 404.4 euros per tons in 2009/2010.

Production in the European Union, after only three years of this reform was reduced by 5.8 million tons by closing 80 factories, the loss of 25,000 jobs in rural areas, 138,000 farms have given up cultivating beet sugar and beet acreage in the European Union fell by 700,000 ha.

In our country it was recorded the smallest reduction in the rate of 4% while other countries have reduced their quota by at least 14-15%. On sugar reform at European level an essential element, which came into force as of July 1, 2006 was the establishment of a restructuring fund funded by the leading producers of sugar coming to help the restructuring process making it the industry more competitive. The main objective would be to balance the market, taking a share of almost 6 million tonnes.

This paper is based on the analysis of the sugar market both at national and European level. I will analyze the problems that lead to stagnation and the imbalance of sugar production in Romania and then try to come with proposals to solve problems by taking sugar beet holdings at European and World level as examples.

¹ Assistant research ICEADR - email: surca.elena@iceadr.ro

MATERIALS AND METHODS

Materials and methods we could use are collecting and interpreting quantitative and qualitative analysis of statistical data from 2000 to 2014, provided by: National Institute of Statistics of Romania, Eurostat, Faostat, DG-AGRI. from for the study and for the evolution of prices, I also used following methods:

Methods of quantitative analysis

- Involving the use of statistics.
- Generally based on collection and processing of data "dimensions" great
- Research result is expressed in the form of indicators (average percentage), graphs and tables.
- Comparative analysis method
- Interpretation of results;
- Generalizations evaluation of the results.
- Economic indicators - financial; indices (average production and price, profit, cost,);

Analysis of the legislation on this culture, as well as the analysis of the existing documents in the literature.

RESULTS AND DISCUSSIONS

Surfaces and production of sugar beet in **Europe** - the main producing countries of sugar beet at European level and the top three countries with the largest areas for this crop are France, Germany and Poland.

In 2014 the total area planted with sugar beet in Europe is 1.6231 million ha, which 59.8% - (more than half) is owned by the countries mentioned above. In 2014, France a had the most hectares of sugar beet in Europe, with a cultivated area of 406,000 ha, in the same year Romania had only 31,000 ha

The fewer hectares cultivated was in Portugal just 400 ha, these being affected by the reform of 2007 where production quotas for this country was drastically reduced, France holds 25%, Germany 22.9% and Poland 11.7% of the total European Union for this culture, more than half, while 38% is divided among the 35 remaining countries. Romania has a rate of 1.88%.

The highest percentage in Europe in production of sugar beet they register are the same countries mentioned above, they have the highest productions because they are holding the largest surfaces. Other EU countries have 37% of total production at European level. Romania holds a small percentage of 1% compared to the main producing countries

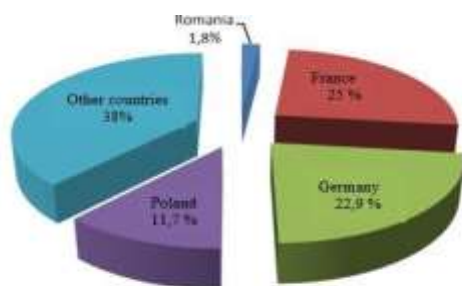


Fig. 1. Situation areas in percent of sugar beet at European level in 2014

Source: Own design based on Faostat data

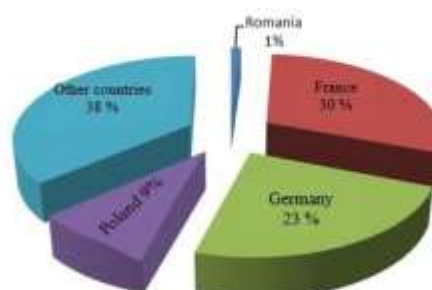


Fig. 2 Situation percentage production of sugar beet at European level, 2014

Source: Own design based on Faostat data

Surfaces and beet sugar production in Romania - Out of 23.8 million ha as totals in Romania, the agricultural area used farm is about 13.3 million ha (55.9%), of which about 9.3 million ha is arable land.

Productions by use: arable land occupies about 62.5% of agricultural land, cereals and oilseeds occupy about 80% of the arable area planted with sugar beet in 2014 is 31,000 ha representing only 0.33% of arable land Romania.

Table 1. Cultivated surface with sugar beet in Romania

	Period	Hectares
Year	1990	162.675
	2010	22.029
	2011	18.816
	2012	27.303
	2013	28.144
	2014	31.000

Source: INSSE

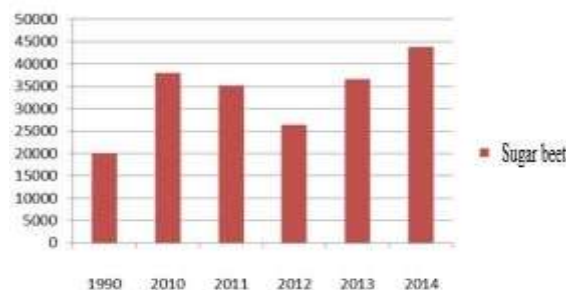


Fig. 3 Average production / ha at national level
Source: INSSE

In the above table are shown the areas planted with sugar beet in 2014 and 2010 at the same time looking at 1990, it found that the surfaces of sugar beet grown considerably decreased. In 1990 registering a very large surface area cultivated the 162,675 ha, 2014 representing a decrease of 80.9% of the hectares planted with sugar beets.

Making a comparison between the year 2014 and year 2010 we see an increase of 8,971 ha compared, which represents an increased interest in sugar beet in recent years.

Sugar beet surfaces in Romania gradually decreased from year to year, the greatest decrease is recorded in the 2014 compared to 1990, reporting the 2014 at every year there is the surface area increased by 64.8% compared to 2011, which is the largest growth area for years before the study except 1990, where cultivation areas of this product were enormous compared to the current.

The average production per ha of sugar beet in 2014 was over 40 tonnes with 7,000 kilograms more than the previous year, where the average yield was less than 36 tonnes. Because the weather was rainy in 2014 is observed this increased production per hectare.

Lowest average production recorded in 1990 due to agro-technical works of the time. As illustrated in the graph occurs a decline in average yields/ha from 2010 until 2012 due to climatic conditions, so that in 2013 the production increase, it is remarkable that the year 2014 recorded the highest production, which is 43 tonnes / ha.

Price evolution in the European Union 2010-2014:

In accordance with art. 9 of Regulation (EU) No. 1370/2013, the minimum price for beet quota referred to in art. 135 of Regulation (EU) No. 1308/2013 is 26.29 EUR / t, up to September 30, 2017.

Beet price can increase / decrease depending on the sugar content, as follow:

- a) For each sucrose content is increased by minimum price:
 - 0.9% sucrose containing more than 16% but not more than 18%
 - 0.7% sucrose containing more than 18%, but not more than 19%
 - 0.5% sucrose containing more than 19%, but not more than 20%
- b) For each 0.1% of sucrose content is reduced by the maximum price:
 - 0.9% sucrose content is below 16%, but not more than 15.5%
 - 1% sucrose content is below 15.5%, but not more than 14.5%
- c) The minimum price for beet quota to be laid down by was:
 - 32.86 euro / tonne for the 2006/2007 marketing year
 - 29.78 euros / tonne for the 2007/2008 marketing year

¶ 27.83 euros / tonne for the 2008/2009 marketing year

¶ 26.29 euro / t in marketing year 2009

The reference price for white sugar was fixed over time:

¶ 631.9 euros / tonne for each of the marketing years 2006 to 2008

¶ 541.5 euros / tonne for the marketing year 2008-2009

¶ 404.4 € / t in marketing year 2009

The reference price for raw sugar is fixed at:

¶ 496.8 euros / tonne for each of the marketing years 2006 to 2008

¶ 448.8 euros / tonne for the marketing year 2008-2009

¶ 335.2 euros / tonne in the 2009/2010 marketing year

As can be seen in Table 2 price for beet sugar in Europe declined in the year 2014, because of high interest growing, over the last years, this culture, this has led to increased global production and thus lower prices worldwide.

Table 2 Evolution of beet prices 2010-2014 in selected EU countries (euro)

Years	2010	2011	2012	2013	2014
Belgium	29.26	30.73	28.68	29.26	26.34
Czech Republic	28.08	28.63	32.29	31.76	29.72
Germany	36.39	36.64	35.34	31.42	29.03
France	24.87	24.55	29.98	27.17	26.57
Croatia	:	39.81	39.29	39.19	24.19
Netherlands	43.00	45.00	60	61	50.12
Austria	28.78	37.77	40.57	35.18	23.18 ^P
Poland	28.31	34.95	32.78	35.44	30.16
Romania	28.49	40.10	38.12	38.47	35.58
Slovakia	36.37	36.13	36.7	40.09	37.07
Finland	32.09	26.76 ^P	34.9	41.78	41 ^P

Source: www.eurostat/database.com

Prices in Europe decreased on average by 17%, in Poland one of the main producing countries in Europe decreased by 14.83% price, this percentage has affected many producers and these decreases resulted as noted earlier the continuous reduction of the surface in recent years. [8]

Beet price trends 2000-2014 in Romania:

As you know price is the exchange value of a good or service on the market at times and different places, it refers to the amount of money you pay someone to purchases of goods or money it receives someone to possession of a good yield.

As can be seen in table 3, there was a rapid evolution and light variable from year to year of prices per tonne of product analysed. In 2011 the price per tonne of sugar beet increased by 50 lei compared with 2009.

Making a comparison between 2014 and 2000 found that prices increased by 280.95% in 2014 compared to 2000 and with 77.95% compared to 2007 were registered a decrease of 5.88% in 2014 compared to 2013.

Table 3. Price evolution for average prices – sugar beet

Average prices	
Year	LEI/TON
2000	42
2001	49
2002	69
2003	63
2004	85
2005	86
2006	90
2007	90
2008	138
2009	130
2010	120
2011	170
2012	170
2013	170
2014	160

%		
2014/2000	2014/2007	2014/2013
280.95	77.95	-5.88

Source: Own calculation.

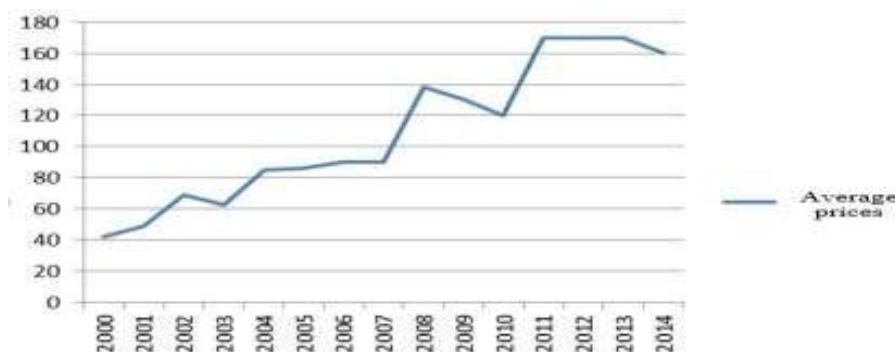


Fig. 4. Annual evolution of price for sugar beet

Source: INSSE, Eurostat

Source: own design

Consumer price indices (CPI) measures the evolution of prices and tariffs of goods bought, services used by the population in a specific period relative to an earlier period. [1]

Table 4. Consumer price indices for sugar beet

Year	%
2001	139,1
2002	114,8
2003	104,6
2004	118,4
2005	108,2
2006	104
2007	125,37
2008	101,61
2009	106,43
2010	104,97
2011	107,58
2012	116,7
2013	101,96
2014	92,17
2015	81,64

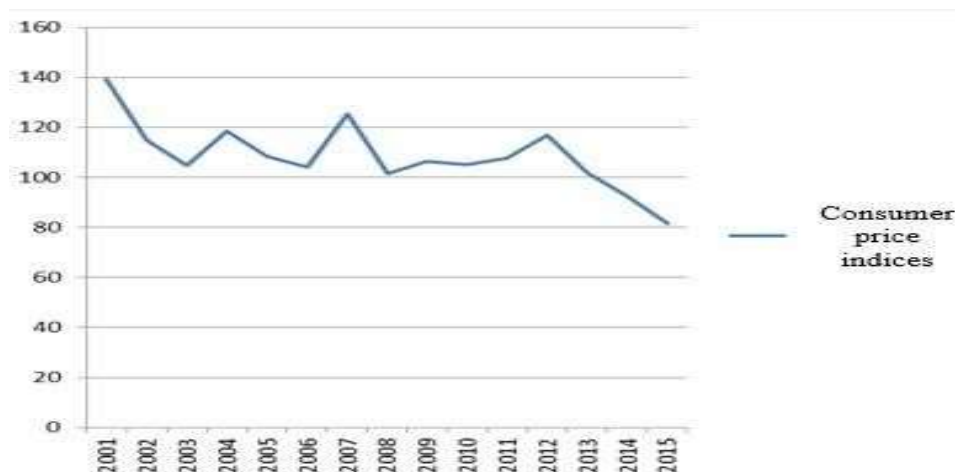


Fig. 5. Annual evolution of consumer price indices

Source: INSSE, MADR

Source: own design

Consumer prices, measured by the consumer price index, were higher in 2001 compared to 2015 average of 42.1%. Consumption decreased because of factors influencing the price listed above.

The second highest value recorded for consumer index is observed in 2007 (125.37%). As noted in the chart above are continuous fluctuations.

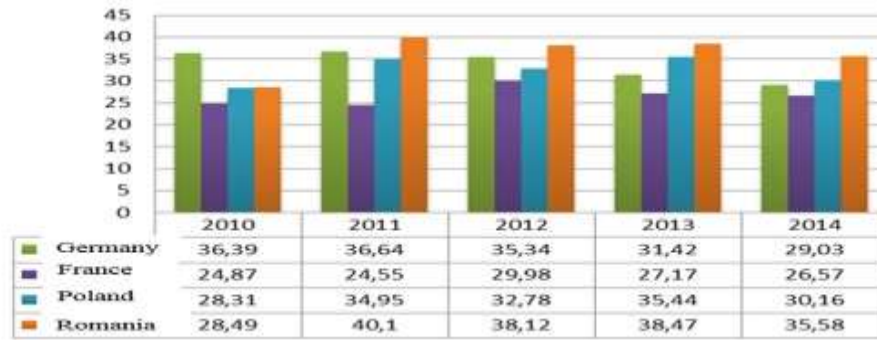


Fig. 6. Price evolution in the major sugar producing countries than Romania (EUR / tonne)
Source: Eurostat

Although Romania bring a small part of the sugar beet market that keeps prices relatively high compared with major producing countries. The lowest costs of production are found in France

Sugar prospects of the market at European and National level in 2014-2020:

According to European Commission estimates, production quotas in 2016 had a positive impact on the production of beet increased by 1.9% and the price of sugar, which would fall by 8.2% until 2020. Also provided is an increase of 6.9% of EU sugar exports, while imports will be reduced by 4.7%. The elimination of quota system have benefit because European producers will be guided more by world prices than the prices for domestic market.

Table 5. Average production, cost of production and profit in 2014 for sugar beet

Indicator specification	Sugar beet			
	Poland	USA	Germany	Ukraine
Average beet / cane production (t / ha)	39,5	19,5	46,1	60,3
Sugar yield (%)	13,9	11,2	14,6	16,6
Average sugar production (t / ha)	5,5	2,2	6,7	10
Cost of production (euro / ha)	945	263	1878	2542
Cost / 100kg sugar (euro)	17,18	11,9	28,2	25,4
Profit / 100 kg of sugar (euro)	18,38	16,1	31,1	32,6

Source: Eurostat

Table 6. Average production, cost of production and profit in 2014 for sugar cane

Indicator specification	Sugarcane			
	Brazil	Australia	India	Romania
Average beet / cane production (t / ha)	68,5	97,7	74	38,9
Sugar yield (%)	11,5	14	9,9	14,4
Average sugar production (t / ha)	7,9	13,7	7,3	5,6
Cost of production (euro / ha)	763	1565	860	1333
Cost / 100kg sugar (euro)	9,65	11,42	12	23,8
Profit / 100 kg of sugar (euro)	6,99	12,3	20	2,4

Source: Eurostat

The highest production / ha of sugar beet in the world is owned by Germany 60.3 t / ha, because the climatic conditions are very favourable and appropriate use of hybrids has resulted in increased production. On the opposite side are Poland with an average yield of 19.5 tons and a profit of 16.1 EUR / 100 kg sugar, 16.5 euros less than the profit Germany 32.6 euro / 100 kg . The highest sugarcane production has Australia almost 100t / ha, but recorded a profit of 12.3 euro per 100 kg because for sugar cane processing costs are relatively high compared to those for sugar beet.

At national level - sugar production in our country has never achieved annual quota granted by the EU.

European Union has allocated an annual quota of 104,688 tonnes of sugar beet for Romania,

It is estimated that in 2007 sugar beet growers had lost about 18 million euros because Romania did not achieved annual production quota, which otherwise, does not cover consumption

Future goals for the sugar market:

- ✦ Protection of the EU sugar market from extreme price fluctuations for the product and also ensure constant offer for sugar;
- ✦ Creating a strong, competitive sector that can withstand international competition;
- ✦ Creating and / or providing high living standards for farmers;
- ✦ Implementation of quality standards and compliance;
- ✦ Increase market transparency;
- ✦ Diversification of products from sugar, providing an affordable price but also increase competition for this sector

CONCLUSIONS

Following this paper I realized that areas planted with sugar beet globally and nationally are declining, due to cane sugar which remains number one in the world to obtain the sugar. The sugar it produces in huge quantities in other countries of the world, and its use has a negative impact on sugar beet, sugar cane registering an annual growth of 2-2.5% in the structure for consumption.

In conclusion national productions were accomplished based on quotas allocated by the European Commission and that would allocate production quotas greater Romania, this market not supposed to depend on imported sugar and could become an exporter.

European Commission has removed in 2016 the quota system for sugar production and minimum prices, this has a positive impact on the production of sugar beet and the sugar price, European production and national increased and this it will be noted within exports and imports.

What is clear is that the sugar sector is in constant reform and shall be made more efficient and more flexible, closer to the customer and the market it serves.

REFERENCES

- [1]. Dinu Toma, 2014, course notes Costs, Prices and Tariffs - Faculty of Management, Economic Engineering in Agriculture and Rural Development.
- [2]. Dona Ion, 2014, course notes Common Agricultural Policy- Faculty of Management, Economic Engineering in Agriculture and Rural Development.
- [3]. Nicolae Ioana, 2013, course notes Financial and Economic Analysis -Faculty of Management, Economic Engineering in Agriculture and Rural Development.
- [4]. Turek Rahoveanu Adrian, 2010, „Sugar Chain Analysis Romania”, publisher Ars Academica.(11, 117,158,162)
- [5]. COMMISSION REGULATION (EC) 318/2006 OF THE COUNCIL On the common organization of the markets in the sugar sector
([***http://www.apia.org.ro/files/pages_files/Regulamentul_Consiliului_\(CE\)_nr._318.pdf](http://www.apia.org.ro/files/pages_files/Regulamentul_Consiliului_(CE)_nr._318.pdf))
- [6]. Interprofessional agreement for sugar beet - harvest of the marketing year 2016/2017 - Article 11 - price of sugar beet
([***http://www.dscllex.ro/legislatie/2016/mai2016/mo2016_366.htm](http://www.dscllex.ro/legislatie/2016/mai2016/mo2016_366.htm))
- [7]. Selling price of sugar beet – statistical data Eurostat
([***http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00064](http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00064))
- [8]. www.insse.ro
- [9]. www.madr.ro
- [10]. www.eurostat.com
- [11]. www.faostat.com

THE EVOLUTION OF CHEMICAL PROPERTIES OF SOIL UNDER THE INFLUENCE OF TILLAGE SYSTEMS AND FERTILIZATION AT THE CULTURE OF WHEAT IN THE PERIOD 2007-2016 AT ARDS TURDA

FELICIA CHEȚAN¹, ALINA ȘIMON², VALERIA DEAC³, CORNEL CHEȚAN⁴

Abstract

Through the experiment realized at ARDS Turda in 2007, was monitored in comparativ, the evolution the soil under the influence of the tillage system, the crop plant, and the level of fertilization. Increasing the reserve in the macro-elements is much more significant in the case of the conservative system compared to the classic system, especially at the depth of 0-20 cm. The production data registered at the variety of autumn wheat Ariesan in the period 2007-2016, indicates the suitability of cultivation in the "no tillage" system, the difference in production between the two systems, the classical (5535 kg/ha) - "no tillage" (5435 kg/ha) being only 100 kg/ha.

Keywords: *clime, fertilization, no tillage, macro-elements, yield.*

Classification JEL: Q 01, Q 15, Q 16.

INTRODUCTION

Soil tillage, if properly applied, favors self-repairing processes and those that lead to increased soil productive potential (Chetan et al., 2011; 2015.). These processes include increasing the content of organic matter, improving the water and air regime, increasing biodiversity, slowing soil erosion etc., ensuring soil sustainability. An appropriate crop rotation is obligatory, alternating plants with strong rooting with plants with superficial rooting, the legumes having a favorable effect on the succeeding cultures, improving the soil in nitrogen and contributing to the development of the root system of the plants (Chetan, 2013; Chetan et al., 2012). Integrated plant protection management leads to reduced use of pesticides (Malschi et al., 2013), giving priority to agro-technical and biological measures, bio-pesticides, the use resistant varieties and hybrids. The main pests present in wheat crops every year at SCDA Turda, are combated by agrotechnical methods (rotation of crops, soil works) and chemical (seed treatment and used insecticides applied in various stages of grain growth) are *Lema melanopa*, *Oscinella frit*, *Haplothrips tritici*, *Eurygaster intergripes*, *Agriotes lineatus*. Diseases frequently occurring in wheat crops in the Turda (*Helminthosporium gramineum*, *Ustilago tritici*, *Septoria tritici*, *Puccinia recondita*, *Erysiphe graminis*, *Fusarium culmorum*) area must be known and monitorized to prevent their installation and attack on crop plants. From the research carried it is recommends at least two treatments with fungicides in two moments: at the blossoming and bellows. In the unconventional agricultural systems, the weed control (for dicotyledonated and monocotyledonated) it is realized used herbicides (do not presented a retention in the soil), (Chetan et al., 2013; 2015).

The choice of the unconventional system variant should take into account the technological features of the soil, depending on the texture, humidity, structure, humus content, clime etc.

MATERIALS AND METHODS

Through the experiment set up within SCDA Turda in 2007, the evolution of soil properties under the influence of the working system, the cultivated plant and the level of fertilization was monitored. The biological material was represented by autumn wheat Arieșan variety.

Experimental factors:

¹ PhD Eng Chețan Felicia, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA, e-mail: felice_fely@yahoo.com

² PhD Eng Șimon Alina, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

³ PhD Eng Deac Valeria, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

⁴ PhD Eng Chețan Cornel, SR, AGRICULTURAL RESEARCH AND DEVELOPMENT STATION TURDA

Factor A - system of work with two graduations: a₁-conventional with plowing; a₂- the no tillage (direct sowing);

Factor B - two-stage fertilization: b₁- the basic fertilization with N₄₀P₄₀; b₂- the basic fertilization with N₄₀P₄₀ + N₃₀ on vegetation;

Factor C- experimental year: c₁-2007, c₂-2008, c₃-2009, c₄-2010, c₅-2011, c₆-2012, c₇-2013, c₈-2014, c₉-2015, c₁₀ -2016.

The method used for pH determination was the Potentiometric method, for the humus the Walkley-Black method was used, the nitrogen was determined by the Kjeldhal method, the Colorimetric method was used for the phosphorus, and the potassium content was determined by the Flamfotometric method (OSPA Cluj). The results were statistically analyzed by ANOVA test.

The meteorological conditions in the years tested (Turda Meteorological Station, longitude 23°47', latitude 46°35', altitude 427 m) are presented in Table 1.

Table 1. The thermal and rainfall regime, ARDS Turda, 2007-2016

Year	Average annual (°C)	Annual amount (l/m ²)
2007	10.3	655.3
2008	10.1	630.6
2009	10.3	493.4
2010	9.7	739.8
2011	9.4	433.0
2012	10.4	504.4
2013	10.4	523.2
2014	11.1	741.5
2015	10.7	641.2
2016	10.0	816.8
Average 60 years	9.1	518.6

RESULTS AND DISCUSSION

Of the 10 years analyzed, from the point of view of the thermal regime, five years have been warm, three years have been little warm and only 2 normal, and for precipitation, 4 years of excessive rain, 2 very rainy years, 3 years normal and only 1 year dry. Annual mean values refer to multi-annual averages of 9.1°C and 518.6 l/m². In these years, the thermal values are also deviating by 2°C higher, as in the case of 2014, compared to the 60-year multiannual average. Also during this period the rainy year was 2016, respectively, with 816.8 l/m², a deviation of + 303.2 l/m² but with a non-uniform distribution of precipitation and excessive October (Table 1). The physical properties of the soil directly influences its fertility, which in turn has a strong influence on the water, air and soil nutrition regime. At the same time, chemical and biological processes are intensified, seed germination, rooting into the soil, soil erosion is prevented, all of these data being provided by the literature of speciality. The experience has been founded on a fertile soil but also with a susceptibility to rapid compaction at the passage of large agricultural aggregates or when working mechanically in high humidity conditions. The evolution of soil chemical attributes under the influence of soil and fertilization systems is presented in Table 2.

As can be seen from Table 2, in the classical system + 1 fertilization N₄₀P₄₀ compared to the initial values of the main agrochemicals, we can see, first of all, the increase by 10.79% of the weak acid pH (6.30) at (6.98) on a depth of 0-20 cm and a change of 20-40 cm depth (pH 7.11). If we refer to loamy-clay texture and a apparent density of 1.2, the humus content remained small, recording a decrease of 5.44% on the 0-20 cm depth and a 19% increase on the depth 20-40 cm. As regards the macro-elements content, the most important change was observed in the case of phosphorus, recording an increase of 300 ppm, from a small content (5 ppm) to a medium content

(20 ppm), an increase in potassium by 83, 57% ppm on the 0-20 cm (middle) depth and 57,14% on 20-40 cm (from medium to good supply).

Table 2. The influence of works system and fertilization on soil fizico-chemical properties, ARDS Turda, 2007-2016

Work system/year /fertilization		Depth of soil sampling	Name analysis/UM				
			pH	Humus %	Total Nitrogen %	P ppm	K ppm
2007	Classic N ₄₀ P ₄₀	0-20 cm	6.30	2.94	0.162	5	140
		20-40 cm	7.00	2.21	0.124	9	126
2016	Classic N ₄₀ P ₄₀	0-20 cm	6.98	2.78	0.183	20	257
		diference %	10.79	- 5.44	12.96	300	83.57
		20-40 cm	7.11	2.63	0.123	9	198
		diference %	1.57	19	-0.80	0	57.14
	No tillage N ₄₀ P ₄₀	0-20 cm	6.79	3.44	0.220	74	291
		diferența %	7.77	17	35.80	1380	107.85
		20-40 cm	7.14	1.96	0.125	11	162
		diference %	2	-11.31	0.80	22.2	28.57
	Classic N ₄₀ P ₄₀ +N ₃₀	0-20 cm	6.66	2.60	0.186	43	255
		diference %	5.71	-11.56	14.81	760	82.14
		20-40 cm	7.11	2.25	0.128	10	171
		diference %	1.57	1.80	3.22	11.1	23.10
	No tillage N ₄₀ P ₄₀ +N ₃₀	0-20 cm	6.89	3.49	0.229	54	246
		diference %	9.36	18.70	41.35	980	75.71
		20-40 cm	7.16	2.51	0.143	8	214
		diference %	2.28	13.57	15.32	-11.1	69.84

In the classical system + 2 fertilizations N₄₀P₄₀ + N₃₀, pH changes are less pronounced, on the 0-20 cm depth (6, 66), increases by 5,71% and on the 20-40 cm depth there was an increase of 1.57%. The humus content decreases by 11.56% in the first 20 cm, remaining almost unchanged on the 20-40 cm (rising 1.80%). As expected, there were significant increases in total nitrogen content (by 14.81%) and especially phosphorus by 760%, from very low (5 ppm) to good (43 ppm) on the 0-20 cm and on the 20-40 cm depth with only 11.1% growth, it remains weak. In the case of the "no tillage" + 1 N₄₀P₄₀ fertilization, it resulted in a slight increase in pH, remaining weakly acidic on 0-20 cm and neutral on the 20-40 cm depth. This system shows the highest increase of the humus content in 0-20 cm, respectively by 17% in the variant with fertilization and by 18.7% in the case of the two fertilization variant. The increase in the macro element reserve is more important in the case of the "no tillage" system than the classic system, especially on the 0-20 cm depth. Thus, the nitrogen content recorded the highest increase (+ 35.80%) in the case of the "no tillage" system with fertilization and with 41.35% in the variant with two fertilizations, the phosphorus content registered the highest increase in case of the variant with one fertilization (+ 1380%) from very low to very good on the depth of 0-20 cm, respectively (+ 980%) from weak to good on the same level of fertilization. On the 20-40 cm depth the phosphorus content remained weak, from 9 ppm to 11ppm (+ 22%) in the variant with the basic fertilization and dropped from 9 ppm to 8 ppm (-11.1%) in the two-fertilization variant. Potassium increased by 107.75% in the first 20 cm from the good (140 ppm) to the very good (291 ppm) in the variant with the base fertilization and maintained good (+ 75.71%) in the two-fertilization variant. On the 20-40 cm depth, the potassium value increased from medium to good (+ 28.57% with fertilization and + 69.84% with two fertilizations).

The different climatic conditions in 2007-2016 have influenced wheat production differently. The lowest productions were registered in the non-conventional system (NT) in the variant with a fertilization (2974 kg/ha) and in the variant with two fertilizations (3062 kg / ha) in the

dry year 2009. Also this year, low production was also achieved in the classical system (SC) 3468 kg ha with basic fertilization, respectively 3584 kg/ha in the variant with additional fertilization. Slightly and unevenly rainfall in the years 2011, 2012 and 2013 led to small production ranging from 4597 to 4893 kg/ha (fertilization) and 4587-5076 kg / ha (two fertilizations) in the classical system (CS) compared to no tillage system (NT) - the recorded productions ranging from 4602-4845 kg/ha (fertilization) and 4876-5232 kg/ha (two fertilizations). It seems that the "no tillage" system preserves the rainwater better. The abundant rainfall of the last years (2014, 2015 and 2016) led to the faster dissolution and solubilization of applied mineral fertilizers, the wheat culture benefited to the maximum of the intake of these minerals, resulting in the production of over 6800 kg/ha, in the both systems in both basic fertilization and base fertilization variants plus additional nitrogen fertilization in spring to resumption of the wheat vegetation. The average production achieved in the 10 years experimental was 5445 kg/ha in the fertilization version and 5625 kg/ha in two fertilizations from the classic system compared to the "no tillage" system with a production average of 5342 kg/ha in the variant with fertilization and 5528 kg/ha in the variant with two fertilizations (Table 3).

Table 3. The interaction factors tillage system x fertilization x year on winter wheat yield, 2007-2016

System/fertilization /year		Yield kg/ha	Difference	System/ fertilization	Yield kg/ha	Difference
Classic + N ₄₀ P ₄₀	2007	4911 ^{Mt}	0.00	No tillage + N ₄₀ P ₄₀	4721 ⁰⁰⁰	-191
	2008	5512 ^{Mt}	0.00		5329 ⁰⁰⁰	-183
	2009	3468 ^{Mt}	0.00		2974 ⁰⁰⁰	-494
	2010	5247 ^{Mt}	0.00		5064 ⁰⁰⁰	-183
	2011	4598 ^{Mt}	0.00		4602 ⁻	4
	2012	4807 ^{Mt}	0.00		4845 ^{**}	38
	2013	4893 ^{Mt}	0.00		4714 ⁰⁰⁰	-180
	2014	6971 ^{Mt}	0.00		7064 ^{***}	93
	2015	6988 ^{Mt}	0.00		7027 ^{**}	39
	2016	7066 ^{Mt}	0.00		7093 ^{**}	27
Classic + N ₄₀ P ₄₀ + N ₃₀	2007	5066 ^{Mt}	0.00	No tillage + N ₄₀ P ₄₀ + N ₃₀	4939 ⁰⁰⁰	-128
	2008	5786 ^{Mt}	0.00		5522 ⁰⁰⁰	-264
	2009	3584 ^{Mt}	0.00		3062 ⁰⁰⁰	-522
	2010	5498 ^{Mt}	0.00		5232 ⁰⁰⁰	-267
	2011	4588 ^{Mt}	0.00		4824 ^{***}	236
	2012	4928 ^{Mt}	0.00		4904 ⁰⁰	-25
	2013	5076 ^{Mt}	0.00		4876 ⁰⁰⁰	-200
	2014	7155 ^{Mt}	0.00		7193 ^{**}	39
	2015	7246 ^{Mt}	0.00		7341 ^{***}	95
	2016	7329 ^{Mt}	0.00		7399 ^{**}	70

LSD (p 5%) = 4; LSD (p 1%) = 12; LSD (p 0,1%) = 79.

CONCLUSIONS

Chemical fertilizers should be applied as a complement to existing soil reserves, rationally and differentiated, depending on soil characteristics and cultivated crop, while protecting the environment.

In order to establish accessible and mobile reserves of nutrients for agricultural crops, it is absolutely necessary to study the agrochemical of the soil.

The study of climatic factors helps us to form a picture of climate change and adaptation of some technologies that are suitable for the reference area, in the unconventional systems of soil works the accumulation and preservation of water is easier compared to the classic system where the reduced the large number of works, the water is conserved in the soil better.

The increase in the macroelement reserve is more important in the case of the "no tillage" system than the classic system, especially on the 0-20 cm depth.

The humus content is higher than the initial values in most "no tillage" variants.

The production data recorded on the Arieșan Autumn wheat variety during the period 2007-2016 indicate the cultivation pretability in the "no tillage" system, the difference in production between the two classic systems (5535 kg/ha) and "no tillage" (5435 kg/ha) being only 100 kg/ha.

The fractional fertilization: autumn at sowing + spring at the resumption of vegetation, ensures a production increase of 180 kg/ha in the SC and 186 kg/ha in the NT.

The production is influenced by the climatic conditions, the years 2014, 2015 and 2016 they was with thermic and pluviometric favorable conditions and has a positive influence on the expression of the wheat variety production potential of the experiment (over 7000 kg/ha).

The soil conservation system has the following advantages: the small number of land crossings and the reduction of the risk of destroying the crop; soil rich in clay is not brought to the surface; organic matter accumulates in the superficial layers, thus ensuring a better soil structure.

BIBLIOGRAPHY

1. Chețan, Felicia, Haș I., Dana, Malschi, Valeria, Deac, Ignea, M., Alina, Șimon, Adina, Ivaș,(2011). *Tehnological Features of the Winter Crop in the Conservation Agricultural System*, The Agricultural research-Development Station Turda, Buletin USAMV Agriculture, 68(1)2011, Romania.
 2. Chețan, Felicia, Deac, Valeria, Ignea, M., (2012). *Influence conservative agricultural system on wheat production. A study case at Agricultural Research and Development Station Turda*. Volumul „Symposium Trends in the European Agriculture Development”, USAMV Timișoara, RJAS 44 (1)/2012: 28-35;
 3. Chețan Felicia, (2013). *Combaterea buruienilor din culturile agricole la SCDA Turda*, Agricultura Transilvana, Buletin informativ, nr.18, pag.79-83;
 4. Chețan, Felicia, Chețan, C.,(2013). *Cultivarea soiei în sistemul de agricultură conservativ și rolul ei în protejarea mediului*. În volumul CIEC, Simpozionul Național „Folosirea îngrășămintelor minerale și organominerale în agricultură,, 7 oct 2013, Lucrari Stiintifice, Bucuresti 2014. Editura AGRIS - Revistele agricole SRL, Bucuresti. ISBN-10973-8115-47-5, ISBN-13978-973-8115-47-7;
 5. Chețan, Felicia, Chețan, C., Rusu, T., Alina Șimon, (2015). *Effects the winter wheat cultivation, in system without plowing, on the soil properties, ARDS TURDA, 2005-2014*. The 8 th International Symposium Soil Minimum Tillage System, Cluj-Napoca, 25-26 June, 2015, Vol.8, No.22, june 2015, pag.119-125, pISSN: 1844-6698, ISSN: ISSN 2006-1363;
 6. Chețan, Felicia, Rusu, T., Chețan, C., Șimon, Alina, (2015). *Influența sistemelor de lucrare a solului asupra însușirilor acestuia, la SCDA Turda*. AN. I.N.C.D.A. FUNDULEA, VOL. LXXXIII, Electronic ISSN 2067-7758;
 7. Malschi, Dana, Ivaș, Adina, Ignea, M., Chețan, Felicia, Chețan, C., (2013). *Adequat Integrated Control of Wheat Pest in No-tillage Conservative System*. The 7th International Symposium „Soil Minimum Tillage Systems” Cluj-Napoca, 2-3 May 2013, Pro Environment, vol.6, p: 332-341;
- *** Meteorological Station Turda, longitude: 23°47', latitude 46°35'; altitude 427 m
*** ANOVA statistically program

DEVELOPMENT OF COOPERATIVES IN THE REPUBLIC OF MOLDOVA

Anatolie IGNAT¹, Alexandru STRATAN², Eugenia LUCASENCO³

Abstract: *The paper presents the review of the development of cooperatives in the Republic of Moldova during the post independence period. After the massive land privatization a large number of small scale agricultural producers occurred that hardly can compete with large scale producers. This preserves a state of underdevelopment of small farmers and of the rural sector. To identify problems that jeopardize cooperation processes and potential solutions a study on the development of cooperatives in the country was carried out.*

The major problems and possible solutions were identified through a semi-structured survey that encompassed 150 agricultural producers purposively selected in North, Central and South regions of the country.

Addressing this critical situation can be made by coagulating dispersed efforts of small scale farmers to reduce costs of purchasing agricultural inputs and services, improve the access to post harvest, processing, transportation, financing, consulting services. Access to more stable markets and negotiation of better prices and better conditions of delivery can also be achieved through consolidated efforts agricultural producers' groups.

Key words: *agriculture, small scale agricultural producers, agricultural cooperatives, marketing groups*

JEL Classification: *Q13, Q15.*

INTRODUCTION

The agricultural sector plays an important role in the economy of the Republic of Moldova. It is a generator of demand, thus enhancing the creation and development of added value in other branches of the national economy such as trade, construction and financial services. At the same time, it faces several challenges, particularly small scale production, insufficient productivity and quality, as well as limited access to finance.

At the same time, small scale farms, including subsistence and semi-subsistence produce a large part of high value crops such as fruits, nuts, grapes, vegetables and potatoes that are mostly sold in open air agricultural markets. Meanwhile, the decrease of productivity in the agricultural sector is directly related to the lack of investments, capital and credit availability, factors that have resulted in farmers applying low yield technologies and drastically reducing their use of agricultural inputs.

Besides the above mentioned problems, there are other major obstacles that hamper the development of cooperation in agriculture such as the land consolidation, lack of the labor force, excessive bureaucracy, difficult access to financing sources, lack of strongly developed and supporting legislative framework, etc.

In terms of statistical aspects, there is big gap in elaboration of the official statistic data concerning the development of cooperatives in the Republic of Moldova.

Thus, cooperation is seen as one of the key solutions for the multiple problems faced by the cooperating agricultural producers, among which can be mentioned: the mentality that still links the notion of cooperative with those of kolkhoz; the lack of mutual confidence among cooperative members; necessity of enormous efforts for convincing people to cooperate; difficult process of establishing common vision referring to the objective of the cooperation; small share of success stories that could motivate farmers to associate; lack of management skills and of the integrity of the cooperative leaders; difficult and slow decision making process inside the cooperative.

¹ PhD Anatolie Ignat, National Institute for Economic Research, Chisinau, Republic of Moldova, anatolie.ignat@gmail.com

² PhD, Prof. Alexandru Stratan, National Institute for Economic Research, Chisinau, Republic of Moldova, alex_stratan@yahoo.com

³ Eugenia Lucascenco, National Institute for Economic Research, Chisinau, Republic of Moldova, eugenia_lucasenco@yahoo.com

MATERIALS AND METHODS

The paper on the development of the associations and partnerships of agriculture producers in the Republic of Moldova aims to provide valuable information on producers' cooperation in all three regions of the Republic of Moldova. The research is based on a modern theoretical and applied approach in terms of methodology, with an emphasis on field research methods, like face-to-face interview and questioning. The wide range of respondents determine the comprehensive character of questioning, allowing to identify the opportunities, major challenges and constrains for producers' cooperation. The use of this interactive methodology provides valuable knowledge for the design of the field support activities. Besides the above mentioned research methods, a series of other socio-economic tools have been used: analysis, synthesis, forecasts, comparative method, etc.

RESULTS AND DISCUSSION

Cooperatives have become a social economic necessity, providing small-scale farmers a viable alternative to become competitive with large scale economic agents and increase bargaining power relative to suppliers of materials and agricultural markets.

At the same time, creation and development of cooperatives and other forms of associative agricultural producers must be seen as an evolutionary process that has as the main motivation factor socio-economic interests of small-scale agricultural producers.

Agriculture is an important sector of the national economy that can exploit and capitalize the potential of the country. Agriculture, including the primary production and processing industry has a multiplier role in the economy, generating demand and stimulating the creation of added value in other branches of national economy such as trade, construction and financial services.

The sector faces several challenges, namely, small scale production, large diversity of cultivars, insufficient productivity and quality, limited access to finance. It also faces bottlenecks in limited entrepreneurship capability and inadequate skilled and competent human resources.

Excessive fragmentation of agricultural land underlies a number of problems for the country's horticultural sector. In particular, the division of land into small plots did not allow intensification of the horticultural production and highlighting of the scale effect in the use of agricultural technologies, supply of inputs, processing, transportation, storage and marketing of horticultural products.

Specific climate conditions affect seriously the agricultural production because of often droughts, stormy rains associated with hail, early spring or autumn frosts.

Irrigation is limited to small areas closer to larger rivers Nistru and Prut and some inland water reservoirs, due to high costs of irrigation water and insufficient quality of the water for irrigation.

The further development of the agriculture is strongly linked to creation and maintaining of a critical mass of population endowed with entrepreneur spirit, knowledge and specialized training, skills and able to work in conditions of the market economy. Creation of the human potential in the agriculture sector is a long lasting and capital consuming process.

In order to identify the key features of the agricultural cooperatives and other forms of associative activities a survey of agricultural producers was carried out. In the framework of survey 50 members, 45 non members and 43 former members of cooperatives have been interviewed using a semi structured questionnaire.

As major findings one can state that the average age of the interviewees is about 51 years with small deviation as 52 years for members of cooperatives, 47 years for non members of cooperatives and 54 years for former members of cooperatives.

The gender analysis of the interviewed members, former members and non members of the agricultural cooperatives shows that the gender balance is more visible among members of

cooperatives, while among non members of cooperatives or especially among former member of cooperatives the share of male persons is obviously higher (see figure 1).

This can lead to the conclusion that women are more compatible with work in cooperatives than men that is why the share of men among former members is so high.

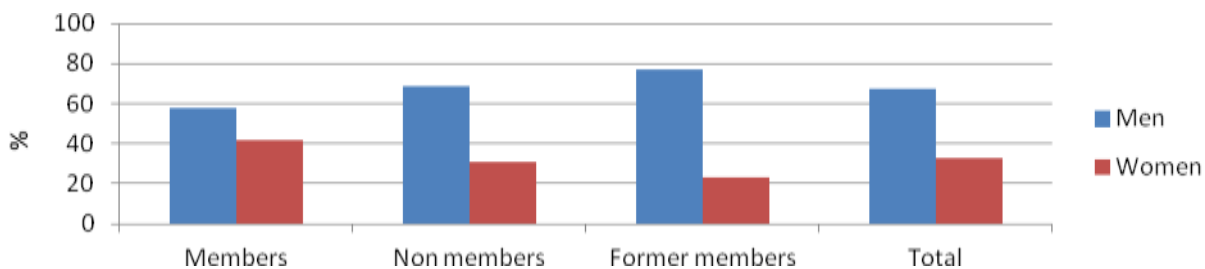


Figure 1. Gender structure of the interviewed members, former members and non members of the agricultural cooperatives

Source: elaborated by authors based on own data

The average experience in agricultural activities of interviewed persons is about 15 years that speaks about a rather good experience in agriculture.

Interviewed members of cooperatives have on average a 6 year experience and interviewed former members a 7-year experience of cooperative activity. The average number of members of cooperative is 28 members for existing cooperatives and 101 members in case of former members. This can lead to the conclusion that at present in the Republic of Moldova cooperatives that have on average about 30 members are more viable than those that have about 100 members.

A large part of the interviewees (about 29%) beside the agricultural activities have also another sources of revenues among which the most spread are providing technical services, lending storage or refrigerating capacities etc.

There are some obvious similarities concerning the size of the land owned by members and former members of the agricultural cooperatives that vary around the value of 9,1-9,5 hectares. This gives a hint concerning the average size of the potential members of agricultural cooperatives in conditions of the Republic of Moldova. In the same time the acreage of the land owned by non members of agricultural cooperatives is about 50 hectares (see figure 2).

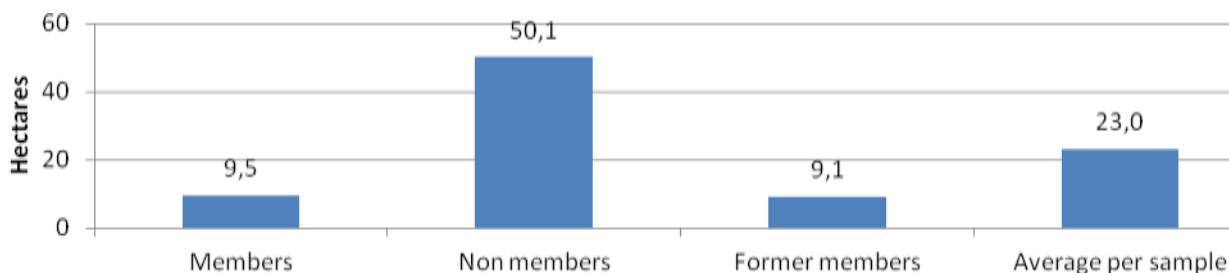


Figure 2. Average acreage of the land owned by interviewed members, former members and non members of the agricultural cooperatives, hectares

Source: elaborated by authors based on own data

In the same time a large number of farms work on the rented land. Thus about 50% of interviewed members of cooperatives, 36% of the former members of cooperatives and about 44% of the non members of cooperatives rent land for agricultural activities. The acreage of the land rented vary from about 30 hectares in case of the former members of cooperatives to about 258 hectares for non members of cooperatives. This picture again gives a hint that farms with an acreage larger than average are less motivated to cooperates with other farms or at least with those that are have smaller land areas.

Cooperatives play an unimportant role as a main market outlet for the majority of the responders. Thus, even in case of interviewed members of cooperatives less than 6% of responders mentioned cooperatives as a main market outlet, while in case of non members or former members of cooperatives no positive answers were registered at all. This shows the weak commercial orientation of the existing cooperatives comparing with wholesale companies and markets, open air agricultural markets, collecting companies, processing factories and other market outlets.

The most important activities that are coordinated through the agriculture producer group are related to trainings, input purchasing and marketing activities. To a less extent are coordinated through the cooperative such activities as: lobbying, production, storage, and transportation. Financing, packing and processing are the least coordinated activities inside the cooperatives to which belongs interviewed members of cooperatives (see figure 3).

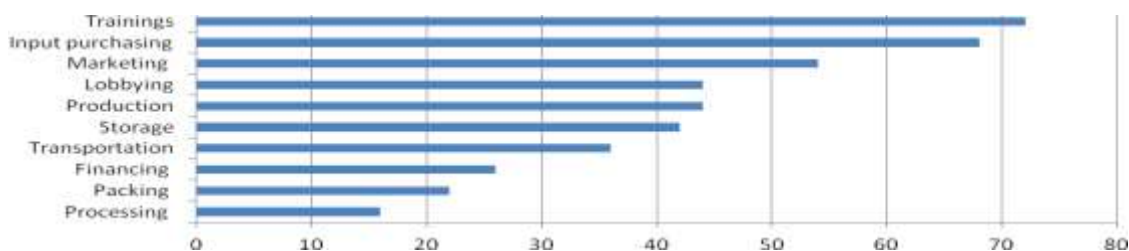


Figure 3. The most important activities coordinated through tyhe cooperative by active members, %
 Source: elaborated by authors based on own data

There are some significant differences between activities coordinated through cooperation at present members and former members of cooperatives. First of all this is the degree of personal involvement in common activities that reached the level of 60-70% of interviewed active members and only about 30% of former members.

The second difference is related to the structure of priorities. Thus in case of active members these are “Trainings”, “Input purchasing” and “Marketing” activities, while former members mentioned among the most important “Input purchasing”, “Production”, “Transportation” and “Marketing” activities.

The opinion of non members concerning the most important factors that could motivate them to establish or join a cooperative is focused more on such issues as: getting a better prices for such agricultural inputs as seeds, fertilizers etc., having a better organized post harvest and sales activities, better access to agricultural machinery and equipment, better access to post harvest infrastructure, access to credits and grants.

A smaller importance is given to improvement of knowledge and skills, better access to infrastructure of roads, irrigation and energy, and better organized agricultural production. The least important issue is the mutual support and assistance (see figure 4).

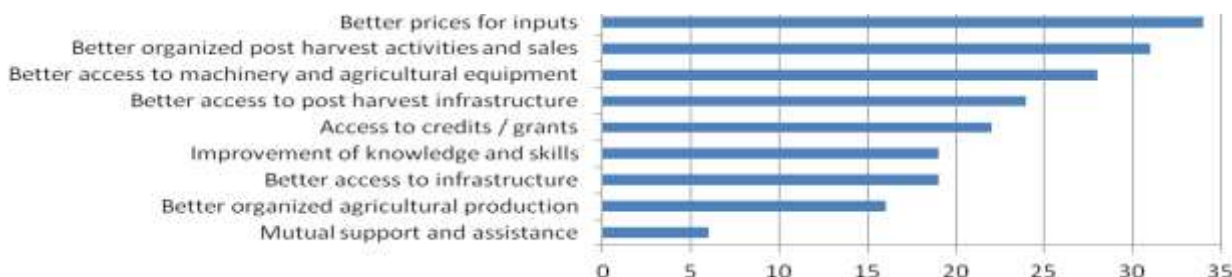


Figure 4. Factors that could motivate non members to establish or join a cooperative, %
 Source: elaborated by authors based on own data

The level of participation in the decision making processes of cooperatives is rather high among interviewed members of cooperatives. Thus only 12% of these respondents mentioned that

they do not participate in the process of decision making, but they are interested to be involved in this process. In the same time 30% mentioned that they are involved in the decision making process but at insufficient level, while 58% mentioned that they are satisfied with the level of involvement in the decision making process.

Interviewed members of cooperatives show a high level of trust to decisions made by the management of cooperative. Thus 78% of respondents mentioned that they are confident and 14% of respondents mentioned that they are very confident in the decisions made by the management of cooperative. Just 4% of these respondents mentioned that they are not confident and other 4% that they are not confident at all in the management decisions. What is important to mention is the lack of neutral evaluation of the level of trust in the decisions made by the management of cooperative.

Among the most frequently mentioned reason for leaving a cooperative were mentioned the lack of mutual trust between agricultural producers. Another reason was the lack of effective communication and mutual support between cooperative members. Closely related to this is the lack of understanding between the producers on sales and processing the agricultural land. In some cases the reason for leaving the cooperative was the lack of management skills of the administrator and the fact that all incomes were going into the pocket of the cooperative administrator.

Lack of market outlets for large quantities of agricultural products and therefore the unstable economic situation of the cooperative members also were mentioned as a negative factor. As a result of different negative factors many cooperatives were disbanded and in the situation when there were no other cooperative in their region many agricultural producers decided to work individually.

In the opinion of the non members of cooperatives the main risks of the cooperation among farmers are related to the “Lack of mutual trust between agricultural producers” – 87% of respondents, the “Lack of proper management abilities for cooperative in my village” – 67%, “Lack of supporting policies at central and local level”, -60% and the “Unclear statute of the proprietorship over the cooperative assets” – 58% of respondents. “

Some other risks such as “Lack of knowledge about advantages and disadvantages of the cooperation between agricultural producers”, “Lack of success stories of cooperation in my field of horticultural production”, “Difficult coordination of the common production and marketing policies”, “Insufficient communication between members of the cooperative” and the “Lack of technical support for members of cooperatives“, are perceived as being less important.

What is important to mention is the equal appreciation of the “Lack of mutual trust between agricultural producers”, “Lack of proper management abilities for cooperative in my village” and the “Lack of supporting policies at central and local level”, as the most risky factor both by interviewed members and non members of cooperatives. On the other hand the “Lack of technical support for members of cooperatives“ is seen by both members and non members as the least risky factor for cooperation.

Only about one third of interviewed non-members of cooperatives mentioned that they want to create a cooperative , about one quarter have no willingness for it, and almost 42% of the respondents have hesitated to give a clear answer with this respect (see figure 5).

The situation is quite similar in case of joining an existing cooperative. In this case the share of persons hesitating to give a clear answer was of about 33%, about 27% have a rather high willingness and 13% a very high willingness to join an existing cooperative while about 16% and 11% have a low and very low willingness to do it (see figure 6).

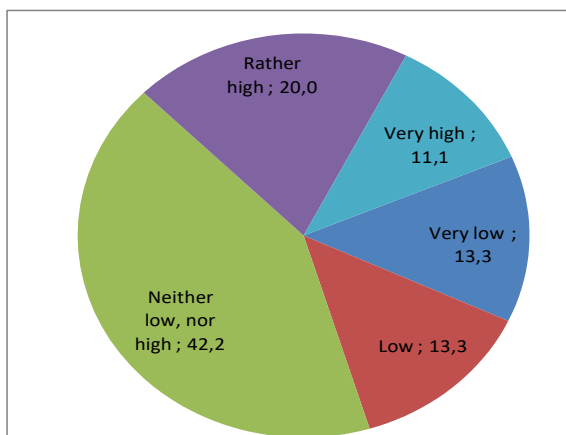


Figure 5. Willingness to create a cooperative among non members, % of respondents

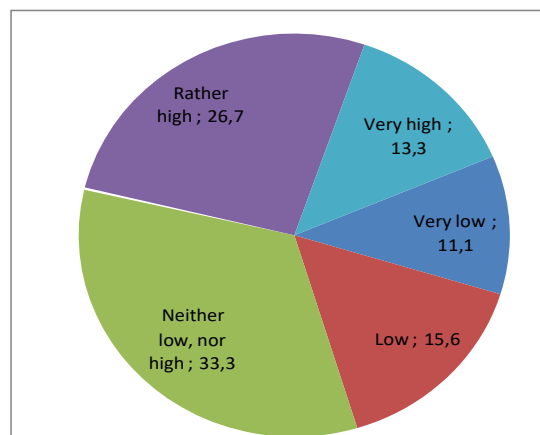


Figure 6. Willingness to join a cooperative among non members, % of respondents

Source: elaborated by authors based on own data

Despite the negative experience, the share of former members of cooperatives willing to create a cooperative is about 30%, some 35% of respondents do not want to create a cooperative and another 35% did not give a clear answer. While asked about joining an existing cooperative the distribution of answers was almost the same (see figures 7 and 8).

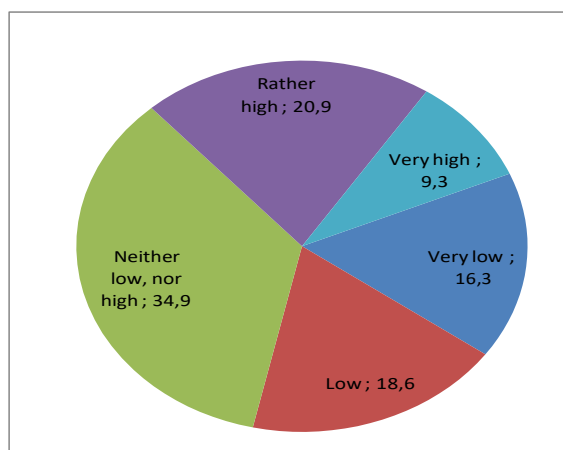


Figure 7. Willingness to create a cooperative among former members of a cooperative, % of respondents

Source: elaborated by authors based on own data

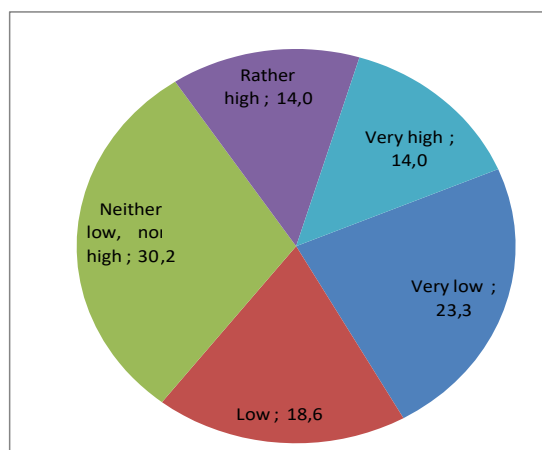


Figure 8. Willingness to join a cooperative among former members of a cooperative, % of respondents

Evaluation of the further development of their cooperatives by their members is quite careful. Thus about 76% of respondents forecast a slight increase and 2% a strong increase of the number of cooperative members. About 14% of them think that their number will remain the same. While 6% assumes a strong decrease and some 2% a slight decrease of the members of their cooperative. Thus one can draw a conclusion of a rather static vision of the interviewed members concerning the evolution of their cooperatives.

CONCLUSIONS

Understanding how collective action can help address the inefficiencies, coordination problems or barriers to market access is particularly important and this paper helps at providing key learnings on how best to use collective actions to promote profitable and inclusive value chains.

Even the poorest farmers typically have some formal and informal connections to markets, although the main production may be subsistence oriented. Thus the key challenge is to ensure better and more profitable market integration for this group.

Cooperatives have become a social economic necessity, providing small-scale farmers a viable alternative to become competitive with big economic agents and increase bargaining power relative to suppliers of materials and agricultural markets. Currently cooperatives in Moldova are in a quite complex and difficult situation given the multiplicity of managerial, financial, legislative and consultative problems they face. At the same time, farmers are not yet fully aware of the importance of support and mutual assistance to develop cooperatives and other forms of associative activity.

Low productivity, low investment capacity and poor access to markets appear to be evidence that the association in agriculture intervention is the only solution for the survival of small farmers. Nevertheless, development of cooperatives has not yet become an obvious priority for subsidy system in Moldova and is not sufficiently supported through financial and technical assistance national and external projects.

Recommendations

- The increase of the number of cooperative members and further merging of cooperatives into larger association will contribute significantly to the increase of their bargaining power versus retailing sector and middlemen.
- Agricultural and rural development policies have to be more focused on strengthening cooperative movement that will solve as a side effect a range of problems faced by agricultural producers such as land fragmentation, scientifically based crop rotations, input purchase, access to finance, marketing and other ardent problems.
- There is a strong need in setting up a permanent platform for communication and cooperation among agricultural producers, political structures, science and extension services.
- In order to improve the institutional situation could be useful establishment of a Cooperative Development Agency following the example of other countries.
- Involvement of the state in developing associative structures could take the form of improving and adjusting the legal and regulatory framework to the real needs of small producers, including the introduction of a flat tax in agriculture, improving the advisory services, ensuring a fairer distribution of subsidies, developing and promoting sector specific policies.

BIBLIOGRAPHY

1. Bijman J. et al. (2012) Support for Farmers' Cooperatives. Final Report. Accessed at: http://ec.europa.eu/agriculture/sites/agriculture/files/external-studies/2012/support-farmers-coop/fulltext_en.pdf
2. Chiriac V. (2003) Moldovan Savings and Credit Associations' Experience. Accessed at: <http://www.microfinancegateway.org/sites/default/files/mfg-en-case-study-moldovan-savings-and-credit-associations-experience-2003.pdf>
3. CNPF (2017). The National Commission for the Financial Market / Comisia Națională a Pieței Financiare. Official web site. Accessed at: <http://www.cnpf.md/md/asoc/>
4. Groeneveld H. (2016) Doing Co-operative Business Report. Methodology and exploratory application for 33 countries. International Co-operative Alliance.
5. MAFI (2011) Strategic priorities for the activities of the Ministry of Agriculture and Food Industry of Moldova in the years 2011 - 2015
6. Münkner H.-H (2002). The Supportive Environment for Cooperatives in the Context of the Current Political, Economic, Social, Demographic and Ecological Environments. Paper for Expert Group Meeting on "Supportive Environment for Cooperatives: A Stakeholder Dialogue on Definitions, Prerequisites and Process of Creation" jointly organized by the Division for Social Policy and Development, United Nations and the Government of Mongolia, 15-17 May 2002, Ulaanbaatar, Mongolia
7. The State Registration Chamber under The Ministry of Justice. Official website. Accessed at: <http://www.cis.gov.md/buletinul-electronic>
8. Șelari G. (2009) Sectorul agrar al Republicii Moldova și al Transnistriei: reforme și rezultate. Accessed at: http://www.ipp.md/public/files/Proiecte/blacksee/rom/selari_ro_bodean.pdf
9. The National Land Cadastre, 2016.

THE DISCURSIVE BRAND ANALYSIS OF THE ACCOMMODATION UNITS FROM THE TOURISTIC BASIN OF SUCEVIȚA (BUKOVINA REGION, ROMANIA)

CODRIN DINU VASILIU¹,
IOAN SEBASTIAN BRUMĂ²

Abstract: *In the rural areas where there is an economic potential clearly defined by the agricultural or commercial activities, tourism is the business key within reach. Under the circumstances, the socio-economic reflex takes the form of developing projects for tourist services, especially in the places with tourist potential. Further, the local economy, at least with respect to the private initiative, advances towards agritourism.*

In the present study we aim to run a discursive analysis of the presentation messages offered by 54 accommodation units from the touristic basin of Sucevița. Making an inventory of the online messages (own sites and platforms for touristic services) we could identify 24 key concepts (keywords and key phrases) and starting from their occurrences within the identity narratives of the accommodation units we have analysed their relationship with the supra themes and the themes belonging to the local and regional brand. Further on, we have outlined the general profile of the accommodation units and the profile of the target group as they appear in their presentation discourses. The relationship between these two profiles reveals strong brand connections but also shows some fractions which can be mended. To repair these inconsistencies, we provide a few handy recommendations in formulating medium and long-term strategies of development in the rural tourism.

Keywords: *discursive analysis, rural touristic unit, brand, Sucevița, Bukovina*

JEL Classification: *Z32, Z13, M31, O18*

INTRODUCTION

The present study is part of a research enterprise which aims to advance new digital technologies for the brand of the rural touristic unit in the North-East Development Region. The content of this intervening introduces an early research stage defined by the discursive analysis of the identity narrations suggested by the rural touristic units from Sucevița in the hospitality economy. Further we aim to identify the valences and fractures within the identity discourses and the captivation discourses for the beneficiaries 'audience.

MATERIAL AND METHOD

In the context of economic analysis and from a methodological point of view, the discursive analysis requires a double reduction. On one side, it closes the interpretation inside a discourse which makes hardly possible to perform the classic economic analysis and, on the other side, it evades any straightforward position related to the socio-economic reality as reference point of the analyzed discourse. On these (guide)lines we cannot avoid the following question: is there any methodological legitimacy for a discursive analysis in the field of an economic analysis? Is it both justified and efficient such an interpretation enterprise/ enterprise of interpretation? In the inter-disciplinary space, we are opening into the field of economic research, the discursive analysis assumes that success in communication generates plus value from an economic point of view too. At least on medium and long term, a socially efficient communication can contribute to the economic growth. This assumption cannot be methodologically overturned/ overtaken and the present paper fully takes responsibility for it. Under the circumstances the enterprise legitimacy is based on its exploratory nature. For a start, the justification is rather more interesting than necessary and sufficient.

Regarding the working space of the research, the identity brand analysis of the touristic units from the region mentioned earlier will have supra reference themes, namely Bukovina regional brand (South Bukovina located on nowadays Romanian territory) Sucevița local brand. Thus, we shall

¹ Codrin Dinu Vasiliu, Senior Researcher, Iași branch of Romanian Academy, ICES „Gh. Zane”, codrindinuvasilu@gmail.com

² Ioan Sebastian Brumă, Senior Researcher, Iași branch of Romanian Academy, ICES „Gh. Zane”, sebastianbruma1978@gmail.com

identify the key themes, phrases and concepts starting with the identity discourses as they are promoted in the online on own sites or intermediary platforms for touristic services. However, it should be specified that our intervening is not attempting to certify or deny the validity of the discourses analysed. Our interest is solely based on understanding the paradigm where the rural tourism of Sucevița positions itself, whenever formulating its identity, activity, and touristic offer.

RESULTS AND DISCUSSIONS

The regional brand of Bukovina. From an identity point of view, Bukovina identifies itself with two main themes: the relationship with the historical region of Moldavia and assuming the influences inherited during the Austro-Hungarian administration (1774 - 1918). In the matter of the former, Bukovina assumes the Moldavian tradition essentially on a spiritual line but also delimitates itself away from the Moldavian lifestyle, especially in matters of private life organization where many Austro-Hungarian influences are still preserved. Thus, Bukovina is nowadays the characteristic discourse of multi-culturalism generating specific identity features. In this connection, the cultural legacy in Bukovina is strongly assumed and seconded by an identity discourse with conservative notes in the sense of preserving and protecting the traditional values.

Considering the touristic economy, Bukovina has surpassed the subsistence stage of the rural tourism (where the rural household used to supplement its income by running touristic activities without a clear business strategy developed on medium and long term), a situation characteristic of the period between 1990 and 2000. The touristic activities have an increasing enterprising character and are turning into actual business projects. A simple evidence of this state of facts is that accommodation facilities offered involve larger investments than the previous ones.

The local brand of Sucevița. The brand of Sucevița touristic basin is focused on the brand of Sucevița monastery. Sucevița commune is barely visible in the Romanian tourists imaginary due to that fact that Sucevița monastery is one of the most important ones from North Moldavia. Concurrently, compared to other touristic basins in the area, Sucevița commune is not located on an intensively transited route and does not have the modern facilities for outdoor sports (especially, winter sports, as for instance, Gura Humorului possesses). Therefore, the brand's notes are determined by a religious building and by a sense of belonging to Bukovina region characterized by the following features: historical heritage, traditional gastronomy, bucolic natural landscape, and crafts (especially those related to wood crafting and traditional pottery). For running a discursive analysis, it was developed a database with the identity narratives presented by 54 accommodation units from the touristic basin of Sucevița. The units have been identified by using Google maps, their own sites, and online intermediary platforms for touristic service promotion. Within the analysed discourses there have been identified 24 keywords and phrases which conclude the semantics of the identity narratives of the 54 touristic rural units. In the chart below (fig. no. 1), we introduce the frequency of appearance, on a general basis, of these keywords and phrases as decisive notes within the paradigm of the analysed discourses.

Their occurrences generate sufficient justifications for initiating a paradigmatic interpretation of the way rural touristic units choose to formulate their identity discourse and profile of the target group. Hereunder we shall analyse those themes which determine the profile of the rural touristic unit from Sucevița region and the tourist's profile targeted.

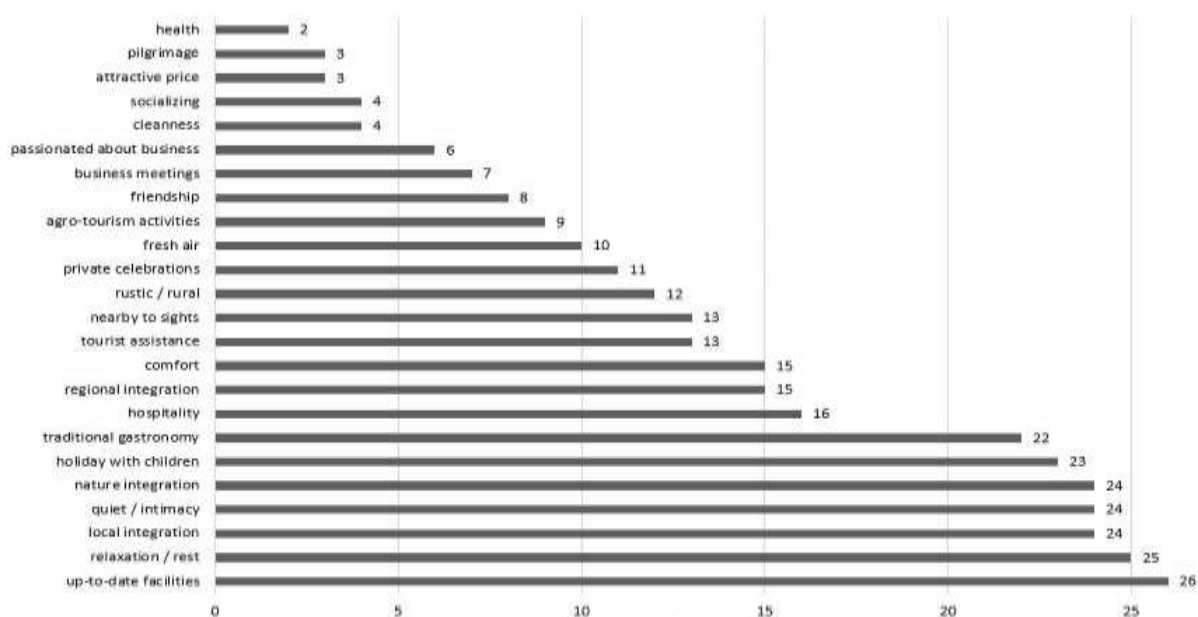


Fig. no. 1. The occurrences of the key phrases for 54 rural guesthouses from the touristic basin of Sucevița (Bukovina - Romania)

Regional integration (15 occurrences). The integration in the regional brand is achieved by simple references without engaging into a discursive relationship of reciprocal transfer of semantics and rhetorical value. At the same time, the nowadays context of touristic economy is barely visible. Although the Romanian tourists manifest a growing interest in the zones with an already known brand but less previously visited (Maramureș, Bukovina and so on), the accommodation units take too little advantage of the regional brands when promoting their own message. There are also some positive aspects. The brand of Bukovina, for instance, is drawing attention again and is not fundamentally determined by its religious component as it is rather defined by its cultural value and the opportunity of relaxation and leisure in bucolic surroundings. However, the touristic basin of Sucevița is not nu a fully -developed zone which could constitute an advantage for a sustainable and lasting tourism.

Local integration (24 occurrences). Although there are many units that tick the box of this theme, the tone used is usually a neutral one and rather informative as the discourse merely specifies the geographical position in Sucevița commune or the directions to the accommodation unit. Only 5 units refer to the local brand of Sucevița (“the beautiful Sucevița”, “the famous Sucevița monastery” and so on). The integration in the local brand is done directly, missing rhetorical devices and a clear recognition of the values included in the Sucevița supra brand.

Up-to-date facilities (26 occurrences). At first sight the value of “up-to-date facilities” should not have thematic features in the case of an identity discourse. We cannot see it under the species of a key phrase coming from an ideological engagement. On the contrary, the appurtenance may look more than ordinary: the “facilities” phrase is used by the digital platforms for touristic services and, consequently, slowly but gradually is gaining ground in the common language of accommodation units. It is about a mimesis phenomenon, a simple imitation. A quasi-standardized grid of utilities under the facilities class is entering the common language of accommodation units by taking the form of a cliché classification and it is becoming increasingly difficult to avoid it or, more creatively, improvise within its limits. The accommodation unit should be careful enough to merely tick the categories which are representative in its case. Thus, we could believe that “facilities” is nothing else but a discursive constant in the concept field and does not involve rhetorical engagement. As a result, “modern facilities” would be a minimal, rather insignificant extension and would refer to the simple fact that the utilities are up-to-date. Yet, the phrase “modern facilities” is becoming interesting by the relationships expressed towards the following key themes, at least: traditional values and return to nature (or to a lifestyle with a high degree of nature integration). Thus, at the very moment the accommodation units (at least, the category 3 of classification: stars or daisies) advertise their modernization, they specify their dedication to the traditional values of the place and

position in the natural surroundings of the region. The identity discourse is keen to make all these additions as a matter of urgency as if there is a question of direct consequence or successful adjustment. On the other hand, within the same context, the tourist units under category 3 subsidiarily state the modern state of their facilities by resorting to concepts of close semantics (comfort, cleanness) or by supplementary messages (“everything is at your disposal”, “you will not miss one thing”). In return, the same units rely on the rustic feature understood as direct access to tradition and nature integration. The conclusion is not too far from the idea that tourist units conceptualize a type of tourism capable of high-standard comfort demanded by the modern guest but related to a tourism capital made available by the access to tradition and integration within natural environment. This philosophy may appear a small paradox to some extent (and it is itself that rejects some purist categories of tourists). But it can also generate significant economic effects because it mainly addresses to those “always on a rush from the big cities” who can bring important financial resources in the tourist basin of Sucevița.

Integration in nature (24 occurrences), **Relaxation / Rest** (25 occurrences), **Quiet/ Intimacy** (24 occurrences). The analysed discourses support a rustic or bucolic type of integration within the natural environment. Whenever nature is subject of discussion, these discourses refer to an unaltered world where the human factor blends in a sustainable and lasting manner. The discourses have, most of the time, an arty sentimental tone and resort to a certain idyllic naïve language which reminds of the wooden language used for nature integration: “the murmur of water”, “the rustle of woods”, “a fairylike location”, “a slice of heaven”, “at the foot of the forest”, promising “a dreamlike stay”, “away from the hustle and bustle of the city”. The theme is also supported by the invitation to “relaxation”/ “rest” (25 occurrences) and “quiet”/ “intimacy” (24 occurrences). These key concepts are closely connected to the theme of remoteness far from the madding crowd and city turmoil. Thus, the tourist units suggest a recuperation tourism with little reference to outdoor activities and fully employing the resources of relaxation which provide integration in nature and the rustic monotonous character of the area. Concurrently, it cannot go unnoticed that merely 10 discourses refer to “fresh air” and other two mention “health”. These concepts contain an energy of concept reinforcement of nature integration but are barely used.

Holiday with children (23 occurrences). The theme often appears in the case of tourist units of 1 and 2 classification (stars or daisies). These units mostly target groups (families or friends) with children. Nevertheless, only 8 units specify their availability for agro-tourism activities which also contain an educative element.

Traditional gastronomy (22 occurrences). Although 22 units refer to traditional gastronomy, merely 4 of them specify explicitly the categories, recipes, or names of local traditional gastronomical products. The discourse is rather generical, lacking examples and auxiliary media materials.

Hospitality (16 occurrences). The hospitality is stated by 16 accommodation units and usually associated with the soul of a place. The rhetorical discourse customarily appeals to the friendship semantics and proves that the target group is mainly constituted by tourists who are potentially coming back in the area.

Pilgrimage (3 occurrences). Although the tourist zone of Sucevița serves as a pole for religious tourism, few guesthouses have a pro-active promotion of the religious tourism. A certain hold-back can be sensed regarding their affiliation (especially agro-tourism guesthouses) with this type of tourism. Surprisingly, a secularization phenomenon of the relationship between tourism business and religious life emerges in Bukovina. A possible explanation lies in the limited economic possibilities traded by the common pilgrim in the region, either due to a frugal alimentary behaviour (pilgrims usually fast) or because most pilgrims are engaged in a transitory tourism. Another explanation lies in the fact that during local the feasts of titular saints the zone becomes overcrowded and advertising this segment proves unnecessary. The pilgrim is no longer the very tourist of the tourist basin of Sucevița, although one of the most significant visitation pivots is represented by Sucevița monastery. The target group belongs to the middle class of young age and scarcely sensitive to the religious connotation of the place but open to discover the secular identity of the place. To that

purpose, 13 units state their activity on tourist assistance for visitation and the same number specifies their near-by location to the important tourist sights in the region.

Attractive price (3 occurrences). The price is not exactly a theme employed in the rhetoric of the promotion discourses. Only 3 tourist units advertise the idea of a good deal. This position can be interpreted in view of two perspectives. Either the tourist unit believes that it offers quality services at a fair price or the target group of limited financial resources is not taken into consideration.

CONCLUSIONS

Starting from the above-mentioned interpretations, we can draw the following conclusions:

1. The guesthouses come up with a socio-reality with the following configuration: a remote place apart from the artificial life of daily life from the urban environment, a timeless capsule open to nature, monasteries and other sights, a bubble filled with positive energy that operates a transfer of vitality to the tourist.

2. The pivot concepts for the introduction discourse of the accommodation units from rural tourism in Sucevița are as follows:

The up-to-date status of the accommodation facilities with reference to the quality of services, comfort and hospitality.

The rest and relaxation as opposed to the daily city life burdened by stress and work.

The integration in the special geography of the place with reference to the cultural aspects, sights, and beauty of the landscape.

The nature integration of the guesthouse either by location (a remote natural place) or by immediate access to such zones.

The quiet with reference to isolation and intimacy in contrast with the daily city life.

The traditional gastronomy as important tourist resource.

Family holiday with plenty of fun opportunities for children as well.

3. In contrast, the most least interesting aspects of the identity discourse of the guesthouses are as follows:

✓ The price presentation as an attractive deal.

✓ The explicit integration within the pilgrimage phenomenon. Although there are many references to monasteries and phrases of the place integration in the monasteries' area, they are often rhetorically capitalized as cultural historical sights and less as religious destinations.

4. Thus, the profile of the accommodation unit from the tourist basin of Sucevița is the following: generally speaking, we are dealing with a rural guesthouse which pursues a modern approach of the traditional values. It aims to provide, in a hospitable and familiar manner, comfort, quiet, rest and traditional gastronomical experiences in a natural and integrated place within the local particularities for the tourist who comes from urban zones and mostly wishes to take refuge in a place of relaxation and rest.

5. On this line it becomes gradually clearer that the profile of the target group is as follows:

✓ Adults between 30 and 50 years old

✓ Persons who mainly come from urban zones with a high economic potential

✓ Persons with sufficient financial resources not to worry about spending

✓ Persons who wish to have local cultural experiences

✓ Persons who are not willing to try outdoor activities

✓ Persons who are willing to come back to the visited place

✓ Persons interested in the local traditional gastronomy

In this context, there are a few fractures in the branding strategies of the guesthouses in the region. As long as the profile of the target group is the one mentioned above, we recommend to the managers of the accommodation units a series of medium and long-term actions as follows:

1. to supplement their services;

2. to refine their identity discourses;

3. to improve their techniques of branding and promotion.

Tourist services. A prime issue relates to the diversity of the tourist offer. Generally, guesthouses offer similar services (see chart no.2). The difference resides in the hospitality rhetoric (supported by online reviews and direct advertising by word of mouth), modernism degree of facilities (similarly, supported online by reviews and direct promotion), culinary experience and hazard elements (individual experiences of the tourists influenced by various positive or negative events). There are few exceptions in the matter of offers that convey a high degree of singularity and creativity. The specialized and highly specialized tourism attracting important incomes does not exist here yet. The regional and local brand, due to the fact that are very well-known, generate a sort of inertia that almost forces the local brands to have a captive relation with the traditionalising discourse of the place. At the moment, maybe this aspect is not sensed as a negative one. On the contrary. There are still plenty opportunities of economic capitalization in the discursive capital of the traditional values promoted. However, on medium and long-term things can turn complicated in the case of the guesthouses opposing the offer diversification.

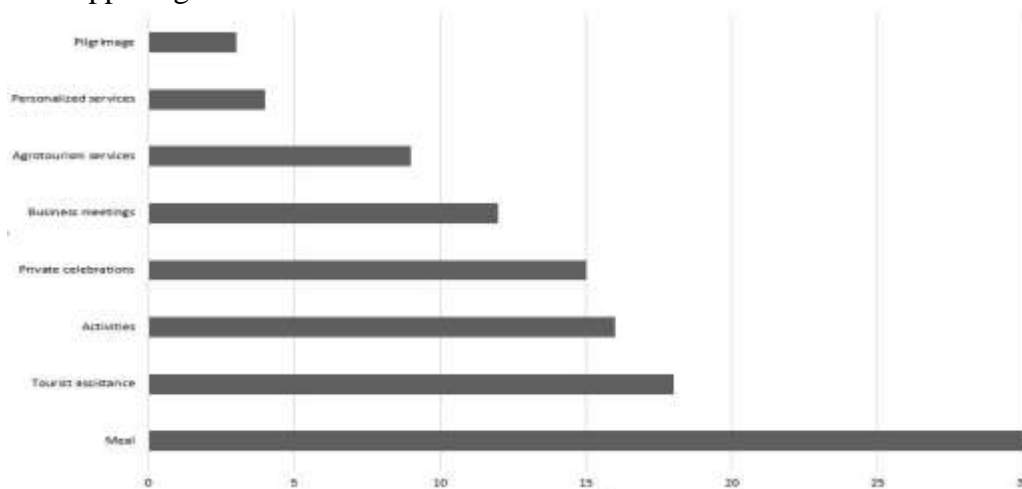


Chart no. 2. The occurrence of the services stated by the 54 accommodation units from the tourist basin of Sucevița

Branding. At least, as it appears online, the introduction discourse of the accommodation units is generally emotionally precious with familiar notes and often resorting to a wooden language (see chart no.3). It also does not have a dynamic and efficient relationship with the local and regional brand. Thus, the local sights should be promoted in an attractive and explicit manner. The same applies to the traditional gastronomy (with reference to the local products and recipes), creative industries, the lifestyle from Bukovina and Sucevița. At the same time, the accommodation units should know they are vectors and catalysers of promotion which are able to connect with local producers and thus develop the short chains of supply. The development of the individual, local and regional brands should take place in an integrated way by reciprocal promotion and by identifying a common addressing discourse. Concurrently, the modernisation of the sites belonging to the accommodation units is a real necessity in view of message (text and online material), applications and design with impact in matters of accessibility and usability.

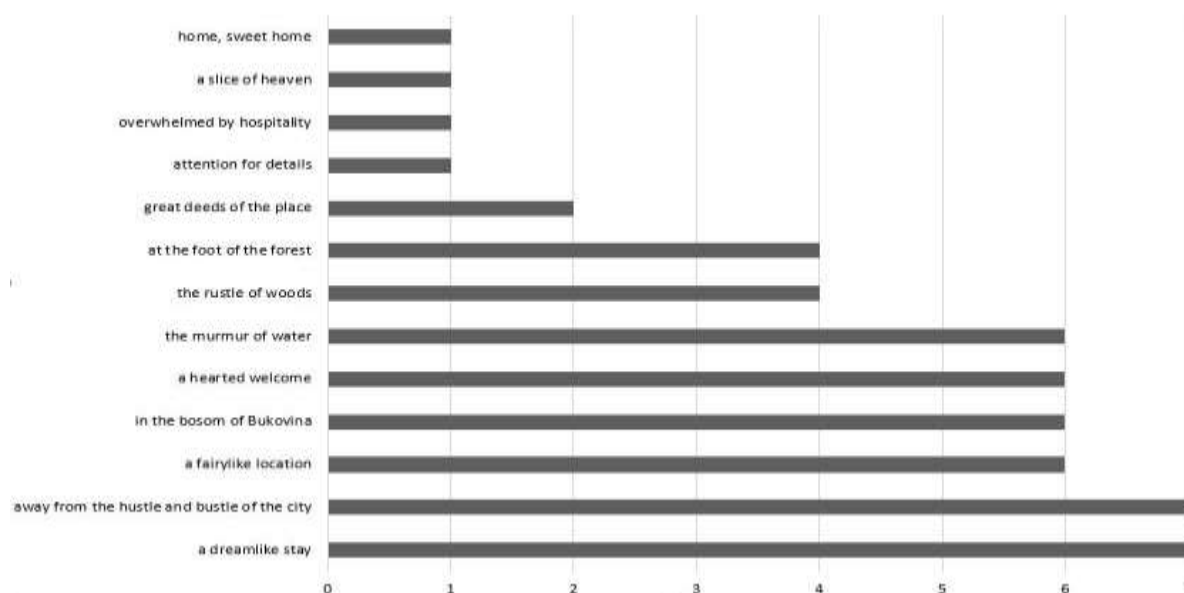


Chart no. 3. The occurrence of the most frequent phrases used in the promotion discourse of the 54 accommodation units from the tourist basin of Sucevița

Digital integration. On the whole, we are dealing with the following deficiencies:

- 36 accommodation units do not have their own site;
- out of the 18 existent sites only 6 use dynamic web solutions;
- only 4 sites are responsive and can be accessed from mobile;
- only 3 have an attractive design and out of them just 1 has a strong media integration;
- only 5 have integration applications for the digital maps;
- only 7 have integration applications for social networks;
- only 6 have applications for multi-linguistic applications;
- none has a HTTPS protocol (for safe accessing);
- only 6 have an optimum accessing speed for desktop devices;
- only 4 have an optimum accessing speed from mobile devices;
- only 6 provide information about contact and proximity in the area;
- only 3 have obtained a high score on performance, accessibility and use of best practice.

The overall digital situation for the 54 accommodation units is catastrophic. There is not a durable and sustainable digital integration. The possible explanations can be substantiated on lack of:

- financial resources for developing high-tech web products,
- identity message, coherent for promotion,
- confidence in the marketing value of their own sites.

However, the target group, as it has been identified in our analysis, is profoundly anchored in the digital world related to accessing information to make decisions. Thus, the message promotion among the tourists belonging to the target group is not an efficient one. Even if the business appears to function under satisfactory parameters, the perspectives of growth are rather limited.

Acknowledgement:

This paper has been written within the inter-disciplinary research group RDRP.

BIBLIOGRAPHY

1. Mirel Bănică (2014), *The need for Miracle. The Phenomenon of Pilgrimages in Contemporary Romania*, Iași, Polirom.
2. Monica Iorio & Andrea Corsale (2010), *Rural tourism and livelihood strategies in Romania*, Elsevier, *Journal of Rural Studies*, 26 (2010), pp. 152-162.

TOURISM AND AGROTOURISM POTENTIAL OF VRANCEA COUNTY - ROMANIA

ENACHE (TUREK) PETRUȚA ANTONETA¹
MANEA DRĂGHICI²

Abstract: *The Vrancea County region is one of the important areas of the South-East Development Region through tourism potential, through the natural cadre it possesses, the historical monuments and architecture, folk art, because here live householder people who keep the ancestral traditions, adding the quality of the offered tourism services.*

The tourism potential represents, truly, the primary tourism offer (potential) which, together with the existing tourism structures (accommodation structure and specific infrastructure) form the real tourism offer or the patrimonial tourism.

In this essay we analyze the tourism accommodation structures and the accommodation capacity, the tourist circulation, the net usage of the operative capacity coefficient in Vrancea County.

Key words: *tourism, agrotourism, tourist circulation*

JEL Classification: *Q 11*

INTRODUCTION

Rural tourism is and isn't a new form of expressing in the EU countries where tourist lodging in villages in a more or less organized manner has been done for a long time, this phenomenon appearing with the desire to expand and to spend leisure time another way than the classical way, by avoiding urban jostle and by looking for quiet areas and recreation in nature, in the form of countryside holidays, being also an alternative to classic tourism, industrial, that has had and still has, regarding fondness and constancy, as place of unfolding, tourism centers that are mostly urban. In its ensemble, rural tourism includes that large range of lodging possibilities, of activities, events, festivities, sports and entertainments, all of them unfolded in a typical rural environment³.

Vrancea, ancient hearth of Romanian ethnography and folklore and of remarkable cultural values, has a picturesque landscape, in which there are protected nature monuments that have a special beauty.

The tourism potential of Vrancea County really makes up the primary tourism offer (potential) which together with the existing tourism structures (accommodation structure and specific infrastructure) form the real tourism offer or the patrimonial tourism, to which it adds, not lastly, the general factors of human existence: hospitality, traditions, the variety and the quality of the offered services, for a good unfolding of the tourist activities.

The sojourn tourism in the mountain, vineyard or plain areas is favoured by the existence of multiple natural factors that can determine many ways to spend the holidays in spas with picturesque landscape, unpolluted and with distinct microclimatic particularities.

MATERIALS AND METHODS

Tourism is analyzed and followed in dynamic through a system of specific indicators, based on a calculation methodology that is standardized worldwide. The indicators of the tourist phenomena reflect its particularities and dimensions, the rates of operation generally or by certain sectors from it.

The analysis aims to identify the tourist and agrotourist potential in Vrancea County based on statistical indicators regarding the tourist accommodation structures and the lodging capacity by types of structures and tourist circulation.

¹ Ph.D.eng.Enache(Turek)Petruta, e-mail:turek_anca@yahoo.com

² Prof. Univ.Dr. Manea Draghici,USAMVB, email: dmprofesor@hotmail.com

³ Glăvan V.,2002, Agrotourism.Ecotourism.,Editura Alma Mater,Sibiu, p.11

RESULTS AND DISCUSSIONS

From the comparative analysis one can notice the fact that in 2016 the number of accommodation units has increased from 45 in 2010 to 57. In this period the number of hotels, motels and tourist boarding houses has increased, but the number of agrotourism boarding houses has decreased from 24 in 2010 to 18 in 2013, staying that way until 2016.

On a County level, the number of accommodations has registered a decrease in 2013 compared to 2010, of approx. 25% (280 accommodations), only to increase in the following period until 2016 with a of 28% percent compared to 2013

A considerable increase is noticed in the lodging capacity of motels which doubles in 2013 but has a small decrease in 2016 with a 6,3% percent compared to 2013.

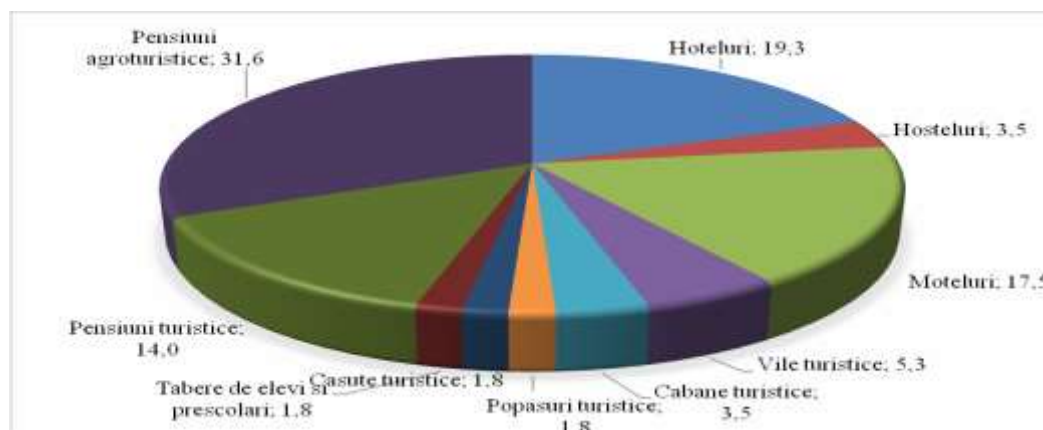
Table nr.2 Comparative analysis of the tourist accommodation structures and lodging capacity
by types of structures in Vrancea County

Unit Type	2010		2013		2016		2013/2010(%)		2016/2013(%)	
	nr. of units	nr. of accom.	nr. of units	nr. of accom.	nr. of units	nr. of accom.	units	accom	units	accom.
Total	45	1836	49	1556	57	1993	108,9	84,7	116,3	128,1
Hotels	6	504	8	425	11	723	133,3	84,3	137,5	170,1
Hostels	*	*	2	60	2	60	*	*	100,0	100
Motels	4	166	10	397	10	372	250,0	239,2	100,0	93,7
Tourist Villas	2	127	1	12	3	48	50,0	9,4	300,0	400
Tourist Huts	1	7	1	10	2	108	100,0	142,9	200,0	1080
Tourist Rest areas	*	*	*	*	1	6	*	*	*	*
Bungalows	1	58	*	*	*		*	*	*	*
Tourist Cottages	*	*	*	*	1	10	*	*	*	*
Pupil and pre-school camps	2	520	1	200	1	240	50,0	38,5	100,0	120
Tourist Boards	5	84	8	137	8	141	160,0	163,1	100,0	102,9
Agrotourist Boards	24	370	18	315	18	285	75,0	85,1	100,0	90,5

Source: INSSE tempo data series online 2010-2016

In the chart below we can see the share of the tourist accommodation structures out of total. The largest share is held by agrotourism boarding houses with a percentage of 31,6%, followed by hotels with 19,3% and motels with 17,5%.

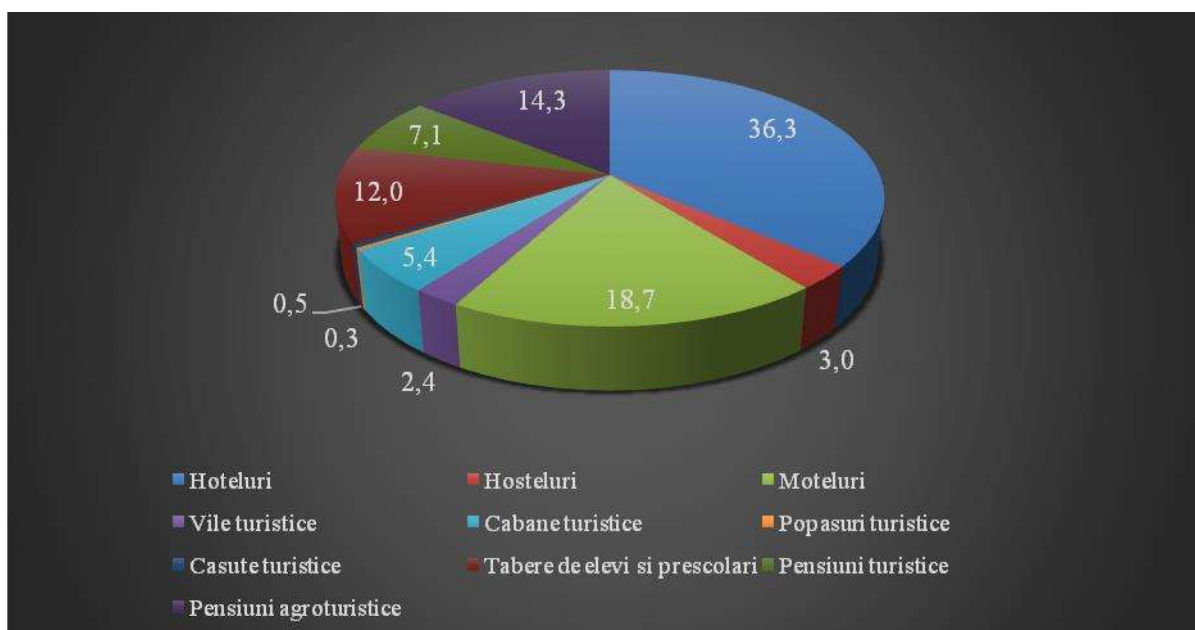
Chart nr.1. Tourist accommodation structures in 2016 in Vrancea County



Source: INSSE

Regarding the accommodation capacity in 2016, the largest share is held by hotels with 36,3%, motels with 18,7% and agrotourist board houses with 14,3%. A very small share is held by tourist rest areas with 0,3% and tourist cottages with 0,5%.

Chart nr.2. Lodging capacity in 2016 by types of structures in Vrancea County



Source: INSSE

Analyzing the evolution of the number of tourists foreigners as well as Romanians we can see both decreases and increases in the analyzed period so that in 2010 the number of arrivals increases until 2012, only to decrease 16% in 2013 compared to past year. Until 2015 the number of arrivals increases by 41% compared to the first year from the analyzed period, only to decrease a little in the following year.

Table nr.3. Analysis of the tourist circulation between 2010-2016 in Vrancea County

Years	ARRIVALS (nr. of people)			OVERNIGHTERS (nr.)			Average sojourn duration (nr.)		
	T	RT	FT	T	RT	FT	T	RT	FT
2010	30606	29276	1330	51464	49097	2367	1,68	1,68	1,78
2011	41625	39901	1724	71697	68766	2931	1,72	1,72	1,70
2012	40657	38034	2623	57330	52972	4358	1,41	1,39	1,66
2013	34196	31455	2741	55898	51020	4878	1,63	1,62	1,78
2014	38901	36584	2317	63206	58225	4981	1,62	1,59	2,15
2015	43290	41355	1935	75061	71495	3566	1,73	1,73	1,84
2016	41350	39013	2337	74517	69177	5340	1,80	1,77	2,28

Source: INSSE tempo data series online 2010-2016

We can see that the number of tourists has a very small share of total arrivals in the County, of 4,34% in 2010, increasing until 2016 to 5,7%.

In 2016, the number of arrivals in hotels holds the largest share with 41%, followed by motels with 21,4%.

Romanian and foreign tourists go for hotels, but Romanian tourists also go for motels and boarding houses.

In overnighers' case the minimum value is with tourist cottages (61) and the maximum one with hotels (34417).

The average sojourn duration ranges from 1,3 for boarding houses, up to 4,1 for pupil and pre-school camps.

Table nr. 4 Tourist circulation structure in Vrancea County by types of tourist accommodation structures and tourists in 2016

Types of structures	Types of tourists	Arrivals	Overnighers	Average sojourn duration
		Nr. of people	Nr.	Nr.
Total	T	41350	74517	1,8
	RT	39013	69177	1,8
	FT	2337	5340	2,3
Hotels	T	16981	34417	2,0
	RT	15655	30993	2,0
	FT	1326	3424	2,6
Hostels	T	1005	2596	2,6
	RT	1005	2596	2,6
Motels	T	8867	12490	1,4
	RT	8847	12448	1,4
	FT	20	42	2,1
Tourist Villa	T	254	520	2,0
	RT	187	361	1,9
	FT	67	159	2,4
Tourist Cottages	T	36	61	1,7
	RT	36	61	1,7
Pupil and pre-school camps	T	2179	8863	4,1
	RT	2179	8863	4,1
Tourist Boarding Houses	T	7337	9555	1,3
	RT	6679	8315	1,2
	FT	658	1240	1,9
Agrotourist Boarding Houses	T	4691	6015	1,3
	RT	4425	5540	1,3

Source: INSSE tempo data online 2016

The net usage of the functioning capacity index in Vrancea County is 17,9%, which shows a small usage of the lodging capacity, one of the influencing factors being the weak tourism advertisement.

Table nr. 5. The capacity and the tourist lodging activity

Types of structures	Lodging capacity		Arrivals	Overnighers	Net usage of the functioning capacity index %
	Existent	Number of accommodations -days			
Total	1993	415802	41350	74517	17,9
Hotels	723	137775	16981	34417	25,0
Hostels	60	21952	1005	2596	11,8
Motels	372	89833	8867	12490	13,9
Tourist Villas	48	4380	254	520	11,9
Tourist Cottages	10	1530	36	61	4,0
Pupil and pre-school camps	240	80560	2179	8863	11,0
Tourist Boarding Houses	141	40822	7337	9555	23,4
Agrotourist Boarding Houses	285	38950	4691	6015	15,4

Source: INSSE tempo data online 2016

The net usage of the functioning capacity index registers minimum values for tourist cottages of 4% and maximum values for hotels of 25% and tourist boarding houses with 23,4%.

CONCLUSIONS

Vrancea County is a part of the South-East Development Region, an area that registers a large number of unemployed people, tourism representing an alternative. In order to capitalize the tourist potential, some tourism development directions are imperative, aiming to integrate the Vrancea tourist product in the future national and international tourist programs.

Here we find a very diverse relief with areas that have powerful historical, ethnographic or winegrowing resonances, making possible to promote:

- mountain tourism in the Soveja, Tulnici-Lepșa and Jitia-Vintileasca massifs
- balneary tourism through the improvement of the lodging conditions, of the degree of comfort in general in Soveja resort
- founding the local interest resort Vizantea through capitalizing the bioclimate and the mineral waters
- founding the Tulnici-Lepșa recreation resort

For those who prefer week-end tourism, Vrancea County offers many possibilities for backpacking and relaxation: the Soveja resort, known for the highest quantity of ozone in the air in the country, Putnei– Lepșa Valley, vineyards and the “domnești cellars” from Panciu and Odobești.

A specialized form of tourism that would capitalize this characteristic of being the largest wine-bearing County in the country is the wine tourism, for wine tasting in renowned vineyards, where there are wineries equipped for this purpose: Panciu, Odobești, Cotești.

The rising interest of tourists, Romanian as well as foreigners, for the customs, traditions and folk art, pottery and traditional costumes, brings a considerable development of this type of tourism, the rural tourism.

In Vrancea County there are many natural reservations that could attract tourists. In order to do that, the possibilities of the natural reservations of the County should be capitalized scientifically and they should be given a special attention.

BIBLIOGRAPHY

1. Cultura si tradiții, <http://www.cjvrancea.ro/media/cultura-si-traditii-5/>
2. Program de valorificare a potențialului turistic al județului Vrancea <http://www.creeaza.com/afaceri/turism/Program-de-valorificare-a-pote967.php>
3. Proiecte implementate în județul Vrancea, <http://www.cjvrancea.ro/Proiecte-implementate-44/>
4. <http://www.cjvrancea.ro/Strategia-de-dezvoltare-a-judetului-2007-2013-42/>
5. %20integrata%20a%20judetului%20Vrancea%20%202014-2020.pdf
6. Turismul județului Vrancea , <http://www.cjvrancea.ro/media/turism-2/>
7. Valorificarea potențialului turistic din Județul Vrancea http://www.scritub.com/geografie/turism/Valorificarea-potentialului-tu61828.php#_ftn1
8. Institutul național de statistică, baze de date Tempo-Online, accesat la data 15.06.2017, www.insse.ro
9. Wikipedia, Județul Vrancea , https://ro.wikipedia.org/wiki/Jude%C8%9Bul_Vrancea

REFLECTIONS ON THE IMPACT OF THE ASSOCIATION AGREEMENT BETWEEN THE REPUBLIC OF MOLDOVA AND THE EUROPEAN UNION ON THE ECONOMY OF THE NATIONAL RURAL SPACE

SIMION CERTAN,
ION CERTAN

Abstract : *European authorities have given and increased attention to rural areas. Still in Agenda 2000, the European Commission has included "coherent sustainable rural development policies". Moldova is "condemned" to pay more attention to rural areas, as the majority of the population is located here. Moreover, the share of the rural population increases from 52.6% in 1990 to 57.5% of the total population in 2016. The approach of the rural development problem is also conditioned by the difficult condition of the village.*

Incidentally, paragraph (d) of Article 68 of the Association Agreement between the Republic of Moldova and the European Union and the European Atomic Energy Community and their Member States, of the other part, initialed in November 2013 (hereinafter referred to as "Agreement"), urges us to "exchange knowledge and good practices on rural development policies to promote the economic well-being of rural communities".

The basic unit of the rural area in our country, in administrative terms, is the village, which according to the "European Rural Country Book" [14,9] is assigned the following functions: economic, ecological, socio-cultural. The article meditates on the economic function, which includes the sustainable use of natural resources, the development of an efficient agricultural production system, the promotion of tourism and other services. As a result, the authors come up with some proposals that would contribute to the sustainable economic development of the national rural economy.

Key words: *rural space, resources, agriculture, ecology, cultural values, efficiency.*

JEL Classification: *Q12, Q15, Q17*

INTRODUCTION

The Moldovan Parliament's decision of 25 July 1990, which qualified "... the transition to a market economy as a model of management ..." and "Concept of agrarian reform and socio-economic development of the village" (hereinafter conception) adopted by the same Parliament of February 15, 1991 contributed to the dismantling of the centralized economic administration system and the establishment of the economy based on market relations, the suppression of public property and the enhancement of private property in the national economy, including in the rural economy. But after twenty-seven years of reforming the country's rural economy, the poverty level has not diminished as expected.

In the present study, the authors meditate on the situation that has been created in the country's rural economy and come up with some proposals that would help to change the situation to "better".

THE STATE OF KNOWLEDGE OF THE PROBLEM

The study of the country's rural economy is found in national and international research. However, even though this issue has been addressed in scientific sessions in various publications, it remains current.

This situation has prompted us to return to the study of the economy of the national rural area under the provisions 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 hand was initialed in November 2013. The investigations provided us with the opportunity to outline some recommendations for improving the impact of the Nominal Agreement on the Rural Economy of the Republic of Moldova.

MATERIAL AND METHOD

The materials used in the research are the normative documents of the EU and the Republic of Moldova, the specific publications that allowed us to identify the factors influencing the impact of the Association Agreement between the Republic of Moldova and the European Union on the economy of the national rural space. The quantitative analysis is performed on data selected and processed by the authors. The study of empirical information provided us with relevant meanings and explanations in relation to the phenomena or processes of the impact of the Agreement on the Rural Economy of the Republic of Moldova.

RESULTS AND DISCUSSIONS

1. National Rural Area Resources: General Characteristics

The fate of the rural economy is firstly influenced by natural resources, which, according to P. Bran [3,34], "in the form of its general and particular laws in every form of motion of matter, will cause nothing in this process to win, nothing to lose, everything to change. "

An important component of natural resources is climatic conditions. The average annual air temperature in the Republic of Moldova is $+8 + 11^{\circ} \text{C}$, including 9.30 at Briceni (north), 10.90 in Chisinau (center) and 11.30 at Cahul (south), respectively, by 33.70 with the absolute maximum of 36.8 and with an absolute minimum of -21.8 degrees Celsius. The territory of the Republic of Moldova belongs to the area with insufficient humidity. The amount of precipitation decreases from northwest to southeast, from 620 to 490 mm during the year. Precipitation falls in the warmer year of the year in the form of rain showers and only about 10% of its annual amount is in the form of snow. The available water resources amount to 7.21 km³ in the average per year and are represented by the 3085 large and small rivers, permanent and temporary streams, natural and artificial lakes.

The most valuable natural resource is the land fund that at the beginning of this year was 3384.6 thousand ha, 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° . Lands with slopes of more than 8° form 4.4%. On our land, the chernozems (about 80%) with a humus content of 2.5 to 5 percent, which provide increased fertility to agricultural land, are curing. The average credit score is 68 points.

The agricultural land on 01.01.2016 formed 2499.6 thousand ha, including 648.6 thousand ha or 25.95% in public property and 1851.0 thousand ha or 74.05% in private ownership. Among the 52.4% public land owned by the agricultural land dominates the pastures, and the lowest share (0.3%) belongs to the meadows. Private sector with 13.6% highlights multiannual plantations. In the public sector, they are 3.4% and the vineyards - 1.2%, while those in the private sector are respectively 6.0% and 6.9%. 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.

The increase in the surface of agricultural land held by state agricultural holdings, joint stock companies and collective households was made on the account of agricultural land of peasant households, the total area of which fell from 692.9 thousand ha (30.7% of the total agricultural land area) in 2005 Table 1) to 508.4 thousand ha (28.85% of the total area of agricultural land) in 2015.

Table 1 Agricultural land by categories of owners at the beginning of the year, thousand ha

	2005	2010	2011	2012	2013	2014	2015
Total	2257.4	2236.9	2234.0	2233.6	2235.9	2235.4	2235.4
of which: legal entities	841.2	871.3	866.0	868.7	875.4	881.3	884.0
peasant farms (farmer)	692.9	661.4	662.6	653.4	649.3	654.5	645.0
including the average plots less than 10 ha	601.9	565.6	559.3	536.7	523.7	523.6	508.4
auxiliary households - plots and gardens next to the house	299.1	313.6	316.7	325.5	326.4	315.9	323.0

Source: authors' calculations according to the results of statistical research on agricultural activity of small agricultural producers in the Republic of Moldova, Statistical Statistics Chisinau

If in 2005 the peasant households with an average land area of less than 10 hectares were covered by 601.9 thousand ha (86.9% of the agricultural land owned by peasant farms), then in 2015 - 508.4 thousand ha (78.8%), or 15.5% smaller.

The natural potential of our country is sufficiently favorable for the economic development of the rural environment.

To create value in rural areas, innovative modern technologies that require material resources are needed. The most important components of material resources are fixed assets. Total fixed assets at the end of the year in the Republic of Moldova increased from 21958 million lei from the initial value in 1995 (Table 2) to 219507 million lei in 2014 or about 10 times.

The existing fixed assets in agriculture at the end of the year increased very modestly from 7687 million lei after the initial value in 1995 to 14189 million in 2014 or only 1.84 times. If the fixed assets for agriculture in 1995 were 35.0%, then in 2014 - only 6.5%, which is very serious. Vertiginous increased fixed assets in manufacturing from lei 4367 mn in 1995 to lei 26,842 mn in 2014 or 6.14 times. However, their share decreased from 19.9% in 2005 to 12.2% in 2014. If in 1995 the fixed assets in the manufacturing industry formed 56.8% of those in agriculture, then in 2014 they exceeded 1.89 times.

Table 2 Fixed assets existing at the end of the year, by initial value, in millions lei

	1995	2000	2005	2010	2011	2012	2013	2014
Fixed assets, total	21958	91319	112502	180364	199398	208984	228007	219507
of which: -agriculture	7687	8868	5583	8928	10495	11579	12269	14189
% of total	35.0	9.7	5.0	5.0	5.3	5.5	5.4	6.5
- processing industry	4367	14829	19333	30119	31088	30638	32123	26842
% of total	19.9	16.2	17.2	16.7	15.6	14.7	14.1	12.2

Source: Author's calculations based on the information on www.statistica.md.

According to the 2011 agricultural census, agricultural holdings in Moldova used 687765 tractors of all types, which make 76% of the total indicated in the census. Only 6379 households used it Lawn. Only 16064 farms in our country (2.3%) own tractors of all kinds. Trucks have used 75,309 farmhouses. Combines of all types and other harvesters used 98,746 agricultural holdings, which make up 14.7% of the number of tractors. Catastrophic few agricultural holdings (3388 or 0.5% of those using tractors) use irrigation machinery and equipment.

Of the total of 24,695 tractors used, 77% or 19092 units are 10 years old and over. All 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.

Chemical fertilizers used in agricultural enterprises increased from 11.2 thousand tonnes in 2001 to 72.4 thousand tonnes 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 is reduced to 45.8 kg in 2015 or 1.83 times relative to 2014. But they remain insufficient to guarantee an acceptable and stable fruit. The use of natural fertilizers has a clear tendency to decrease from 1517.5 thousand tons in 1995 to 22.2 thousand tons in 2000 or 68 times and then it varies from 15.1 thousand tons in 2010 to 56.2 thousand tons in 2015. Of course, 70 kg of natural fertilizer per hectare of sowing is impossible to practice performing agriculture.

A. Smith's formula [14] that human activity creates the mass of goods is also valid for the man in the village who through work contributes to the development of rural space. The total population in our country decreased from 4361.6 thousand persons in 1990 to 3553.1 thousand in 2016. The share of rural population increases from 52.6% in 1990 to 57.5% of the total population in 2016. The natural increase is reduced from 8 in 1990 to - 0.3 in 2015, including in rural areas from 6.6 to -0.8. The aging rate reached 16.2%, including men - 15.9%, for women - 16.4% and exceeded the admissible level of demographic aging (12%) indicated on the G. Bojio-Gamier scale.

The number of the population living in the countryside of our country working or looking for work abroad increased from 82.1 thousand people in 2000 to 220.5 thousand people in 2010 or 2.69 times and constantly increases to 224.9 thousand persons in 2016 or with about 2% compared to 2010. The remaining economically active population in the country decreases from 1696 thousand in 1995 to 1266 thousand in 2015 or 27.13%. Pronounced declines activity rate from 47.1% in 1995 to 35.6% in 2015 or 11.5 percentage points. The number of persons employed in the economy decreased from 1319 thousand in 2005 (Table 3) to 1204 in 2015 or by 8.7%.

Table 3 Distribution of the employed population in the Republic of Moldova by age, thousands of persons

Population	Total		Inclusiv											
			15-24		25-34		35-44		45-54		55-64		65 și peste	
	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
employed	1319	1204	124	93.6	252	300	341	293	384	290	158	190	60	37
Of which in rural area	745	648	71.9	56.2	121	138	184	159	222	161	93.4	108	52.8	25.8
Of which:														
-in agriculture	512.5	358.4	39.0	30.9	74.1	62.7	119	81.6	155	87.4	73.9	71.8	51.3	23.9
- in industry	40.8	54.5	9.5	5.7	9.6	16.0	10.6	13.9	8.8	12.8	2.4	5.8	0.0	0.2

Source: Author's calculations based on selected information on [http / www.statistica.md](http://www.statistica.md)

The number of those employed in rural areas decreased from 745 thousand in 2005 to 648 thousand in 2015 or by about 13 percent. The population aged 25-54 employed in 2005 in the national economy was 977 thousand people, and in 885 thousand persons or about 10% less, and the occupied in the rural area decreased respectively from 527 thousand in 2005 to 458 thousand persons in 2015 or 13.1%.

The total number of employed in the national economy dominates the employees even if their number decreases from 830.6 thousand (63% of the total) in 2005 to 787.6 thousand persons (65% of the total) in 2015. The number of employees in the rural area decreased from 339.6 thousands in 2005 to 308.8 thousand persons in 2015 or by about 9 percent. The number of self-employed workers in rural areas decreased from 391.3 thousand in 2005 to 291.3 thousand in 2015 or by a quarter. Virtually all unpaid family workers are busy in rural areas. Their number increased from 13.1 thousand people in 2005 to 45.3 thousand people in 2015 or 3.46 times. Obviously, the available resources have influenced the development of the economy in rural areas.

2. Evolution of the economy in rural areas

The most present economic activity in the rural area of the Republic of Moldova was and remains agriculture. Agricultural production, in current prices, increased from 4243 million lei in 1995 (table 4) to 27193 million lei in 2015 or 6.4 times. This increase, to a large extent, was caused by the price account. If global agricultural production in current prices in 1995-2005 increased three times, then in comparable prices of 2000 - by 10.8%; in current prices in the years 2005 - 2014 increased 1.9 times and in the comparable ones of 2005 - by about 4%.

Table 4 Agricultural production in current prices, mil. Lei

	1995	2000	2005	2010	2011	2012	2013	2014	2015
Total	4243	8268	12688	19873	22619	19922	23814	27254	27193
of which: - vegetable production	2687	5790	8449	13616	15751	11968	15480	17341	18082
- animal production	1393	2202	3851	5786	6347	7529	7930	9477	8584
- services	163	276	388	471	521	425	404	496	527

Source: Statistical Yearbooks of the Republic of Moldova, Chisinau

Agricultural production in two years after the initialling of the "Agreement" in 2013 increased 1.25 times over the previous two years. Structural is dominated by crop production, the

share of which is 70% in 1995 (Table 5) and 58% in 2015. Among cereal products, cereal crops range from 17.9% in 2012 to 28.9% in 2013.

Table 5 Structure of agricultural production by branches in households of all categories,%

	1995	2000	2005	2010	2011	2012	2013	2014	2015
Total agricultural production	100	100	100	100	100	100	100	100	100
Of which: vegetal production	70.0	69.0	68.9	66.2	71.7	61.5	72.3	67.8	58.0
Of which: - cereals	19.0	25.0	22.9	18.8	28.0	17.9	28.9	25.4	20.3
- vegetables	7.0	5.0	7.3	7.4	8.1	6.0	5.5	7.5	7.1
- fruits, nuts, berries	7.0	3.0	4.4	3.9	6.8	6.7	5.4	6.4	6.5
- grapes	9.0	12.0	12.8	12.1	6.1	10.4	9.0	6.8	7.0

Source: author calculations based on the Statistical Yearbooks of the Republic of Moldova

If in the 1990s the fruit was 17%, then in the years 2000 - 2015, their weight ranged from 3.0% in 2000 to 6.8% in 2011. In 2015 neither fruits, nuts, berries nor grapes nor fruit to the share of fruit in the 90s, amounting to only 13.5%, which is by 6.8 percentage points lower than the share of cereal crops.

Mutations that have taken place in the structure of agricultural production indicate a tendency to decrease the share of intensive crops such as grapes, fruits, vegetables, tobacco etc. and an increase in the share of products that require less capital such as wheat, corn, sunflower, etc., due to price liberalization in 1992. The agricultural production price index in 1992 increased by 1017%, and energy prices - 2900%, forming a ratio of 1 to 2.85. In 1994 this report constituted 1 to 3.17. As a result, the sales prices of the vegetable products usually exceed those of the cost. Thus, the selling price per ton of grain produced in agricultural enterprises in 1995 exceeded the cost of 2 times, and in 2012 * - only 4%. The selling price for one tonne of sugar beet in 20123 constituted 95%, one tonne of grapes in 2010 accounting 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. This situation encouraged the abandonment of agricultural land, contributing to the expansion of land plots.

In point (g) of the first article of the "Agreement" it is stated that the ultimate objective 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 area, legislative and liberalization of market access with major implications, in accordance with the rights and obligations arising from the WTO Membership of the Parties and the transparent application of these rights and obligations. "

Total exports increased from 1091.2 in 2005 to 1966.8 million in 2015 or 1.8 times. Exports to the 27 Member States of the European Union steadily increased from US \$ 443.4 million in 2005 to US \$ 1217.6 million in 2015 or 2.75 times. Total imports in the years 2005-2015 increased 1.74 times, including in the CIS countries - 1.12 times and in the 27 EU states - 1.88 times.

After the initialling of the "Agreement", the value of agri-food products exported to the CIS countries decreased from 767.8 million dollars in 2013 (Table 6) to 329.0 million dollars in 2016 or 2.33 times, which is in principle due to embargoes imposed on the Republic of Moldova by The Russian Federation.

Table 6 Value of exported agri-food products, thousands of US dollars

	2010	2011	2012	2013	2014	2015	2016
Total	3941134	1803054	1630237	1949885	1993447	1719455	
Of which: - CIS states	1705787	828949	785899	767793	692150	465011	329012
- EU-27	401371	691656	691609	707948	800854	899797	1030516

Source: Author's calculations based on selected information on [http / www.statistica.md](http://www.statistica.md)

The value of agri-food products exported to the 27 member countries of the European Union increased from US \$ 707.9 million in 2013 to US \$ 1030.5 million in 2016 or 1.46 times. If in 2010 the exports of agri-food products to the CIS related to their exports to the 27 countries Member States

of the European Union was 4.24 per 1 in 2013 - 1.08 per 1 respectively, then in 2016 - 0.32 to 1. The shift in export orientation is largely due to the Agreement.

The concept of agrarian reform and socio-economic development of the village, adopted by the decision of the Parliament of the Republic of Moldova in 1991, stipulates the "location of some sections and subdivisions of the urban industrial enterprises". The total value of industrial production increased from 8167.7 mil lei in 2000 (table 7) to 45654.9 mil lei in 2015 or 5.6 times, including in Chisinau municipality - from 4420.8 to 26115.0 mil lei or 5.9 times.

In rural areas, the value of industrial production increased from 2618.7 million lei in 2000 to 14627.9 million lei in 2015 or 5.6 times. But even this growth is far too inadequate for our country's rural space. If in 2013, the year of the initialling of the Agreement, the value of industrial production in the rural area forms 33.9% of the total in our country, then in 2015 - 32.0%. In other words, the industrialization of rural space after the initialling of the Agreement has not yet taken place.

The total number of arrivals of foreign visitors decreases from 32.8 thousand in 1995 to almost 19 thousand in 2000 or 1.7 times, then increases to 25 thousand in 2005 or 1.3 times after decreasing to about 9 thousand or 2.8 or in 2010 and then rises to 13.1 thousand in 2013 or by about 47 percent.

Table 7 Value of industrial production, million lei

	2000	2005	2010	2011	2012	2013	2014	2015
Total	8167.7	20148.1	28140.1	34194.4	36362.2	39024.3	43548.0	45654.9
Of which:- mun. Chişinău	4420.8	10807.7	16171.6	20142.9	21506.9	22590.7	24592.4	26115.0
- mun. Bălţi	1128.2	2225.0	3042.8	3456.8	3774.8	3207.6	4203.5	4912.0
- rural areas	2618.7	7115.4	8925.7	10595.0	11080.5	13226.0	14752.1	14627.9

Source: Author's calculations based on selected information on [http / www.statistica.md](http://www.statistica.md)

In rural areas, the value of industrial production increased from 2618.7 million lei in 2000 to 14627.9 million lei in 2015 or 5.6 times. But even this growth is far too inadequate for our country's rural space. If in 2013, the year of the initialling of the Agreement, the value of the industrial production in the rural area was 33.9% of the total, then in 2015 - 32.0%. In other words, the industrialization of rural space after the initialling of the Agreement has not yet taken place.

The total number of arrivals of foreign visitors decreases from 32.8 thousand in 1995 to almost 19 thousand in 2000 or 1.7 times, then increases to 25 thousand in 2005 or 1.3 times after decreasing to about 9 thousand or 2.8 or in 2010 and then rises to 13.1 thousand in 2013 or by about 47 percent.

The achievement of the economic function in the rural area also includes the "internal tourism" and the "receiving tourism" promotion. The countryside in our country has modest possibilities to provide tourists with what they need. The number of places in the tourist and agrotourist pensions increased from 210 in 2005 (Table 8) to 955 in 2016 or 4.55 times and in holiday villages and other resting structures decreased - respectively from 4833 to 3969 or 1.22 times .

Table 8 Some characteristics of the hotel industry evolution in the rural area of the Republic of Moldova

Indicators	2005	2010	2011	2012	2013	2014	2015	2016
Nr. places in tourist and agrotourist pensions	210	743	813	905	867	990	906	955
Nr. of places in holiday villages	4833	5165	4519	4473	4685	4144	3539	3969
Nr. tourists staying in tourist and agro-tourist accommodation	1807	13290	11701	11570	11526	8208	9283	21343
of which foreigners	1003	2383	2417	3881	4363	1402	1730	2725
Nr. tourists staying in holiday villages	47889	18386	25826	39522	33027	48158	46636	39915
of which foreigners	74	2171	3231	3781	4823	3754	4843	6783
Nr. the overnight stays of tourists in tourist and agro-touristic pensions	3799	43583	37317	36895	34513	24912	24690	35306
of which foreigners	2492	7219	8482	15240	15380	4689	5380	6536
Nr. overnight tourists in holiday holiday villages	143163	45433	54109	119797	108509	148580	95459	137934
of which foreigners	518	5354	9318	9013	11659	9128	10140	15990

Source: Author's calculations based on selected information on [http / www.statistica.md](http://www.statistica.md)

If the number of tourists accommodated in tourist and agrotourist pensions increases from 11526 in 2013 to 121343 in 2016 or 1.85 times, then to those in holiday villages and other resting structures - 1.2 times respectively. The number of foreign tourists staying in tourist and agro-tourism pensions decreases from 4363 to 2725 in 2016 or 1.6 times, and those accommodated in holiday villages increased from 4823 in 2013 to 6783 in 2016 or 1.4 times. In 2013, a tourist accommodated in tourist and agro-touristic pensions accounted for 2.99 nights, including foreign ones - 3.53 and in 2016 - 1.65 and 2.4 respectively. The number of overnight stays compared to a tourist staying in holiday villages and other resting structures increases from 3.29 in 2013 to 3.45, and the number of overnight stays decreases from 2.42 in 2013 to 2.35.

The total number of arrivals of foreign visitors to our country decreased from 32.8 thousand in 1995 (Table 9) to 8.9 thousand in 2010, then increases to 15.7 thousand in 2016. Of course, in general the number of arrivals of foreign visitors in our country is very modest.

Table 9 Foreign visitors, tourists and excursionists in our country

	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
Number of arrivals of foreign visitors in the country, total	32821	18964	25073	8956	10788	12797	13150	14362	15514	15668
of which for purposes of: -										
holidays, recreation and rest	3256	7108	7840	5438	5892	7025	6343	8355	10097	11454
business and professional reasons	24743	11577	16372	2971	4330	5190	5962	4952	4196	3062
Number of tourists and excursionists participating in domestic tourism	16417	26705	60806	35594	37764	34363	34172	43045	37244	41297

Source: Author's calculations based on selected information on [http / www.statistica.md](http://www.statistica.md)

If arrivals of foreign visitors to our country for holiday and holiday purposes increased from 6343 (48.2% of the total) in 2013 to 11454 (73.1% of the total) in 2016 or 1.8 times, then for business purposes and professional reasons declined steadily from 5962 (45.3% of the total) in 2013 to 3062 (19.5% of the total) in 2016 or 1.95 times.

Thus, we can see that even after the initialling of the agreement the foreign visitors do not rush to come to the Republic of Moldova for business purposes and professional reasons. The number of tourists and excursionists participating in domestic tourism in our country increases from 16.4 thousand in 1995 to 60.8 thousand in 2005 or 3.7 times, then decreases to 34.2 thousand in 2013 or 1.78 times and then increases to 41.3 thousand in 2016. Obviously, the question is "What are you going to do?"

3. What to do?

To ensure the sustainable development of rural areas in our country, we recommend:

- organizational-legal structure administrative units appropriate to those applied in the Member States of the European Union, assuring them a greater degree of autonomy;
- to develop a detailed and realistic rural development program focusing on two fundamental directions:

a. Increasing investment in the rural economy. For the economy of the rural area of the Republic of Moldova, a major interest is to increase the investments in the agri-food sector. Investments in fixed capital for the development of agriculture vary from RON 1852 million in 2013 (Table 10) to RON 1802 million in 2015.

Table 10 Investments in fixed capital for agricultural development, million lei

	1995	2000	2005	2010	2011	2012	2013	2014	2015
Investments in fixed capital on productive purposes	91	59	425	1046	1808	1642	1852	2333	1802
of which: - it publishes	25.5	8.2	42.9	30.8	47.5	46.1	34.0	76.6	24.0
- private	65	46	341	863	1444	1435	1709	2119	1623
- mixed (public and private)	0.7	3.8	6.4	0.9	3.0	0.7	0.5	2.0	1.4
- joint ventures	-	0.3	30.3	123.2	234.5	92.4	27.4	122.6	98.2
- to foreign investors	-	0.4	4.5	28.1	78.9	67.9	80.4	12.5	55.1

Source: Author's calculations based on selected information on [http / www.statistica.md](http://www.statistica.md)

Investments in fixed capital for the development of the private sector of agriculture decreased from 1709 million lei in 2013 to 1623 million lei in 2015. If until 2004 foreign investors were virtually lacking in the national agriculture, then their contribution in 2013 form 80.4 (4.3% of total investments this year) then decreased to 55.1 million lei (3.0% of the total) in 2015. Obviously, the contribution of investors, including foreign ones, remains far too insufficient.

The natural potential for rural development requires huge investments to be protected and developed. Investments for environmental protection and rational use of natural resources, even though they increased from 6060 thousand lei in 2000 (table 11) to 72369 thousand lei (current prices) in 2014 or 11.9 times, remain very modest.

Table 11 Investments for environmental protection and rational use of natural resources, thousands of lei

	2000	2005	2010	2011	2012	2013	2014
Total	6060	43939	41521	31050	73479	65955	72369
of which for: - protection and use	1315	23062	14250	14819	15196	39377	43938
rational use of water resources	4723	20877	19698	15208	9789	22810	26312
protection and use	-	-	0.0	0.0	45477	1694	-
rational land	22	-	7572	1022	3018	2073	2119

Source: Author's calculations based on the information collected on [http / www.statistica.md](http://www.statistica.md)

Investments for the protection and rational use of land dominated in the years 2000-2011 when they increased 3.1 times. Investments for the protection and rational use of water resources increased from 1315 thousand lei in 2000 to 43938 thousand lei in 2014 or 33.4 times.

b. to adjust the mechanisms and levers applied in the administration of the economics of the administrative-territorial units of our country to the requirements of the market relations practiced in the prosperous states of the European Union through:

- the use of indicative prices, ie target prices, intervention prices triggering the support mechanism for farmers and the threshold price, which is the minimum level at which imported products can enter the internal market.

- the takeover of surplus products by public authorities from agricultural producers at the prices covering the costs, in order to store them and sell them when the market acts in favor of demand.

c. encourage export of production through:

- Stimulating the export of goods and services by increasing the exchange rate by 5-10% compared to the existent value of goods and services exported.

- Farm abandonment to ex-ante support / before the production / which is usually ineffective and intervention by the state ex post / after the production has been achieved, stimulating farmers to produce what is required on the market and in particular the external one.

- To stimulate the lending of agricultural producers by financial institutions, especially for planting orchards and vineyards, expanding irrigated areas, purchasing the means of production and all that would contribute to the efficiency of this sector of the national economy.

d. Enhance the change of mentality of those employed in the rural economy by endowing them with innovating, performance and competence in making decisions, acting appropriately to the market-based economy.

BIBLIOGRAPHY

1. Acordului de Asociere între Republica Moldova, pe de o parte, și Uniunea Europeană și Comunitatea Europeană a Energiei Atomice și statele membre ale acestora, pe de altă parte, 2014
2. Anuarele statistice ale Republicii Moldova, Ed. Statistica, Chișinău
3. Bran Paul, Economia valorii, Academia de Studii Economice, redacția „Economică”, 1987
4. Certan Simion Politici Agricole Comune ale Comunității Economice Europene, TACIS, Chișinău, 2001.
5. Certan Simion Studiu Comparativ privind organizarea piețelor agricole, TACIS, Chișinău, 2002
6. Certan Simion, Certan Ion, Agriculture in the Republic of Moldova: present and future. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", 2013, Vol. 12 ISSUE 4, ISSN-L 2247-3572, versiune electronică
7. Certan Simion, Certan Ion, Integrarea economică în Uniunea Europeană, CEP USM. Chișinău, 2013
8. Certan Simion, Certan Ion, Aspecte privind dezvoltarea agroturismului în Republica Moldova în „Turismul rural românesc în contextul dezvoltării durabile, actualitate și perspective”, Volumul XLI, coordonatori Teodor Păduraru și alții, Performantica, Iași, 2016
9. Certan Simion, Certan Ion, Satul din Republica Moldova: realizări și speranțe în Economie agrară și dezvoltare rurală. Realități și perspective pentru România, simpozion internațional, noiembrie, 2015, Ed. ASE, București
10. Certan Simion, Certan Ion, Satul din Republica Moldova: realizări și speranțe în Economie agrară și dezvoltare rurală. Realități și perspective pentru România, simpozion internațional, noiembrie, 2015, Ed. ASE, București
11. Concepția reformei agrare și a dezvoltării social–economice a satului, în Acte normative cu privire la problemele economice (1990-1992), Chișinău, Universitas, 1992
12. La Carte europeenne de l'espace rurale-un cadre politique pour le developpement rural, Strasbourg, 1995
13. Rusu M., Dezvoltarea rurală-politici și structuri economice, Ed. Expert, București, 2005
14. Smith A., Avuția națiunilor, cercetare asupra naturii și cauzelor ei, vol. I, Editura Universitas, Chișinău, 1992
15. <http://data.worldbank.org/indicator>
16. <http://ec.europa.eu/>
17. www.statistica.md.

COOPERATION PROGRAMS REGARDING THE DEVELOPMENT OF TURNOVER IN RURAL AREA

DĂNILĂ DANIELA ILEANA¹

Abstract: *This paper aims to analyze the data regarding the cooperation programs supporting the development of agro-tourism of Romania. The data were taken from the Ministry of Agriculture and Rural Development and were processed according to the objectives of the paper, namely the allocation of European funds for the period 2007-2013 for Measure 3.1.3. - "Encouraging tourism activities. To achieve this it was necessary to analyze the projects submitted, the projects selected and contracted. The aim of the paper is to develop tourism activities in rural areas that will help to increase the number of jobs and alternative incomes, as well as to increase the attractiveness of the rural area. This measure aimed at investing in rural areas, namely: investing in infrastructure in areas with tourism potential, investing in recreational activities, investing in infrastructure, investing in information centers, investing in tourist marking development, development and marketing of tourist services as a part an integral part of rural tourism.*

Keywords: *agritourism, cooperation programs, investments*

Classification JEL: *O11, Q13*

INTRODUCTION

Achieving the strategic objectives of agro-tourism development required the analysis of some elements considered essential, but based on two-dimensional relations such as: identifying the opportunities for rural tourism services demand, analyzing the material, financial, technical and managerial resources of the rural pension. These resources illustrate the qualitative side of the strategic objectives, which concerns the modernization of the existing accommodation capacity, the system of values and the aspirations regarding the attractiveness of the rural tourism unit and the development of the rural community, as well as the protection of the natural environment. The strategies adopted by the rural tourism boarding house will have to follow the correlation with the territorial set of alternative activities that will result in a harmonious development of the rural area in the analyzed region. The tourist will know the man (the peasant), his everyday life, rural culture. Therefore, the rural tourism arrangements must exclusively serve the rural community, the only one able to keep the rural space unaltered.

MATERIAL AND METHOD

The dates presented in this article was taken over from the Ministry of Agriculture and Rural Development and were centralized and interpreted to highlight the allocation of European funds for tourism activities.

The research method used is the qualitative analysis by studying, processed and processed data from MADR and the specialized literature, which will put into development and modernization of rural areas and especially agrotourism. The information has been centralized and processed in order to carry out an analysis that highlights the situation of accessing European funds for encouraging agrotourism activities in the period 2008 – 2012.

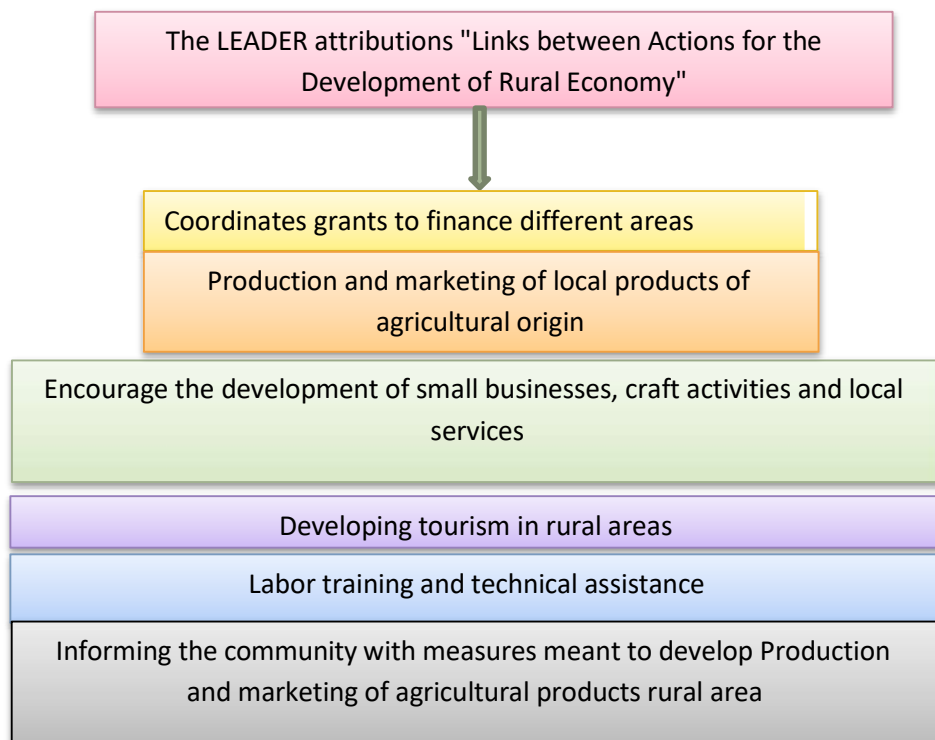
RESULTS AND DISCUSSIONS

It was found that there is a close link between the accommodation offer and the degree of modernization of the respective household, which leads to the development of rural areas and especially of rural tourism and agritourism in European countries. Financial instruments used by the European Community for the use of its rural development policies are: the European Regional

¹ Ing. DANIELA ILEANA, DANIELA ILEANA, BIOTERRA UNIVERSITY OF BUCHAREST, Gârlei street no. 81, District 1, godja_daniela_ileana@yahoo.com

Development Fund (ERDF), the European Agricultural Guidance and Guarantee Fund (EAGGF) and the European Social Fund (ESF). Among the associations with rural tourism activities, the World Tourism Training Association (AMFORT), which is based in Madrid, has been valued for its work. Romania is represented in AMFORT by the Institute of Management and Tourism "EDEN". Another association with rural tourism activity is "EUROTER", a member of the Romanian Federation for Mountain Development (FRDM). In EUROGUTES, Romania is represented by ANTREC. The EU Commission adopted in 1990 an initiative for rural development, called LEADER, which, through its initiative, gives rise to a network of 100 groups in rural areas (Figure 1).

Fig.1 The LEADER Initiative "Links between Actions for Rural Development"

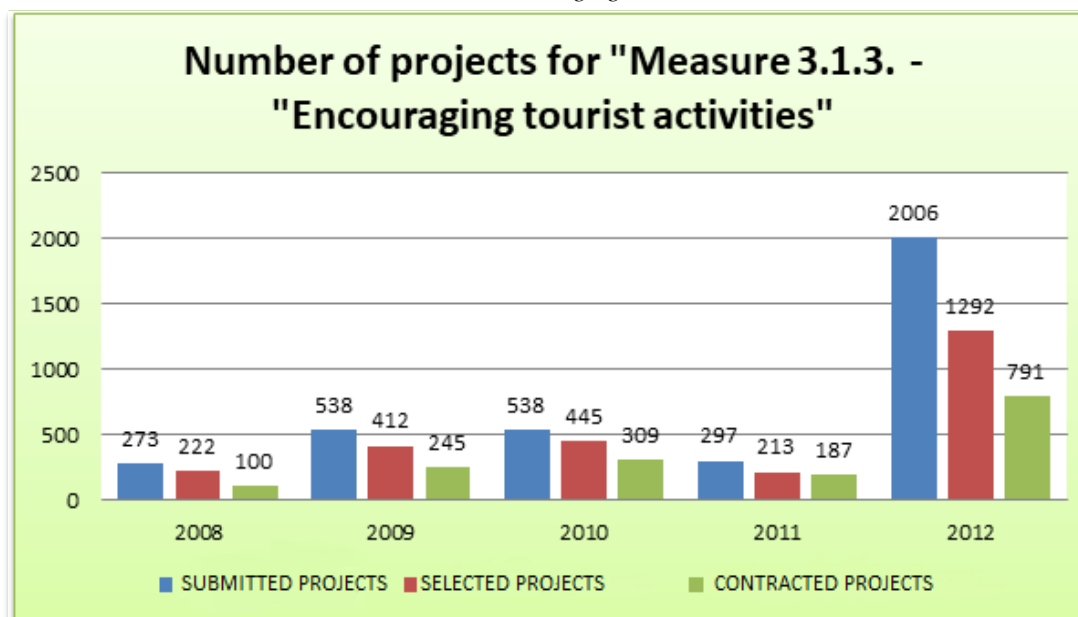


Source: <http://ec.europa.eu/agriculture/rur/leader2/rural-en/euro/p1-1.htm>

The National Rural Development Program (NRDP) is a program of measures developed by the Ministry of Agriculture and Rural Development in collaboration with the European Community, measures to help the development of agriculture in Romania. The measures aim at developing and defining agriculture and, above all, the transition from a fragile, unprofitable agriculture to a modern agriculture. This program is funded by the European Fund for Agriculture and Rural Development (EAFRD), which is a financing instrument developed by the European Union to help Member States implement the Common Agricultural Policy. This is a complex set of rules and mechanisms that support the production, processing and marketing of all agricultural products in the European Union and give great attention to rural development.

Rural development policy can not be seen as an option for the future. This is a necessity, taking into account the problems of the development of agriculture and the rural environment, it has important connotations at the national level, being still a topical issue in Romania. In Chart no. 1, entitled "Allocation of European funds for the period 2007-2013 for Measure 3.1.3. - "Encouraging tourist activities for the period 2008 - 2012 is the number of submitted projects, the number of selected projects and the contracted ones.

Chart no. 1. - Allocation of European funds for the period 2007-2013
Measure 3.1.3. - "Encouraging tourist activities"



Source: MADR data processing

Measure 313 "Encouraging tourism activities" aimed at developing tourism activities in rural areas that would help to increase the number of jobs and alternative incomes and increase the attractiveness of rural areas. The support through this measure aimed at investing in rural areas, namely:

- Invest in infrastructure in areas with tourism potential,
- invest in recreational activities,
- investing in infrastructure,
- invest in information centers,
- investing in the development of tourist markings, development and marketing of tourism services as an integral part of rural tourism.

It is noted that in 2008 out of the total of 273 submitted projects 81.32% were selected, out of which only 45.05% were approved. In 2009, the share of selected projects decreased to 76.58% and that of contracted projects to 59.47%. By 2012, the share of selected projects continued to decline, reaching 64.41%, while the share of contracted projects was 61.22%. We can conclude that as time passed, the projects submitted improved because in 2012 the share of selected projects is approximately equal to that of approved projects (Chart no. 1).

Table no. 1. - The value of European funds for the 2007-2013 period
Measure 3.1.3. - "Encouraging tourist activities"

Thousands of euros

	2008	2009	2010	2011	2012	TOTAL
Value of submitted projects	49.415,76	93.385,65	96.166,32	45.274,97	285.648,05	569.890,75
Value of selected projects	43.308,60	72.208,94	70.663,46	31.385,66	174.523,22	392.089,88
Value of contracted projects	17.823,85	39.942,58	47.670,14	27.543,82	97.391,68	230.372,07

Source: MADR data processing

It is noted that during the period 2008 - 2012 (Table no. 1) from the total of 569.890,75 (thousands euro) submitted projects were selected projects totaling 392.089,88 (thousand euros) out of which 230.372,07 (thousands of euros) were contracted, more than half of the projects submitted. The large number of projects that have been submitted and subsequently approved for funding increasingly motivate the rural population to access European funds for investment and the development of agri-tourism activities.

CONCLUSIONS AND RECOMMENDATIONS

Rural tourism stimulates domestic food and handicraft production, representing the perfect opportunity by which business can be valued and known to the public, and product marketing is a complementary source of income. The local population is the active component of the tourism product, with a high entrepreneurial potential.

Launching programs for "Encouraging tourist activities" contributes to promoting tourism in rural areas. Under these circumstances, rural tourism is less dependent on the attractiveness of the region, with particular emphasis on prices, but through this form of tourism the existing seasonality is attenuated and satisfaction is guaranteed both for the consumer and the entrepreneur tourism.

In conclusion, from the analysis of the allocation of European funds in the period 2007 - 2013, it appears that the investments in tourist activity have increased and the rural space continues to turn positive. The main motivation for increasing the financial value of rural tourism can be synthesized by the fact that agricultural income has increased, the difficulty of selling agricultural products provided by peasant farms is on the verge of disappearing, the prices of products have increased and the surplus of agricultural products is no longer a problem.

BIBLIOGRAPHY

1. Bîrsan, M., Şuşu, Ş, *Economic and Financial Analysis in Trade and Tourism*, Didactic and Pedagogical Publishing House, Bucharest, 2013
2. Cristian Foolish - *Rural Tourism* - University of Bucharest (2010), CREDIS Publishing House
3. Minciu R., *Tourism Economy*, 2nd Edition, Uranus Publishing House, Bucharest, 2004
4. Zaman, Gh., Geamănu, M., *Economic efficiency*, Romania Publishing House tomorrow, Bucharest, 2006
5. *** *ANNUAL PROGRESS REPORT ON THE IMPLEMENTATION OF THE NATIONAL PROGRAM FOR RURAL DEVELOPMENT IN ROMANIA IN 2013*, http://www.madr.ro/docs/rural_development/annual_report/Annual_Progress_Report-NRDP-2013.pdf

MITIGATION VS. ADAPTATION: A CRITICAL OVERVIEW OF EU CLIMATE CHANGE POLICIES AND THEIR IMPACT ON AGRICULTURE

MARIUS COSMIN BOIANGIU¹

Abstract: *The paper does a qualitative assessment of the current European Union policies for dealing with climate change. In the EU mitigation policies are derived from the international agreements for reducing and limiting greenhouse gases emissions. Mitigation policies have a strict compliance regime using both positive and negative reinforcement. On the other side, adaptation measures, meant to increase nature's and society's resilience to climate change negative impact, are designed more as recommendations complementing sectoral policies. Agriculture has a relatively low potential of curbing GHG emissions but are some of the most vulnerable sectors to climate change. By examining the relative projected efficiency of EU's mitigation efforts compared to the overall goal of stopping global warming, the paper finds that there is clear imbalance between mitigation policies and adaptation policies. It concludes that in the absence of matching binding commitments from other large emitters of GHG, the climate objective will not be met. This requires at European level a medium and long-term strategy for the societal and economic adaptation to the new climate conditions and, on short-term, more focus on adaptation policies in vulnerable sectors such as agriculture.*

Keywords: *Climate change policies; European Union; mitigation; adaptation; agriculture*

Jel Classification: *O38, Q01*

INTRODUCTION

The systemic and global changes of climate conditions due to the increase of average global temperature are one of the greatest challenges for humanity. As global warming is determined mostly by the increase in atmospheric concentration of greenhouse gases² (GHG), as a consequence of anthropogenic activities, the main approach to mitigate this effect has been through global, regional and national policies aimed at reducing overall GHG emissions. However, climate change has an increasingly negative impact both on ecosystems and human society and economy, which require strong adaptation policies and measures.

The European Union's climate framework is one the most advanced set of policies globally in dealing with climate change. It currently stands as a binding aggregated commitment of the European Union and its Member States under the Paris Agreement but it is in fact an extension of policies initiated previously under the Kyoto Protocol. The main climate objective of the Paris Agreement is to limit the rise of average global temperature below 2°C over the pre-industrial period level. However, despite the apparent urgency of the situation, the international regulatory regime of the Paris Agreement is less strict than that of the Kyoto Protocol, which preceded it. The current working assumption of scientific research is that the level of emission reductions and limitations under the Paris Agreement will not be enough to meet the climate objective. This will put vulnerable economic sectors such as agriculture at high risk and would require more emphasis on adaptation policies.

In this context, there is scope for a critical examination of EU's policies in climate change, as well as of the balance of resource allocation between mitigation efforts versus adaptation ones. The opportunity of such evaluations is highlighted even more by the imminent start in 2018 of the preparation of the EU's Multiannual Financial Framework (MFF) post-2020.

MATERIAL AND METHODS

The paper performs a qualitative assessment of the main climate change mitigation policies of the European Union under the Paris Agreement. It reviews the projected efficiency of said policies

¹ PhD Candidate, Economy Doctoral School, Bucharest University of Economic Sciences, mariuscosmos@yahoo.com

² Gases that trap heat in the Earth's atmosphere: water vapor - H₂O; carbon dioxide - CO₂; methane - CH₄; nitrous oxide - N₂O; fluorinated gases

against the defining goal of limiting global warming and taking into consideration the level of commitment from the other major emitters of GHG.

It also surveys the principal EU adaptation policies, with a focus on agriculture, which is one of the most vulnerable to the impact of climate change.

The main information sources are EU's and United Nations' policy documents, reports of the Intergovernmental Panel on Climate Change (IPCC) as well as of the Global Carbon Project, for emissions data.

RESULTS AND DISCUSSION

The Kyoto Protocol (KP) was adopted in December 1997 under the United Nations Framework Convention on Climate Change (UNFCCC). The Kyoto Protocol entered into force in February 2005. The Parties to the Kyoto Protocol – 37 industrialized countries and the European Community – committed to binding *GHG* emission reduction targets.

The main policy drivers of the KP were the quantified national emission limitation or reduction commitments included in Annex I of the Protocol. Under the Protocol, the EU's aggregated emissions reduction commitment was of at least 5 per cent below 1990³ levels in the period 2008 to 2012. The document listed also a series of non-binding policy measures to promote sustainable development: enhancement of energy efficiency, protection of sinks and reservoirs of greenhouse gases, promotion of sustainable forms of agriculture, research and development of new and renewable forms of energy, of carbon dioxide sequestration technologies, limitations or reductions of GHG in the transport sector etc.

The commitments under Annex I could be also met through verifiable net changes in GHG emissions and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation.

Following the Kyoto Protocol, the Paris Agreement (PA) was adopted on 12 December 2015 by the Parties to the UNFCCC. 169 Parties have ratified so far the PA, which entered into force on 4 November 2016.

Acknowledging that “*climate change is a common concern of humankind*”, the Agreement sets as principal objectives (Article 2) to:

- a. hold the increase of the global average temperature to well below 2 °C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels (mitigation);
- b. increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development (adaptation); and
- c. make finance flows consistent with a pathway towards low GHG emissions and climate-resilient development.

The Paris Agreement eliminates binding quantitative commitments and replaces them with “*nationally determined contributions*”.

These contributions are entirely voluntary in the Agreement's framework and are to be renewed every five years, with the understanding that “*efforts of all Parties will represent a progression over time*”. In replacing the quantitative commitments, the PA uses qualitative descriptions both for the timelines for reaching the stated objectives (“*the Parties aim to reach global peaking of greenhouse gas emissions as soon as possible*”, “*anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century*”) and for the amplitude of needed actions and measures (developed countries “*should continue taking the lead by undertaking economy-wide absolute emission reduction targets*”, while developing countries “*should continue enhancing their mitigation efforts, and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances*”).

³ Several EU countries chose 1989 as reference year

The EU and its Member States communicated the following Intended Nationally Determined Contribution (INDC): “a binding target of an at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990, to be fulfilled jointly”. Furthermore, the European collective pledge included a commitment to devise a policy on how to include Land Use, Land-Use Change and Forestry (LULUCF) into the 2030 greenhouse gas mitigation framework before 2020.

Also included in the communicated pledge was a list of sectors grouped by emission source, which constitute by-and-large the cross-sectoral range of EU’s mitigation policies:

Energy (Fuel Combustion, including energy industries, manufacturing industries and construction, transport; Fugitive emissions from fuels; CO₂ transport and storage);
Industrial processes and product use (Mineral, Chemical, Metal and Electronic industries; Non-energy products from fuels and solvent use etc.);
Agriculture (Enteric fermentation; Manure management; Rice cultivation; Agricultural soils; Prescribed burning of savannas; Field burning of agricultural residues; Liming; Urea application; Other carbon-containing fertilizers);
Waste (Solid waste disposal; Biological treatment of solid waste; Incineration and open burning of waste; Wastewater treatment and discharge);
Land Use, Land-Use Change and Forestry (Afforestation, reforestation; Deforestation; Forest management; Cropland management; Grazing land management)

The European commitment is internally binding through the EU law (regulations, directives, and decisions). It is therefore highly prescriptive and to a certain extent punitive in nature.

The core instrument for achieving the ambitious target of 40% GHG emission reduction in 2030 compared to 1990 level – one of the highest at global level – is the *EU emissions trading system* (EU ETS). It is an EU-wide system of gradual limitation of emission allowances for more than 11,000 heavy energy-using installations. This system covers around 40% of total EU GHG emissions. In July 2015 the European Commission proposed a directive for the ETS revision for phase 4 (2021-2030), which aims to achieve by 2030 a 43% in EU ETS emissions compared to 2005 levels. Sectors covered by the ETS are: power and heat generation; energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramic, pulp, paper, cardboard, acids and bulk organic chemicals; civil aviation.

The sectors that are not covered by the EU ETS – transport, buildings, agriculture and waste – are included in a legislative proposal called the “*Effort Sharing Regulation*” (ESR), which sets annual binding GHG emission targets for each Member State in these sectors that account for almost 60% of total EU emissions. The emissions reductions by 2030 as per 2005 levels in these sectors range from around and below 40% for countries like Luxembourg, Sweden, Denmark, Finland, Germany, France and UK to 0-10% for low GDP/capita countries like Bulgaria, Romania, Latvia, Hungary, Croatia, Poland or Lithuania. The contribution of non-ETS sectors to the overall EU reduction target is expected to be of at least -30% compared to 2005 levels.

The proposal acknowledges the low mitigation potential of the agriculture and land use sector but provides for the possibility of using for compliance in a given year of a certain quantity up to the sum of total net removals and total net emissions from deforested land, afforested land, managed cropland and managed grassland (Article 7).

The role of agriculture and land use in GHG (especially CO₂) emissions reduction is considered mostly through the combined effect of removals of GHG (through actions like afforestation or conversion of arable land into grassland resulting in CO₂ sequestration) and emissions (actions such as draining of wetlands, forest harvesting or ploughing up grasslands).

To complement the ESR on agriculture and land use sector, the European Commission presented in July 2016 a legislative proposal that integrates the LULUCF sector into the EU climate policy framework under the Paris Agreement. The proposal introduces a binding commitment for each Member State that emissions will not exceed removals in the following land use categories: afforested land (land use reported as cropland, grassland, wetlands, settlements, and other land

converted to forest land); deforested land; managed cropland; managed grassland and managed forest land.

In the fields of energy and transport, which provide the bulk of GHG emissions, several legislative proposals are envisaged to assist in achieving the overall target under the Paris agreement:

- a revised Renewable Energy directive to ensure a minimum share of 27% renewable energy sources in the EU energy consumption by 2030 (includes specific targets for the use and developing of advanced biofuels, food-based biofuels and electro-mobility as well as for the heating and cooling sector);
 - a package of measures to improve the energy efficiency of the Union with at least 27% by 2030 and to accelerate the efficiency improvement of the building sector (accounting for 40% of energy consumption in Europe);
- proposals for setting new CO₂ emission standards for cars and vans post-2020, reducing emissions from heavy-duty vehicles and reducing the GHG intensity of vehicles fuel.

Global CO₂ emissions – the main indicator for GHG emissions - have been on a constant upward trend since 1990 despite the policy commitments under the Kyoto Protocol and lately the Paris Agreement. The global emissions from fossil fuel and industry in 2016 were 36.2 Gigatonnes (Gt) CO₂, a 62% increase over 1990 levels. The projection for 2017 is 36.8 Gt CO₂, a 2% increase over previous year.

The top four emitters in 2016 covered 59% of global emissions: China (28%), United States (15%), EU (10%) and India (7%). Among these four emitters, the EU is the only one with binding targets of GHG emission reductions and whose aggregated emissions have fallen since 1990.

China – the largest emitter – has indicated as commitments: to achieve peaking of carbon dioxide emissions around 2030; to lower CO₂ emissions *per unit of GDP* by 60% to 65% from the 2005 levels; to increase the share of non-fossil fuels in primary energy consumption to around 20%; and to increase the forest stock volume by around 4.5 billion cubic meters on the 2005 level.

United States pledged the intention to achieve an economy-wide target of reducing its greenhouse gas emissions by 26%-28% below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28%.

India's non-binding INDC (like in the cases of China and United States) was to reduce the emissions intensity of its GDP by 33% to 35% by 2030 from 2005 level.

It is evident that EU's mitigation efforts are not matched by those of the other three big emitters. Even more, given its relatively low share of the global emissions (10%), the EU's mitigation policies are not expected to have a relevant impact on achieving the main climate objective of the Paris Agreement, i.e. the limitation of global average temperature to well below 2 °C above pre-industrial levels. A recent study (Millar *et al.*) show that if emissions peak and decline to below current levels by 2030, and continue afterwards on a much steeper decline, it could result in a likely range of peak warming of 1.2-2.0 °C, which is consistent with the Paris Agreement but will require much more vigorous mitigation commitments and action.

Millar et al. assessed that the goal of limiting global warming to 1.5 °C is not yet a geophysical impossibility but that would likely require delivery on strengthened pledges for 2030 followed by “challengingly deep and rapid mitigation.”

On the adaptation side, the Paris Agreement establishes the global goal of “*enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Article 2*”.

Recommended actions on adaptation include: sharing information, good practices, experiences and lessons learned; strengthening institutional arrangements to support the synthesis of relevant information and knowledge; strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems; assisting developing countries in identifying effective adaptation practices, needs and priorities; and, improving the effectiveness and durability of adaptation actions.

The main adaptation policy document at EU level is the EU strategy on adaptation to climate change adopted in April 2013, two years before the EU INDC was presented. The strategy focuses on three key objectives:

- Promoting action by Member States, through the adoption of comprehensive adaptation strategies;
- Promoting better informed decision-making through the developing of the European Climate Adaptation Platform (Climate-ADAPT); and,
- Promoting adaptation in key vulnerable sectors through agriculture, fisheries and cohesion policy.

One of the action lines envisaged by the strategy is the facilitation of climate-proofing of the Common Agricultural Policy, by providing guidance on how to integrate adaptation into the CAP. This guidance aims to help managing authorities and other stakeholders involved in programme design, development and implementation during the 2014-2020 budget period (through the European Agricultural Guarantee Fund and the European Agricultural Fund for Rural Development, with an annual budget of approximately €59 billion).

. Member States and regions can also use funding under the 2014-2020 Cohesion Policy and CAP to address knowledge gaps, to invest in the necessary analyses, risk assessments and tools, and to build up capacities for adaptation.

Climate change has a high degree of regional variability and therefore agriculture is impacted differently from one region to another. The variations of climate conditions – increased atmospheric CO₂ concentration, changes in precipitation patterns, higher temperatures and increased frequency of extreme events such as floods and droughts - affect water resources, state of soils, biodiversity, pest and diseases, which in turn could lead to significant impact of agriculture and livestock productivity.

The main indicators of climate change impact in agriculture are irrigation water requirements, water-limited crop productivity, soil carbon stocks, soil moisture and growing season for agricultural crops.

CONCLUSIONS

The projections of the current commitments of the Parties to the Paris Agreement (*business-as-usual scenario*) indicate that the climate objectives of the Paris Agreement will not be met. In this case, global warming and climate change will continue to put an increasing stress on the ecosystems, societies and economies of the world, requiring more focus on adaptation strategies, policies and actions.

Currently at EU level there is an evident imbalance between the scope and resource allocation of mitigation policies – acting with limited efficiency against the main climate objectives – and that of adaptation policies, meant to counter the adverse impact on some of the most climate-sensitive sectors such as agriculture or land-use.

Based on such conclusions, the EU's Multiannual Financial Framework (MFF) post-2020 would offer an opportunity to adjust this imbalance through more resource allocation for tackling the identified systemic and/or regional risks and challenges related to climate change.

BIBLIOGRAPHY

1. Corinne Le Quéré et al., 2017, Global Carbon Budget 2017, Earth System Science Data Discussions, DOI: 10.5194/essdd-2017-123.
2. European Commission, 2013: The EU Strategy on adaptation to climate change, Retrieved in August 2017 from https://ec.europa.eu/clima/sites/clima/files/docs/eu_strategy_en.pdf
3. European Commission, 2016: Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast), Retrieved July 2017 from <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016PC0767R%2801%29>
4. European Commission, 2016: Proposal for a Regulation of the European Parliament and of the Council on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 for a resilient Energy Union

and to meet commitments under the Paris Agreement and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change (“Effort Sharing Regulation”), Retrieved July 2017 from <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016PC0482>

5. European Commission. 2016: Proposal for a Regulation of the European Parliament and of the Council on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry into the 2030 climate and energy framework and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change (“*LULUCF Regulation*”), Retrieved July 2017 from <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016PC0479>

6. European Union, 2016: Factsheet on the EU Emissions Trading System (EU ETS), Retrieved July 2017 from https://ec.europa.eu/clima/sites/clima/files/factsheet_ets_en.pdf

7. Richard J. Millar et al., 2017: Emission budgets and pathways consistent with limiting warming to 1.5 °C, *Nature Geoscience* 10, 741–747, doi:10.1038/ngeo3031

8. United Nations, 1998: Kyoto Protocol to the United Nations Framework Convention on Climate Change, Retrieved July, 2017, from <http://unfccc.int/resource/docs/convkp/kpeng.pdf>

9. United Nations, 2015, Paris Agreement, Retrieved July, 2017, from http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

10. United Nations Framework Convention on Climate Change, 2015: Submission by Latvia and the European Commission on behalf of the European Union and its Member States, Retrieved July, 2017 from <http://www4.unfccc.int/Submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf>

11. United Nations Framework Convention on Climate Change, 2015: Enhanced actions on climate change: China’s intended nationally determined contributions, Retrieved July 2017 from <http://www4.unfccc.int/Submissions/INDC/Published%20Documents/China/1/China's%20INDC%20-%20on%2030%20June%202015.pdf>

12. United Nations Framework Convention on Climate Change, 2015: U.S. Cover Note INDC and Accompanying Information, Retrieved July 2017 from <http://www4.unfccc.int/Submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf>

13. United Nations Framework Convention on Climate Change, 2015: India’s Intended Nationally Determined Contribution, Retrieved July 2017 from <http://www4.unfccc.int/Submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf>

SECTION 4

**MODELS OF DEVELOPMENT OF THE SHORT CHAINS FOR
CAPITALIZING ALONG THE PATHWAY SERVICE – PRIMARY
PRODUCTION – STORAGE – PROCESSING - SALES MARKET**

CONSIDERATIONS REGARDING THE ASSOCIATION/COOPERATION OF SMALL AND MEDIUM FRUIT PRODUCERS

Mrs. Ancuța MARIN¹

Abstract: *Between March 2017 and April 2017, ICEADR Institute conducted a survey among the Romanian fruit producers, in order to identify the problems they face and to highlight their opinions. The survey's results were used to find solutions for an efficient exploitation of fruits' production. Quantitative research was used as the main method for picking information while the research technique consisted on the structural research (survey). Most farmers are not implied in associative forms and they are not interested in joining one in the nearest future. Small exploitations register small productions which do not permit them to sign selling contracts and consequently their incomings are around 4500 RON each year. Also, the Authorities' implication in supporting small and medium producers is very low. Awareness of the advantages of association / cooperation by facilitating access to private and public resources, promoting practices and technologies that ensure environmental protection, assurance of consultancy, defense of members' interests in their relations with government bodies and state administration, promotion of products on national and international market, ensuring equal rights for all members, improving the information and supply system, developing agro-food markets, correlating the level of production and product quality in line with market requirements, capitalizing on larger quantities of products, reducing tax evasion is the solution to solving problems Romanian grain farmers.*

Key words: *association, cooperative, producers, EU funds, funding*

JEL Classification: *L11, Q11, O13.*

INTRODUCTION

With the Romanian fruit producers' help, Research Institute for Agriculture's Economy and Rural Development conducted between March and April 2017 a survey through the ADER Project 16.1.2 –Models of development of short-chain capitalization on primary production-service-warehousing-processing-selling market, 3rd Stage. The project in discussion, is taking place between 2015 and 2018.

The aim of the survey was to identify Romanian fruit producers' problems and to highlight their opinions, so that solutions could be found for a more efficient exploitation. 153 questionnaires were sent in 5 of the most relevant counties regarding the fruit production: Argeș County, Dâmbovița County, Vâlcea County, Prahova County and Constanța County. The number of respondents was chosen in such way that the margin of error does not exceed +/-5% and the factor of probability which guarantees the results to be 80%. 32 questions were included in the survey and they regarded the activity of fruit producers.

As a result of this survey, ICEADR analyzed the forms of association that small and medium fruit producers use and identified the target group for whom is addressed the third phase of the project.

MATERIAL AND METHOD

Quantitative research was used as the main method for picking information while the research technique consisted on the structural research (survey). Also, the sample was chosen as being representative. The formula used for the sample's size is the following:

$$n = \frac{t^2 \cdot p \cdot q}{\varepsilon^2}$$

Also: $q = 1 - p$; so the formula suffers a change:

¹ Ph.D. Ancuța MARIN – Third-grade Scientific Researcher, Research Institute for Agriculture's Economy and Rural Development, marin.ancuta@iceadr.ro

$$n = \frac{t^2 \cdot p \cdot (1-p)}{\varepsilon^2}$$

Meanings:

t - Factor for the probability which guarantees the results (see table Student for more details) that is, accepted error ε ;

p – Proportion of components from sample which have the researched characteristic and which, in most cases, is unknown. For maximal dispersion, we consider this proportion’s value as being equal with 0.5;

ε - accepted error;

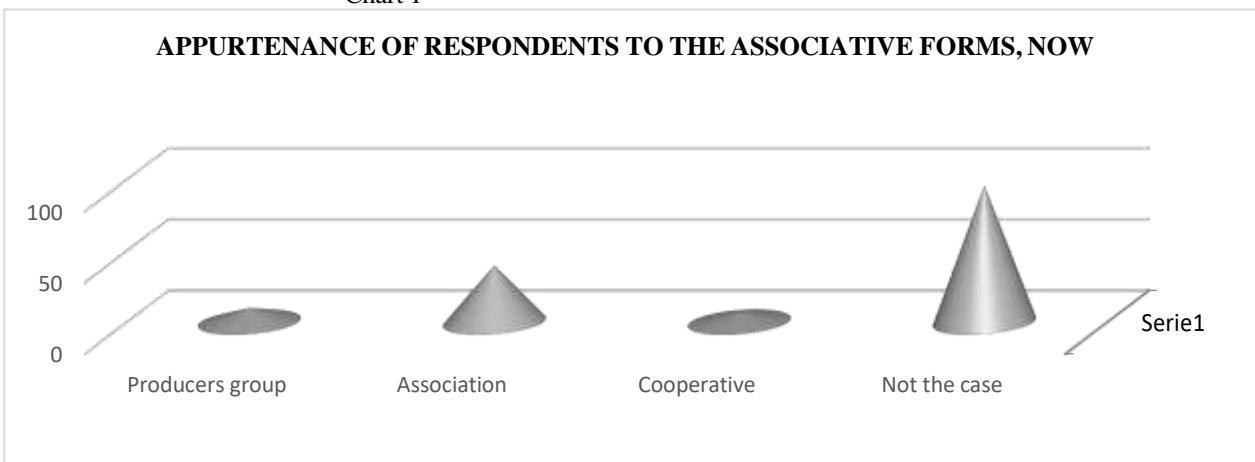
RESULTS AND DISCUSSIONS

For a better perspective of the given answers of the 153 respondents, the results were centralized. As the results show, 96 respondents consider that is not the case to join an associative form which represents 62% of the total sample. 57 of them are already members of an associative form which is nearly 38%. (See Table 1 and Chart 1 for more details)

Table 1

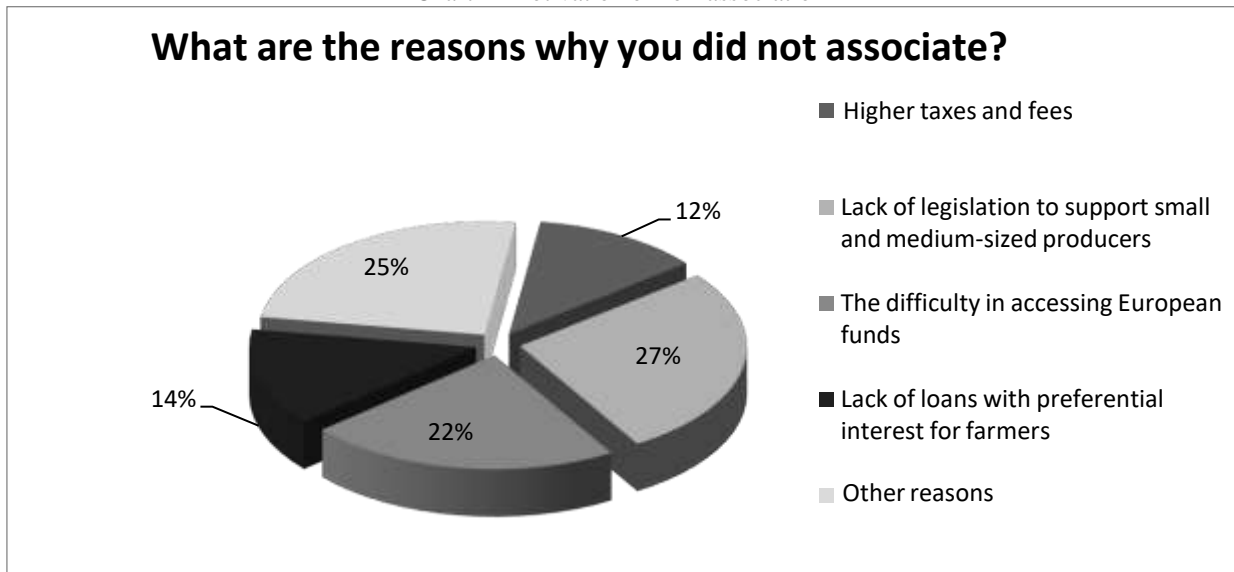
APPURTENANCE OF RESPONDENTS TO THE ASSOCIATIVE FORMS, NOW		
ASSOCIATIVE FORM	NUMBER OF RESPONDENTS	%
Producers group	10	6,54%
Association	40	26,14%
Cooperative	7	4,58%
Not the case	96	62,75%
TOTAL	153	100,00%

Chart 1



The fact that more than a half producers are not in an associative form, has multiple explanations. The majority of them (27.11%) blame the legislation for not offering the necessary support or for being very bureaucratic. 22% of respondents find the accessing process of the structural funds very difficult, while 14% of them consider the lack of loans with preferential interest as an important issue in the association process. Moreover, not few respondents (12%) critic the fees and taxes farmers must pay each year. (see chart 2).

Chart 2- Motivation of non-association

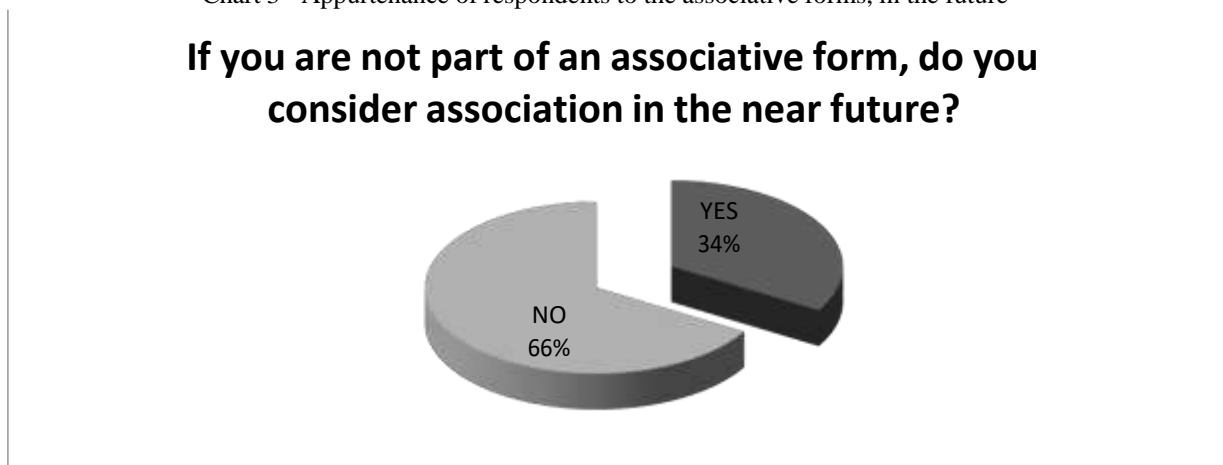


Analyzing carefully the perspectives of the 96 respondents that answered there is not the case to join an associative form, more than 67% still maintain their opinion, while 32% (31 respondents) are considering the possibility of joining such association at a certain time. (see Table 3 and Chart 3).

Table 2

APPURTENANCE OF RESPONDENTS TO THE ASSOCIATIVE FORMS, IN THE FUTURE		
	NUMBER OF RESPONDENTS	%
Want to join an associative form	31	32,29%
Do not want to join an associative form	65	67,71%
TOTAL	96	100,00%

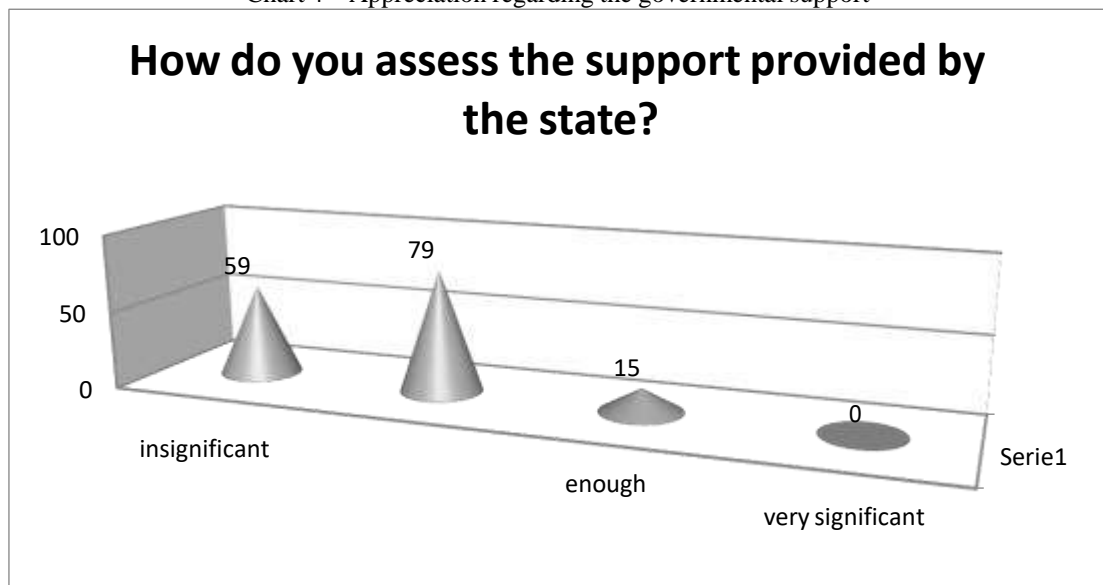
Chart 3 - Appurtenance of respondents to the associative forms, in the future



Moreover, more than a half of the farmers questioned consider the governmental support as being insufficient, 38% of them as being insignificant, while 10% of farmers as being sufficient (see Chart 4).

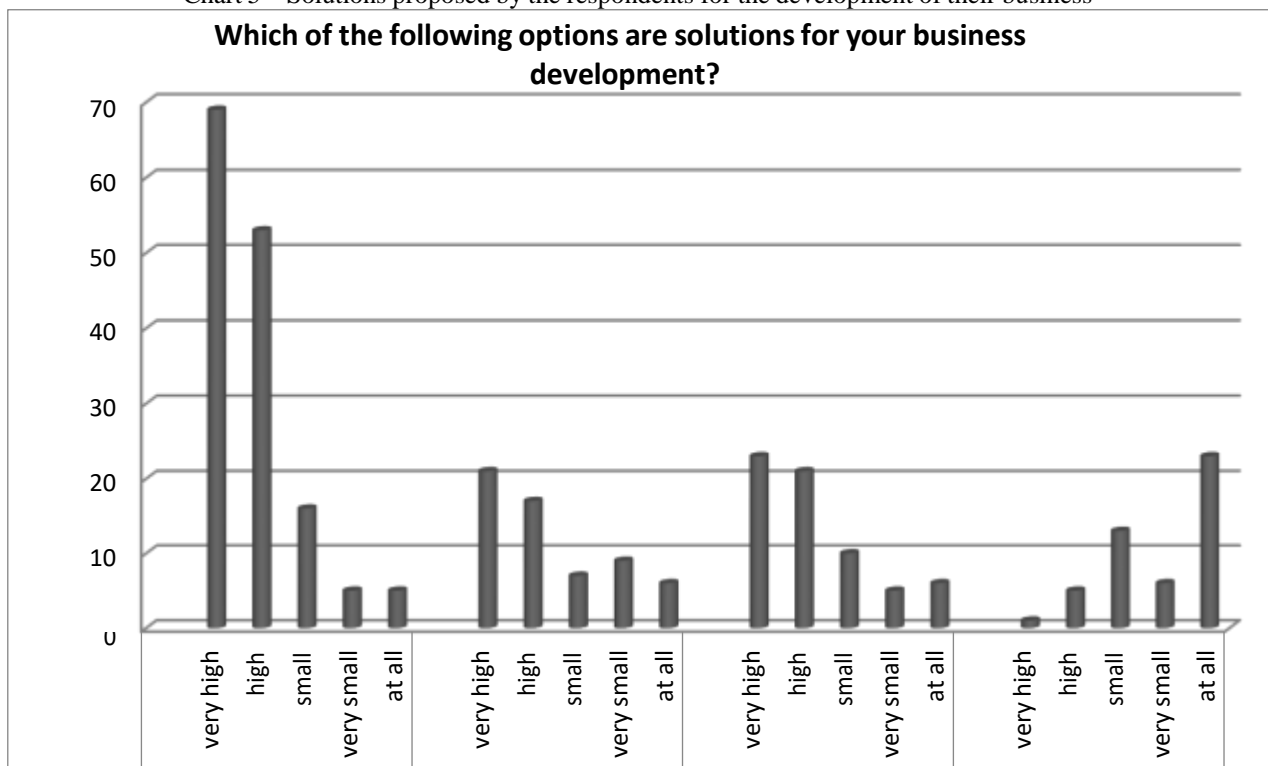
Having these said, we asked these people to find possible solutions which they consider useful in their activity domain, the fruit-growing one.

Chart 4 – Appreciation regarding the governmental support



122 questioned farmers (79%) think that EU funds and a more accessible documentation would be the best solution for a good activity of their exploitation, while 6 persons (3%) consider the bank loan as the optimum solution for the development of their business. Instead, as the Chart 5 shows us, 82 persons (53%) consider the association as a good method of developing.

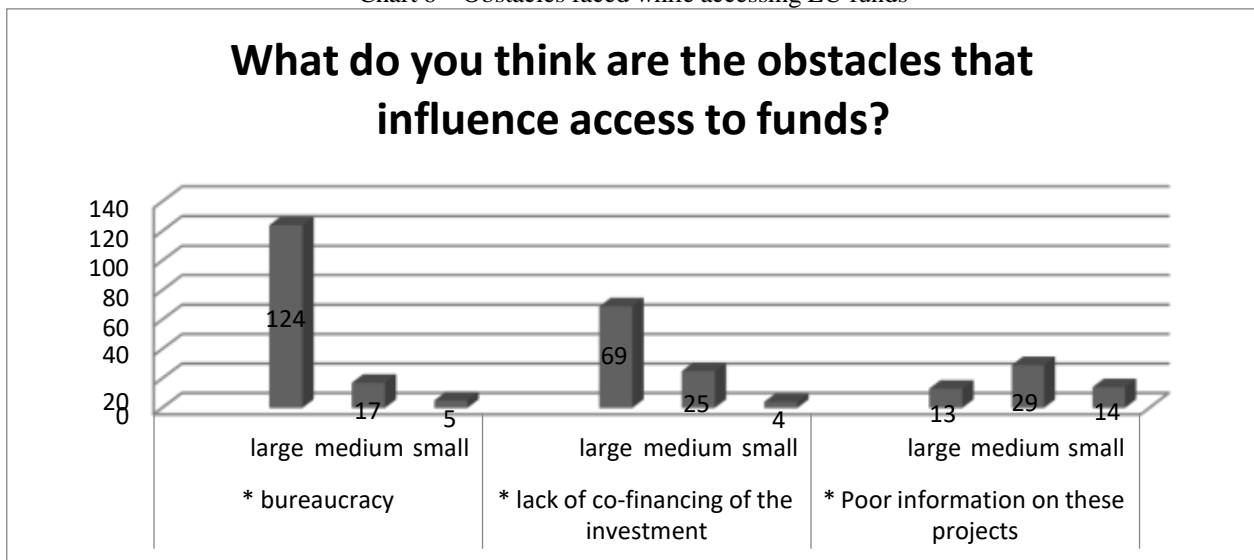
Chart 5 – Solutions proposed by the respondents for the development of their business



In the counties we sent the survey, most farmers have knowledge regarding the methods of financing their business. 60% of them accessed EU funds. The most accessed measure was the 1.4.1 – “Sustenance of semi-subsistence agricultural farms” (57%), while the less accessed one was the 6.1 measure – “Sustenance for the settlement of the young farmer” (1%).

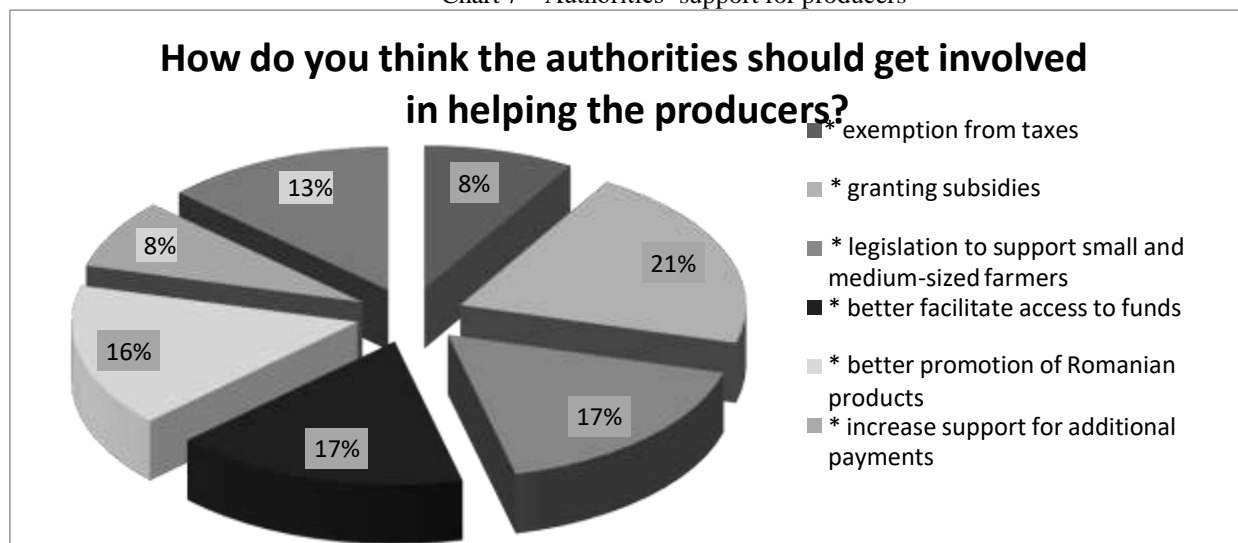
The next step we take with our survey was to ask the farmers about the obstacles they faced while accessing structural funds. The multitude of requested documents, the slow time of reaction from authorities after the submission of documents or the lack of the co-financing are the main reasons for which the respondents are afraid of the EU funding mechanism. (see chart 6)

Chart 6 – Obstacles faced while accessing EU funds



From the point of view of the possible measures for supporting producers, we observe a clear balance among the expressed opinions. The most popular measure was the offering of subventions (21%), while less than 8% of the participants to the survey considered as the best measure the increase of the support regarding the extra financing.

Chart 7 – Authorities' support for producers



CONCLUSIONS AND RECOMMENDATIONS

First of all, after analyzing and interpreting the survey conducted among the farmers from 5 counties, we observe that the majority of them are not implied in an associative form and they do not take into consideration joining one in the nearest future. The reasons for the current situation are justified: the lack of a clear legislation that supports small and medium producers, lack of loans with preferential interest, exaggerated bureaucracy related to the fund accessing mechanism or any type of aid.

Secondly, we observe separated exploitations which means small and inconsistent productions and consequently a lack of selling contracts. For half of the farmers, the registered incomings are around 4500 RON each year. From 153 interviewed farmers, just one sells exclusively in supermarkets while the rest of them sell in village markets or simply in front of the gate of their farm.

Also, storage possibilities are very limited, so just 65% of the production is sold, the rest of 35% being lost.

Having said these, we recommend that fruit producers should join associations in order to better compete with imported products. Not only do they face better the small prices, but also they become more competitive, meaning that they practice a modern agriculture. Farmers' reluctance regarding the association process comes from their confusion between marketing cooperative and the communist system of agricultural cooperatives. Their reserves are justified, because the communist cooperatives were created after massive confiscations of their lands. Having access to information, young members of the local community must promote the advantages of the modern system of association and after that, universities and institutions responsible for this. Association forms will also solve the problem of production's sale, because, in the big supermarket chains' point of view, individual business are less trusted and are less productive due to the old techniques used.

Small and medium-sized producers need to be aware of the benefits of association, including: facilitating access to private and public resources, promoting practices and technologies that ensure environmental protection, consulting for association, management and marketing, defense of members' interests in their relations with governmental organizations and state administration, promotion of products on the national and international market, ensuring equal rights for all members, improving the information and supply system, development of agro-food markets, correlation of production level and product quality in line with market requirements, higher quantities of products, diminishing tax evasion in the agricultural production sector by the fact that the production marketed through the association is sold only with an invoice

For Romanian farmers, joining an association form will bring multiple advantages and will contribute to a harmonious development of the Romanian agriculture.

BIBLIOGRAPHY

1. Sectorial ADER project 16.1.2. - "Models of development of short chains of capitalization on the primary production-service-warehousing-processing-selling market";
2. Bercu F., 2012 "Research on Improving the Activity of Agricultural Cooperatives in Romania, PhD thesis, U.S.A.M.V. Bucharest;
3. Lăpușan A., 2010 - Agricultural Cooperative, Fundamental Condition for the Development of Romanian Agriculture, "Virgil Madgearu" Seminar of Economics and Rural Sociology, Bucharest;
4. Micu Marius Mihai, 2015 Research on farmers' association in the context of sustainable Horticulture, Bucharest.

ANALYSIS BASED ON QUESTIONNAIRE ON THE SITUATION OF FRUIT PRODUCERS IN THE SOUTH AND SOUTH-EAST AREA OF THE COUNTRY

CHETROIU RODICA¹, IURCHEVICI LIDIA²

Abstract: *The paper is part of the research undertaken under ADER Project 16.1.2 - Models of development of short chains of valorisation on the pathway primary production-services-warehousing-processing-marketing, Stage 3. To diagnose the situation of fruit producers, a number of 153 questionnaires were applied in 5 counties from representative areas for fruit production, namely Dâmbovița, Argeș, Prahova, Vâlcea, Constanța. After centralizing the results, it emerged that 79.1% of the fruit growers surveyed started their activity after 1990, and 55% of them are not registered in any legal form. Regarding the size of holdings owned, three-quarters of farmers hold between 1-5 ha. As a structure, the apple orchards rank first (29%), followed by plums (26%), the rest are pear, peaches, nuts and others. 65% of the orchards are cultivated exclusively with native varieties, the planting material being mostly self-produced and only 1% have exclusively imported varieties. Mechanized agricultural works are carried out in a proportion of 76% by own means, and in terms of land fertilization, 63% of respondents apply both chemical and organic fertilizers and only 26% apply only natural fertilizers. Organic phytosanitary treatments are only applied by 12% of producers and 80% do not irrigate orchards.*

Keywords: *fruits, questionnaire, apple, orchards*

JEL Classification: *D13, D23, L11*

INTRODUCTION

In the fruit production domain, our country owns 6.2% of the total production area in the European Union, with an area of 137.514 hectares of fruit orchards. The total number of fruit trees in the year 2016 was 75.4 million, of which 34.7 million plums and 24.7 million apples. According to statistical data, the total fruit production of the previous year was 1242 thousand tons, of which plum production rank first (513 thousand tons), followed by apple production (467 thousand tons). With these results, Romania is among the top 5 fruit producers in the EU.

MATERIAL AND METHOD

The paper is a part of the research carried out under ADER Project 16.1.2 – "Models of development of short chains of valorisation on the pathway primary production-services-warehousing-processing-marketing", Stage 3 - Design and experimentation of models of development of the short chains of fruits valorization, carried out by the Research Institute for Agriculture Economy and Rural Development, in partnership with the Academy of Economic Studies and the University of Agronomic Sciences and Veterinary Medicine. For a diagnosis of the the fruit producers situation, to identify the problems they face, 153 questionnaires were applied in 5 counties in representative areas for fruit production, namely Dâmbovița, Argeș, Prahova, Vâlcea, Constanța. In addition to these questionnaires, there have been meetings with producers in different production areas, during which, besides dissemination activities within the project, discussions took place in which the producers made known their achievements and problems they facing with.

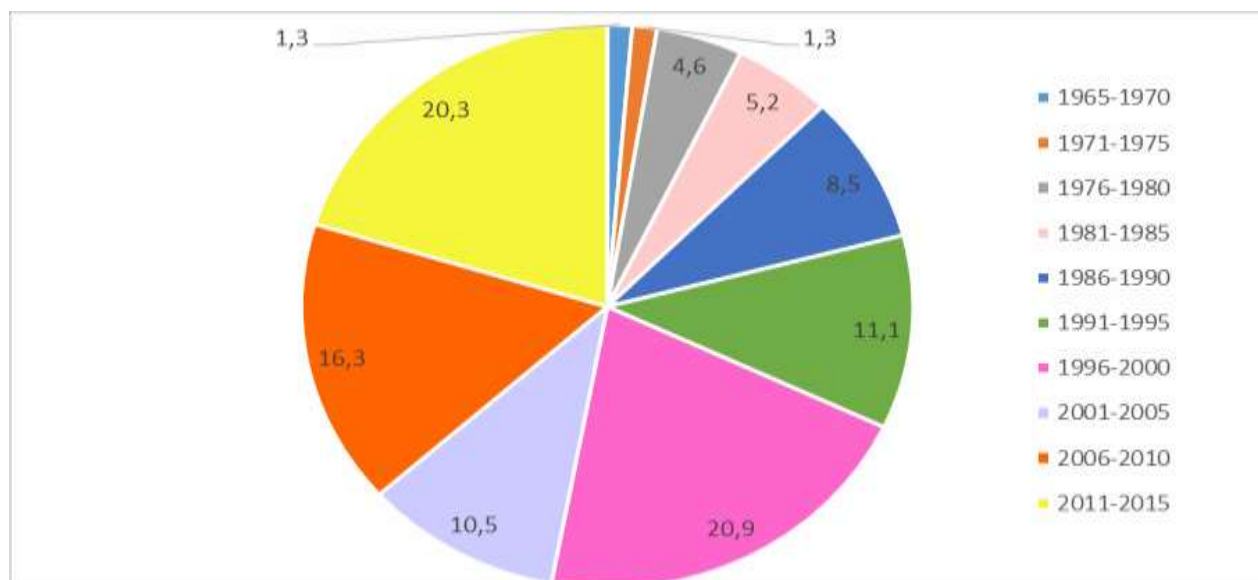
¹ PhD. Chetroui Rodica, Scientific researcher III – Research Institute for Agriculture Economy and Rural Development, e-mail: rodica.chetroui@iceadr.ro

² Eng. Iurchevici Lidia, Scientific researcher III – Research Institute for Agriculture Economy and Rural Development, e-mail: lidia.iurchevici@iceadr.ro

RESULTS AND DISCUSSIONS

From the fruit growers responses to the questions, it turned out that only 20.9% of those interviewed started their activity before the revolution, the remaining 79.1% - after 1990 (see Chart 1).

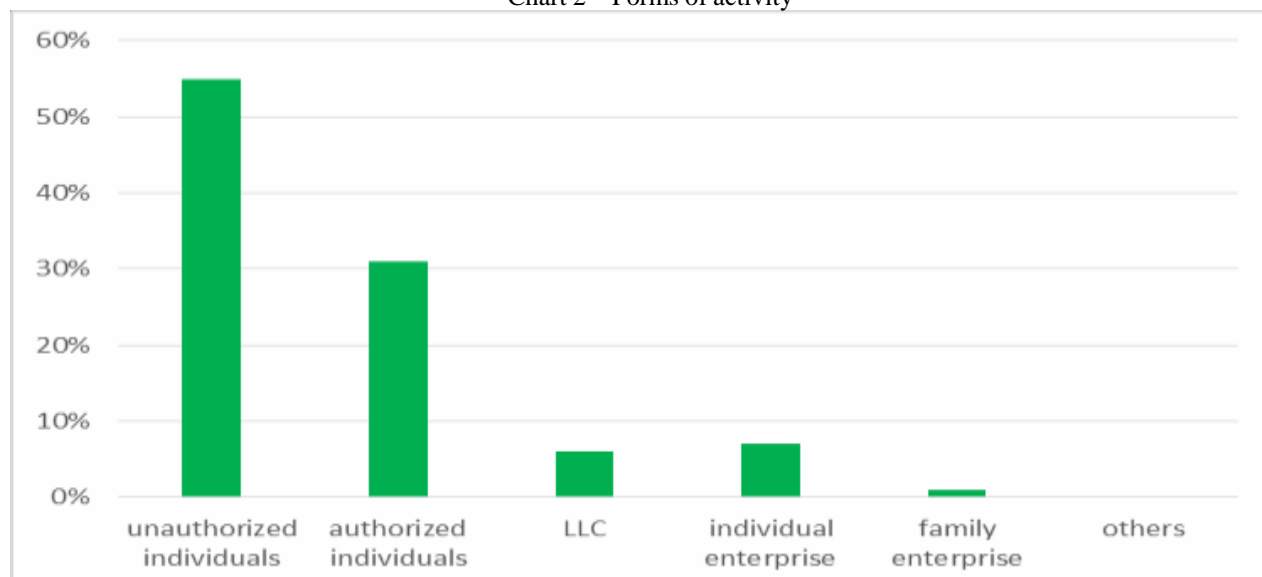
Chart 1 – Establishment periods of the fruit production holdings



Source: Own calculations following questionnaires data

To mention that unauthorized individuals represent the majority of the respondents to this questionnaire (55%), authorized persons represent 31% and 14.4% are into other forms of activity (Chart 2).

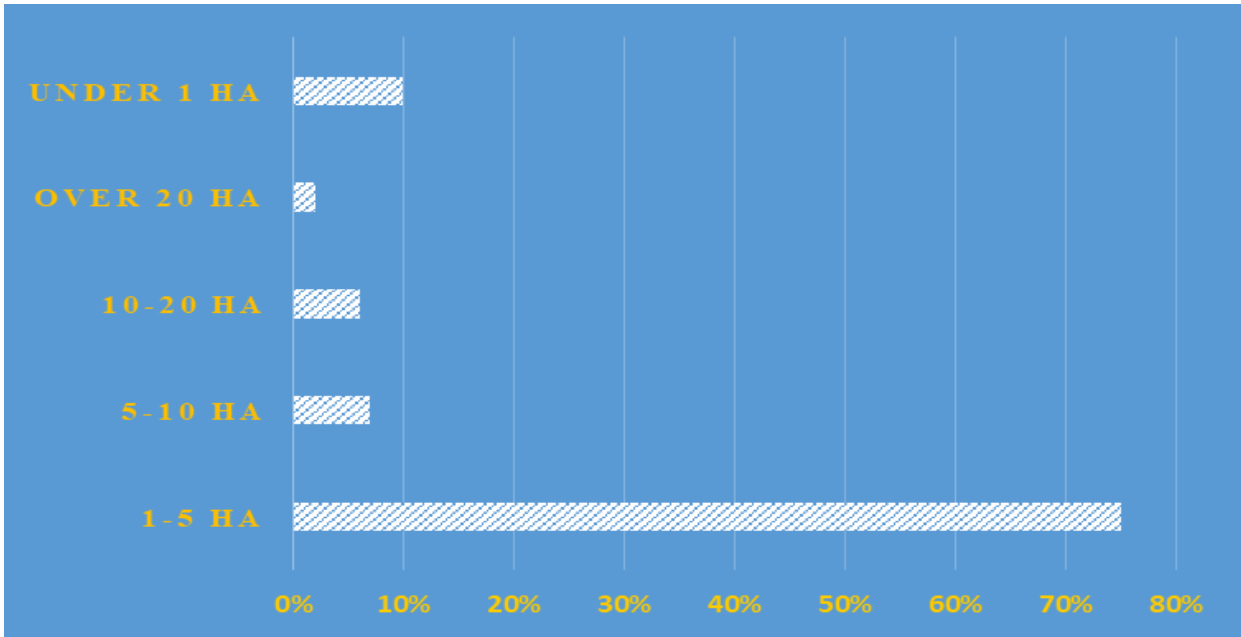
Chart 2 – Forms of activity



Source: Own calculations following questionnaires data

Regarding the area of the holding, three quarters (75%) of these hold between 1-5 hectares, 7% have between 5-10 hectares, 6% between 10-20 hectares, 2% exploit over 20 hectares, and those who have areas under one hectare represent 10% of respondents (Chart 3).

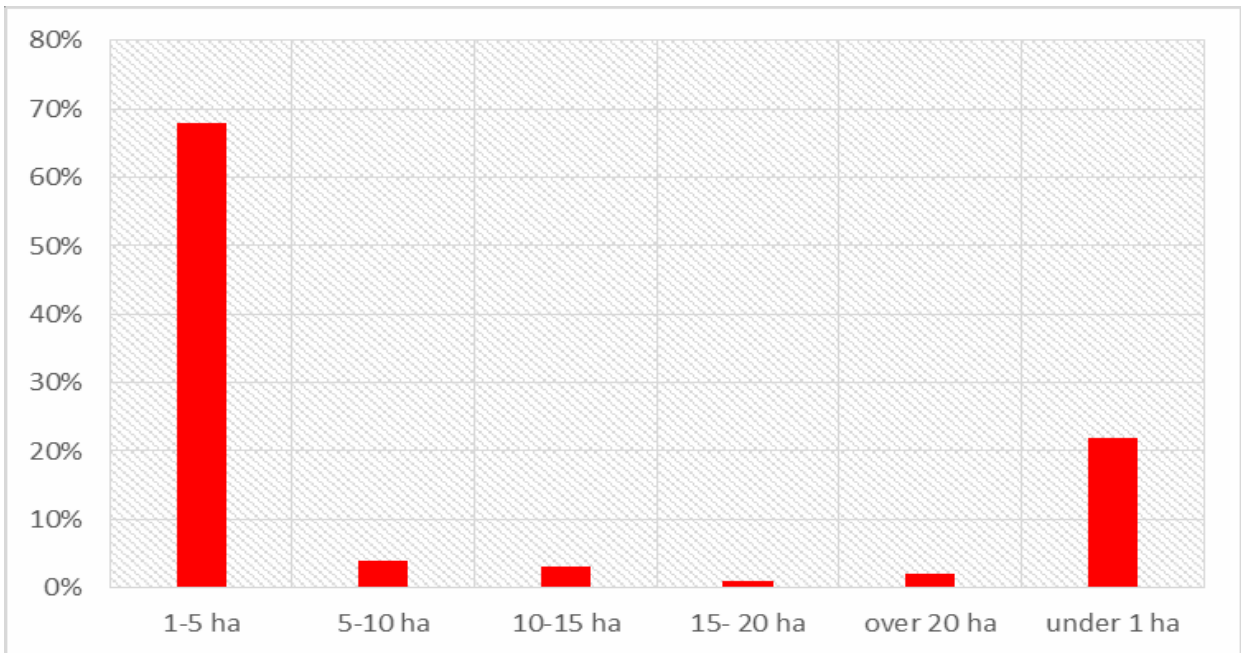
Chart – Surface of holding



Source: Own calculations following questionnaires data

Most of the farmers surveyed (68%) have orchards on areas between 1-5 ha and 22% of them have orchards on an area of less than 1 ha. Those who have orchards over 20 hectares account for only 2% (see Chart 4).

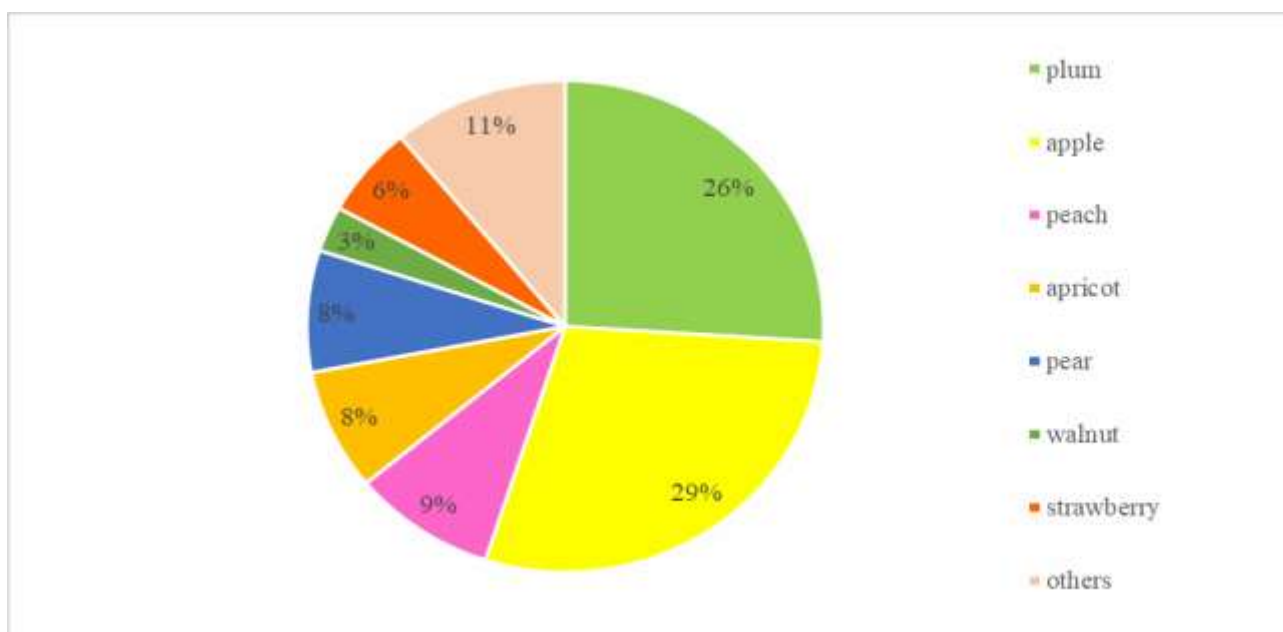
Chart 4 – Surface of orchards



Source: Own calculations following questionnaires data

Regarding the orchards structure, more than half of them are dedicated to apple and plum trees, accounting for 29% and 26%, respectively. The rest of the areas are covered by orchards with peaches, apricots, pears, walnuts, and strawberry crops occupy 6% (see Chart 5).

Chart 5 – Structure of orchards



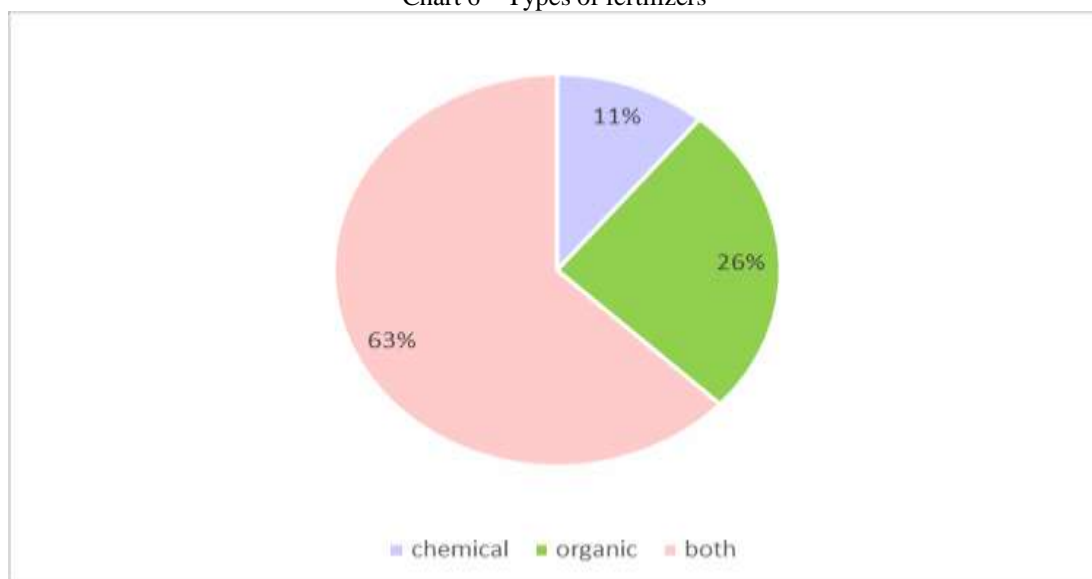
Source: Own calculations following questionnaires data

The varieties used in crop are 65% native and only 1% exploit exclusively imported varieties. 84% of the fruit growers use planting material purchased from third parties and only 16% produce it on their own farm.

Regarding the mechanization of orchard maintenance works, more than three quarters of the producers (76%) use their own means and very rarely (3%) employ companies specialized in the provision of services in agriculture. Almost a quarter of respondents work with private individuals. The structure of human resources used reflects the fact that, in the case of farms with reduced number of employees, family members are those who work on the farm, occasionally also working with seasonal workers. Also, the share of qualified workers is lower than that of unskilled workers.

The organic fertilizers used represent only 26%, 11% of the producers use only chemical fertilizers, the rest using both categories (Chart 6).

Chart 6 – Types of fertilizers



The responses received from the respondents indicated that overwhelming majority use conventional treatments, insecticides and pesticides (almost 90%). Irrigations are applied quite rarely, especially in strawberry crops, using drip installations (14%) or sprinkling (6%).

The fruit production selling of the 153 respondents is made exclusively on the domestic market, and only one of them sells exclusively in the supermarket, the rest of it being marketed at the farm gate or in the communal markets. Due to the inexistence of the optimal storage of fresh produce, not all the quantity is sold and losses of more than 35% occur. Farmers accuse the lack of support legislation for small and medium-sized producers, excessive bureaucracy in accessing all kinds of support.

CONCLUSIONS

ADER Project 16.1.2. - „Models of development of short chains of valorisation on the pathway primary production-services-warehousing-processing-marketing” meets the need of integrated valorization of fruit production on the short chain, offering an economically viable solution by developing a model of marketing cooperative that includes the stages of production, storage, processing and selling of processed products.

Fragmentation of farms involves small and inconsistent productions, which are reflected in the absence of contracts and low incomes. That is why, through the project, there are activities to popularize the need of association fruit producers in organized and integrated forms of production and management throughout the flow, from producer to consumer.

BIBLIOGRAPHY

1. ICEADR, (2017), *ADER 16.1.2 Project - „Models of development of short chains of valorisation on the pathway primary production-services-warehousing-processing-marketing”- Stage 3 – Projecting and experimenting of models of development of short chains of fruit valorisation*
2. Turek Rahoveanu, A., (2008), and collaborators, *Analysis of the vegetables-fruits sector in Romania, Publishing Cartea Universitară*

POSTHARVEST HANDLING PRACTICES FOR FRUIT CROPS

Steliana RODINO¹

Abstract: *The fruit production is a competitive and dynamic sector with many uncertainties coming from fruit biology, diseases and pests that attack them, the climate change, the distribution market and the complexity of logistics activities. Post-harvest handling activities can considerably improve the conditions that maintain fruit quality as they are circulating along the supply chain. Depending on the size of the agricultural holding and its financial possibilities, there are different specific practices considered appropriate for the achievement of management objectives after the harvest. The aim of this paper is to provide post-harvest storage, packaging and handling recommendations for small-scale specialized horticultural growers. It was demonstrated that the implementation of appropriate storage and packaging conditions can increase the storage time of fruits by 300 to 800%. Vertical diversification in the fruit sector by combining the application of traditional and modern processing technologies, both pre-harvesting and post-harvesting, represents a possibility of shortening the distribution chain, and implicitly increasing profitability. At the same time, it is necessary to develop closer collaboration between scientific research, production, distribution and marketing, in order to build strategic alliances to improve technologies and skills, as well as to increase the competitiveness of products offered on the market.*

Keywords: *post-harvest management, fruit crops, packaging methods*

Jel Classification: *L15;O14;Q16*

INTRODUCTION

Post harvest management of fruit production is a necessity originating from the need to reduce the production losses that occur after the harvest. In practice, fruits must be harvested when they reach maturity and have optimal quality characteristics and need to be handled with care to avoid mechanical damage, cool quickly to remove heat accumulated in the field, stored in a modified atmosphere - if there are technologies suitable for the harvested species - and kept at acceptable temperatures during storage (Watkins și Nock, 2012). Post-harvest handling activities can considerably improve the conditions that maintain fruit quality as they are circulating along the supply chain.

The optimum conditions for packing and storage of fruit production can vary considerably depending on the variety of fruits considered, the variety of processing after harvesting, the maturity at harvest time, the harvest time and much more (Irimia, 2013). Vertical diversification in the fruit sector by combining the application of traditional and modern processing technologies (Turek et al., 2009), both pre-harvesting and post-harvesting, represents a possibility of shortening the distribution chain, and implicitly increasing profitability.

The purpose of this paper is to provide an overview of post-harvest storage, packaging and handling recommendations for small specialized horticultural growers.

MATERIALS AND METHODS

The study aims to highlight the main post-harvest processing techniques of fruit production, with particular emphasis on the packaging of fresh fruit. The data were extracted from statistical information provided by the Eurostat database, from the specialized scientific literature. The research has a conceptual and methodological dimension. The information has been processed by analyzing, evaluating and comparing data from tables and diagrams that can lead to the identification of current status and future trends, thus providing the necessary arguments for an objective conclusion and visualizing some correlations between existing conceptual models. Thus, innovative packaging processes are presented, incorporating state-of-the-art technologies, described in the national and European scientific literature.

¹ Dr. Steliana RODINO, Institute of Research for Agriculture Economy and Rural Development: e-mail: steliana.rodino@yahoo.com

GENERAL CONSIDERATIONS

The fruit processing industry is one of the largest economic activities in the world. Efficient management of post-harvest handling activities is essential because they are designed to maintain fruit quality as fresh produce moves along the distribution chain. Post-harvest handling is that stage of plant production immediately after harvesting, including cooling, cleaning, sorting and packaging.

Post-harvest losses are the losses occurring during the period running from the time of harvesting the fruit to actual consumption (Tănăsescu și colab, 2015). This loss term refers broadly to all types of possible losses along the distribution chain, from the farm to the trader and to the final consumer.

Practically, in order to reduce losses along the distribution chain, preparation of the production for marketing and the primary selection of the fruit must start right from the field, alongside with the harvesting operation, by removing non-compliant, diseased crops that may compromise the healthy fruits they come into contact with. Specialists from various fields, such as biology, biochemistry, chemistry, plant nutrition, carry out intensive research to extend fruit storage after harvesting by various means. For example, it has recently been demonstrated that a gamma irradiation (γ) dose (0.1-0.5 kGy) could increase fruit storage by about a week to two weeks, which could help minimize damage during storage and transport (Santos și colab, 2015).

OPTIMISATION OF POST HARVEST MANAGEMENT

Among the most important parameters that are considered for the optimization of post-harvest management and to maintain the quality of fruit harvest are the following:

- *temperature*
- *humidity*
- *modified atmosphere*

Biotechnology practices can make it possible to introduce crop varieties of improved crops with high potency in terms of yield and resistance to diseases and pests. **Genetic transformation technology** is based on the technical aspects of plant tissue culture and molecular biology for: production of improved varieties; the production of plants resistant to diseases (viruses); genetic transformation; production of secondary metabolites; the production of varieties tolerant to salinity, drought and heat stress.

In the last decades, techniques used in biotechnology for plant cell genetics have evolved into a new era, focusing on the production of a large number of secondary plant products. In the second half of the last century, the development of genetic engineering techniques and molecular biology allowed for the emergence of improved agricultural products that have kept growing demand in the productive systems of many countries around the world (James, 2008). However, quality control and compliance with both national and international standards must be strictly followed in order to achieve the best results. As far as possible, damage to fruit production due to the post-harvest activities (eg cross-contamination by water, equipment, transport or handling) should be avoided.

Previous studies have shown that **gamma irradiation** causes modifications of the metabolic pathways, which can delay the production of essential precursors and the energy required for fruit maturation.

An alternative method designed to increase the shelf life of fruit could be the regulation of **endogenous ethylene production**. Classic processing strategies to maintain the freshness of horticultural products involve storage at low temperatures, blocking the biosynthesis of ethylene and their action. Currently, it is conducting research to develop new ethylene measurement devices that will allow for the detection of critical ethylene concentrations during storage and transport (Janessen et al., 2014).

Recent research has shown that degradation of fruit damage could be achieved by such **genetically modified crops** (GM), in which the genetic expression of key enzymes responsible for

fruit maturation is altered. However, the adoption of such technologies has so far been discouraged by food safety concerns associated with genetically modified crops. Other new perspectives arise through the use in post-harvest treatments of *natural or transformed natural products*, tested with great success. Of these, chitosan and carvone can be mentioned. Chitosan has fungistatic and fungicidal properties. (Beceanu, 2002; Turtoi, 2004).

Another strategy for preventing damage to fruit as well as supporting the interests of farmers in the field could be the use of *modern packaging techniques* for post-harvest production. This could be achieved by improving conventional methods, as well as by developing non-conventional products of commercial interest (Surendranathan, 2005).

Fruits become susceptible to damage immediately after maturation, as different chemical and physical processes occur. A matured fruit, depending on the variety, has a shelf life limited from a few days to 1 or 2 weeks. In addition, a mature fruit is more prone to physical damage, lesions, and increased losses due to degradation. It is therefore necessary to develop both the technology and the appropriate infrastructure for proper storage and transport of fruit production.

The main objectives of international research on post-harvest biology of fresh fruit are the reduction of quantity and quality losses and the maintenance of food safety between harvesting and consumption sites.

At present, the activities undertaken to test decontamination methods aimed for extending the shelf life of horticultural products (both fresh and minimally processed) take into account the following research directions:

- Maintaining freshness attributes
- Limiting the fruit depreciation caused by pathogenic organisms;
- Preserving the nutritional qualities of the fruits

One of the reasons for the low commercial activity in the fruit and vegetable sector may be the lack of organized logistics activities related to the storage and transport of the harvest.

One way to achieve this could be by developing a feasible technology to extend the post-harvest conservation period.

Thus, it is important to have a correct assessment of the available technologies, as well as an understanding of the physiology and biochemistry of fruit maturation processes (Surendranathan, 2005; Simson și Straus, 2010; El-Ramady și colab., 2015).

INNOVATIVE PACKAGING TECHNOLOGIES

Packaging methods should be chosen so as to meet a number of conditions at the same time:

- reducing the consumption of raw materials;
- increasing packaging performance by using complex materials;
- reconsidering the product-packaging-environment relationship, by using recyclable packaging

The main packaging methods used to market fruit production are: aseptic packaging, vacuum or vacuum packing, active packaging (with modified atmosphere packaging and antimicrobial packaging) and intelligent packaging. In the following paragraphs, the *active packing and intelligent packaging* options will be described.

ACTIVE PACKAGING

New packaging concepts for fruits and other fresh products are currently being optimized. Such packaging products were designed with the implementation of innovative technologies and does not only act as a passive, inert, barrier to external conditions, but plays an active role in protecting packaged products. The active packaging used for packing fruit production uses active principles that are generated by or come from within the package and exert a specific effect on packaged fruit to trigger defense mechanisms such as antimicrobial agents, oxygen sorbents, capture of ethylene, etc. (Prasad și Kochhar, 2014; Brody și colab., 2001).

The purpose of using this method in the packaging of fruit production is to maintain organoleptic and nutritive qualities and to extend the storage period along the distribution chain as well as to the consumer. Examples of active packaging techniques include systems that absorb oxygen, ethylene, humidity, carbon dioxide and odors, as well as systems that release carbon dioxide, ethanol, antimicrobial agents, antioxidants and flavors.

Active packaging is not synonymous with intelligent packaging!! Intelligent packaging refers to packaging that is able to perceive and provide information about the function and properties of packaged foods (Day, 2003).

In a recent review of active packaging systems used in the food industry (Mane, 2016), the following variants of this method were enumerated:

- Oxygen scavengers
- Carbon dioxide emitters and scavenger
- Ethylene scavengers
- Ethanol emitters
- Moisture absorbers
- Antimicrobial agents
- Flavour/odour absorbers
- Temperature-controlled packaging

Other authors have included other variants such as antioxidant packaging. Antioxidants are widely used in fruit packaging to improve the oxidation stability of fresh fruit slices and to extend shelf life. Incorporation of natural antioxidants such as vitamin C and E on packaging film can reduce oxidative reactions, leading to the development of smell and color changes. Vitamin E is also safe and effective and has been shown to be stable under processing conditions (Biji și colab, 2015). Lately, the use of antimicrobial packaging (ethanol, enzymes, plant extracts in volatile oils, silver ions) is becoming more and more frequent.

Modified atmosphere Packaging

Modified Atmosphere Packaging technology known as MAP technology and Controlled Atmosphere Storage - CAS are innovative new techniques that are widely applied to conserve agricultural products, especially for fruits and vegetables. Modified atmosphere packaging technology has been defined as "packaging a perishable product in a modified atmosphere so that the composition inside the packaging is different from air (Hintlian & Hotchkiss, 1986).

Basically, the atmosphere inside the packaging is modified by introducing a gas. Choosing the gas used to modify the atmosphere inside the packaging or gas mixture depends on the type of fruit and the main types of possible deterioration of its quality (attack of pathogenic microorganisms, fruit oxidation processes). Oxygen (O₂), carbon dioxide (CO₂) and nitrogen (N₂) are most commonly used in MAP. Although there are studies in the literature that report on investigations and other gases such as nitrogen and nitrogen oxides, sulfur dioxide, ethylene, chlorine, as well as ozone and propylene oxide, they are not yet widely applied for reasons of food safety, legislative regulations and production costs. Success in controlling the fruit respiration process as well as ethylene production can result in fruit with outstanding organoleptic qualities. The control of these processes depends on the control of working temperature, one of the most important external factors influencing the quality of the packaged fruit in a modified atmosphere. Therefore, the temperature is controlled and maintained within the limits prescribed during storage for each species (Sandhya, 2010).

Antimicrobial packaging

Antimicrobial packaging is an active packaging form in which the packaging incorporates elements that act to reduce, inhibit or delay the growth of pathogenic microorganisms that may be present in packaged food or in packaging material itself (Appendini and Hotchkiss, 2002). In order to control the pathogenic microorganisms present on the fruit surface, antimicrobial substances can be incorporated into the package or can cover fruit packaging materials.

A variety of natural antimicrobial agents derived from herbal extracts derived from herbs (cinnamon, cloves, thyme, rosemary, oregano, etc.) and other plant extracts such as onion, garlic, horseradish and mustard have been reported in the literature. Packaging systems releasing volatile substances with antimicrobial action include chlorine dioxide, sulfur dioxide, carbon dioxide and ethanol. Chitosan has been used as a protective layer to protect fresh fruit from fungal attacks. It also acts as a barrier between nutrients contained in fruits and pathogenic microorganisms.

Edible and anti-microbial packaging and coating, made from polysaccharides, proteins and lipids, present a variety of advantages such as biodegradability, edibility, biocompatibility, aesthetic appearance, and fruit isolation properties (Biji și colab, 2015).

INTELLIGENT PACKAGING

Intelligent packaging uses various principles to monitor the status of the packaged product and to communicate this status. Intelligent packaging devices include time and temperature indicators, gas detection paints, microbial growth indicators, physical shock indicators, and so on (Day, 2003). Intelligent packages used for fruit production are packaging containing indicators on the quality of the fruit inside the packaging: quality, temperature, gas concentration in the packaging.

Intelligent packaging of fruit usually involves the ability to perceive or measure a fruit attribute, the inner atmosphere of the packaging or the exposure environment. This information can be communicated to users or can trigger active packaging functions (Yam et al., 2005). Basically, there are three types of intelligent packaging systems: Sensors, Indicators and Radio Frequency Identification (RFID).

In the speciality literature were identified different indicators used in intelligent packaging systems, referring to different parameters, as follows:

- Freshness indicators
- Temperature time indicators
- Integrity indicators
- Gas concentration indicators

CONCLUSIONS

In addition to the basic post-harvesting technologies of temperature management, a number of others, including various types of physical packaging (heat, irradiation and packaging), chemical treatments (antimicrobial, antioxidant and anti-aging) have been developed. The packaging currently used presents innovative technologies and new techniques and materials are added each year to fresh fruit and fruit processed products (juices, compotes, purees, jams, marmalades, jams).

Consumer preferences indicate their orientation towards fresh fruit consumption, therefore most of the studies on the improvement of post-harvest processing technologies have been carried out for this form of marketing.

Vertical diversification in the fruit sector by combining the application of traditional and modern processing technologies both in pre-harvest and post-harvesting is a possibility of shortening the distribution chain, and implicitly increasing profitability. In the same time, it is necessary to develop closer links between scientific research, production and distribution and marketing, in order to build strategic alliances to improve technologies and skills as well as to increase the competitiveness of products offered for marketing.

REFERENCES

1. Appendini, P., Hotchkiss, J. H., 2002. Review of antimicrobial food packaging. *Innovative Food Science and Emerging Technologies*, 3(2), 113-126
2. Beceanu Dumitru, Chira Adrian, 2003. Tehnologia produselor horticoale. Valorificare in stare proaspata si industrializare, Editura Economica
3. Biji KB, Ravishankar CN, Mohan CO, Srinivasa Gopal TK. 2015. Smart packaging systems for food applications: a review. *Journal of Food Science and Technology*, 52(10), 6125-6135

4. Brody A.R., E.R. Strupinsky, L.R. Kline, 2001. Active Packaging for Food Applications, CRC Press
5. Day B. P. F. 2003. Active packaging. Food Packaging Technology. Blackwell Publishing, 282-300
6. El-Ramady Hassan R., Éva Domokos-Szabolcsy, Neama A. Abdalla, Hussein S. Taha, Miklós Fári, 2015. Postharvest Management of Fruits and Vegetables Storage Springer International Publishing Switzerland, E. Lichtfouse (ed.), Sustainable Agriculture Reviews
7. Hintlian, C. B., J.H. Hotchkiss, 1986. The safety of modified atmosphere packaging: a review. Food Technology, 40 (12), 70-76
8. Irimia Liviu Mihai, 2013. Tehnologia produselor horticole, Suport de curs, USAMV IASI
9. James, C., 2008. Global Status of Commercialized Biotech/GM Crops: 2008. ISAAA Brief No.39. ISAAA: Ithaca, NY
10. Janssen S, Schmitt K, Blanke M, Bauersfeld ML, Wöllenstein J, Lang W, 2014. Ethylene detection in fruit supply chains. Philos Trans A Math Phys Eng Sci.; 372(2014):20130311
11. Mane K. A, 2016. A Review on Active Packaging: An Innovation in Food Packaging, International Journal of Environment, Agriculture and Biotechnology (IJEAB) Vol-1, Issue -3, 544-549
12. Prasad P., Kochhar A., 2014. Active Packaging in Food Industry: A Review IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT), 8 (1), 01-07
13. Sandhya, 2010. Modified atmosphere packaging of fresh produce: Current status and future needs LWT - Food Science and Technology, 43,(3), 381-392
14. Santos AMG, Lins SRO, da Silva JM, de Oliveira SMA. 2015. Low doses of gamma radiation in the management of postharvest *Lasiodiplodia theobromae* in mangos. Brazilian Journal of Microbiology, 46(3), 841-847
15. Simson SP, Straus MC, 2010. Post-harvest technology of horticultural crops. Oxford Book Company/Mehra Offset Press, Delhi
16. Surendranathan 2005, Post-harvest biotechnology of fruits with special reference to banana— Perspective and scope. Indian J. Biotechnol. 4, 39–46
17. Turek Rahoveanu Adrian coord., 2009. Analiza filierei sectorului vitivinicol în România, - București, Ars Academica
18. Turtoi Maria, 2004. Tehnici de ambalare a produselor alimentare, Editura Academica, Galati
19. Watkins, C. B., and J. Nock. 2012. Production guide for storage of organic fruits and vegetables. New York State Department of Agriculture & Markets, Publ. #10.
20. Yam, K. L., Takhistov, P. T., and Miltz, J. 2005. Intelligent packaging: concepts and applications. Journal of Food Science. 70: R1R10

AGRICULTURAL COOPERATIVES IN DEVELOPING AGRICULTURE IN ROMANIA AND THE EUROPEAN UNION

BRĂTULESCU ALEXANDRA-MARINA¹

Abstract: *The Agricultural Cooperative is an autonomous association of natural and / or legal persons, as the case may be, a private legal person established on the basis of the expressed consent of the parties in order to promote the interests of cooperative members in accordance with the principles of cooperation. In the course of the paper we will present the laws of agricultural co-operation, professional associations and the role of cooperatives in the development of agriculture. Also, the types and forms of agricultural cooperation in the European Union will be presented. To create agricultural producers in associative forms new opportunities for economic development are opened by attracting regional, zonal or local advantages and using collective power in order to increase the prosperity of members, their families and the communities they are part of. The cooperative can carry out several types of activities that have various benefits for members and help them achieve these goals.*

Keywords: *cooperatives, agricultural development, evolution, agricultural.*

JEL Classification: *L 11, Q11, Q13*

INTRODUCTION

Cooperatives are an autonomous association with an unlimited number of members with variable capital, conducting economic, technical and social development in the private interest of agriculture. The members of the cooperative are established and operate with at least 5 farmers. The share capital consists of shares of equal value; The nominal value is determined by the memorandum. Actions may be in cash and / or in kind;

The cash contribution is compulsorily constituted by any agricultural cooperative, it is constituted, organized and based on the constitutive document, signed as authentic document, which includes the decision to involve the list of founding members, the value of the subscribed shares each, together with the statute.

Members of associative forms, regardless of their organization - associations, cooperatives or producer groups - have democratically established rights, and in recent years, due to concentration or development strategies, farmers are faced with a Fundamental strategic decisions, namely to choose how to act better in insecure situations to make viable, cost-effective agricultural holdings, resilience to competition, sales markets and efficiency in accessing financial funds. Alternatively, farmers make different forms of association, including cooperatives, producer groups and producer associations.

Romania, currently in the position of adapting to the new EU regulations, has an agriculture in which approximately 37% of the population is active, with about 3 million plots, the average area of which is 1.5 ha, which requires The organization of farmers in associative forms, with a view to modernizing this important economic branch.

In Romania, agricultural cooperatives are regulated by two laws, namely:

□ Law 566/2004 - Law on agricultural co-operation, which regulates only the sector of agricultural co-operation

□ Law 1/2005 - Law on Cooperatives, which also provides for the possibility of establishing cooperative societies for exploitation and agricultural cooperative societies - associations of natural persons that are established with the purpose to jointly exploit the agricultural areas owned by the cooperative members, to Jointly carry out land improvement works, jointly use machinery and facilities, and harness agricultural products.

The purpose of this paper is to make a comparative analysis of the situation of cooperatives in Romania and cooperatives in the most important countries of the European Union.

¹ ASC Brătulescu Alexandra, ICEADR, Bucharest [brătulescu.alexandra@iceadr.ro](mailto:bratulescu.alexandra@iceadr.ro)

MATERIAL AND METHOD

In this paper, data from the databases of the National Institute of Statistics, the Ministry of Agriculture and the European Commission were analyzed, compared and interpreted. The quantitative and qualitative analysis of statistical data and the Swot analysis were used as a method of analysis regarding the advantages / disadvantages / opportunities and risks of agricultural producers wishing to belong to a cooperative.

Table no.1

SWOT ANALYSIS

<p style="text-align: center;">Benefits</p> <ul style="list-style-type: none"> - Reduces the number of intermediaries in the distribution chain - increases the influence of the manufacturer in price-setting in relation to buyers - also provides timely supplies of good quality at reasonable cost to the cooperative of distribution or processing - Opens new perspectives for the producer / worker who can adopt new technologies (mechanization, planting material, etc.) to allow it to move from traditional to more productive practices. 	<p style="text-align: center;">Disadvantages</p> <ul style="list-style-type: none"> -Confusion of farmers on association in a form of association (cooperative association - producer group)
<p style="text-align: center;">Opportunities</p> <ul style="list-style-type: none"> - changing the legislation on accessing loans with preferential interest to co-operatives and associations - simplifying funding documentation 	<p style="text-align: center;">Risks</p> <ul style="list-style-type: none"> - Farmers are unaware of the legislation and the benefits they can have - the reluctance to cooperate, starting from confusing the term cooperative with the CAP, which was based on land confiscation and cancellation of individual property titles

RESULTS AND DISCUSSIONS

In the countries of the European Union, agricultural cooperatives are in forms and types that vary from one country to another, based essentially on the same principles of organization and functioning that are based on the European Council Directive and which relate to agricultural cooperatives.

Through this directive, cooperatives are entities that are named in the Member State's law as such but are based on cooperative principles.

In the European Union, agricultural cooperatives are organized on three levels, as follows:

At primary level, farmers are associated in simple forms of associations that are called first-class cooperatives in the European Union, they have been formed to jointly achieve the following objectives:

- performing agricultural works;
- joint exploitation of the earth;
- Sharing production capacities;
- or to invest in various areas.

At secondary level, associations of primary agricultural cooperatives, which are referred to as second-class cooperatives, are set up and are aimed at upstream and downstream investments in agriculture for the collection or processing of agricultural products.

Third-level cooperatives are organized at tertiary level, by regions or even at national level through the participation of second-class cooperatives that form strong financial, commercial and industrial groups. These include networks of cooperative factories that provide processing and marketing of products or banks by pooling experience and resources in a particular area or region.

The weak point of agriculture is in the exercise of the market function of the agricultural holding, which has led to the concentration of the supply of agricultural products in order to ensure the sale under conditions of economic efficiency, based on market information and common decisions.

By developing the cooperative forms of economic organization of family farms it is possible to take over some functions of the farms by cooperative enterprises specialized in the storage and marketing of the products or the supply of agricultural holdings with various products necessary for agricultural cycle.

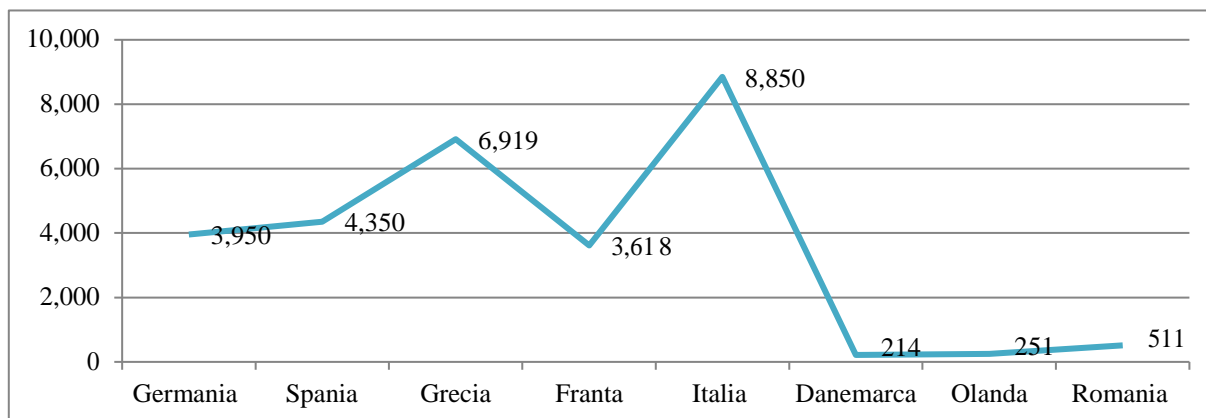
Table no. 2
Statistical data on agricultural cooperatives in some countries of the European Union

Country	Number of cooperatives	Number of members	Average number of members per cooperative	Turnover EUR bill	Average turnover per cooperative
Germany	3.950	3.280.000	830,38	39,30	0,01
Spain	4.350	950.000	218,39	6,30	0,01
Greece	6.919	782.000	113,02	0,85	0,01
France	3.618	720.000	199,00	52,60	0,014
Italy	8.850	1.124.900	127,11	16,45	0,01
Denmark	214	113.00	0,53	12,10	0,06
Netherlands	251	273.000	1087,65	22,40	0,09
Romania	511	23.412	45,816	15,00	0,03

Source: Statistical data processing, taken from the European Commission

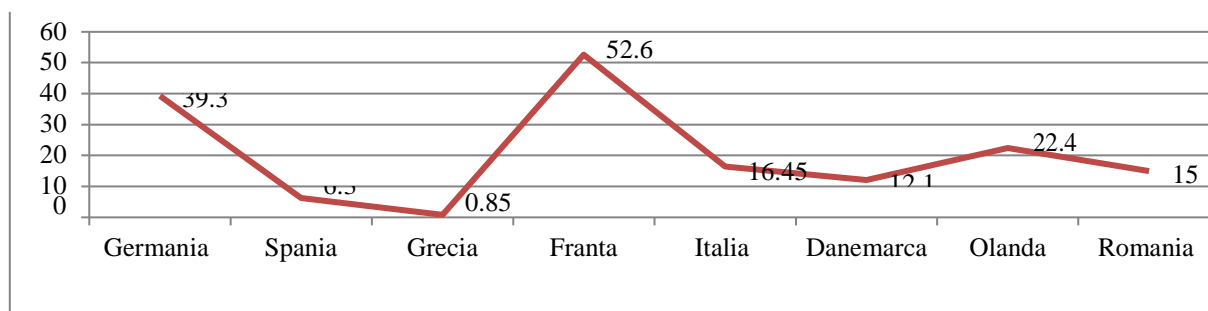
At European Union level, countries with the largest cooperative network are: Italy, Greece, Germany, Spain, France. But the highest economic power lies in agricultural cooperatives in the following countries: France, Germany, Denmark, the Netherlands. In Greece, Spain, Italy, although the number of cooperatives is high, their power is smaller.

Figure no.1 - Number of cooperatives



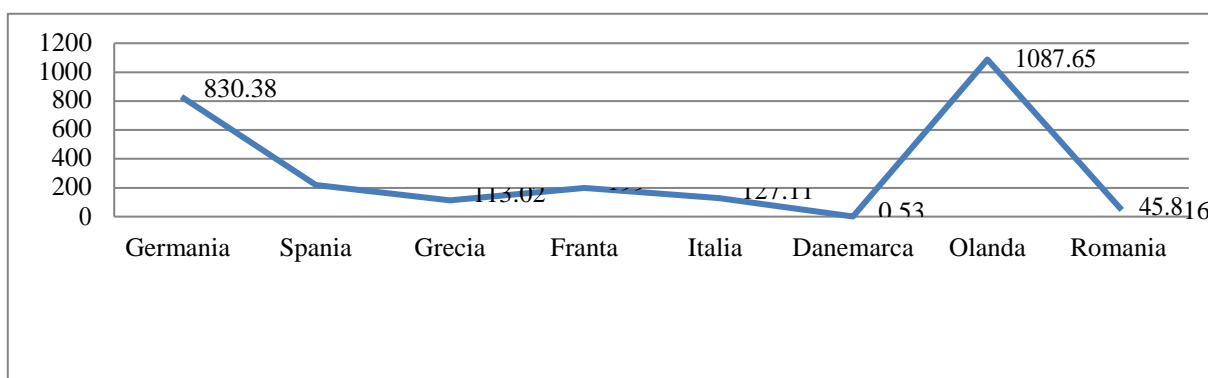
In figure 1, shows the maximum and minimum number for cooperatives in the European Union, here we observe that Italy has the largest number of cooperatives with 8.850, followed by Greece with 6.919, and the last with the smallest cooperatives Of the European Union is Denmark with 214 cooperatives.

Figure no.2 - Business turnover in billions of euros



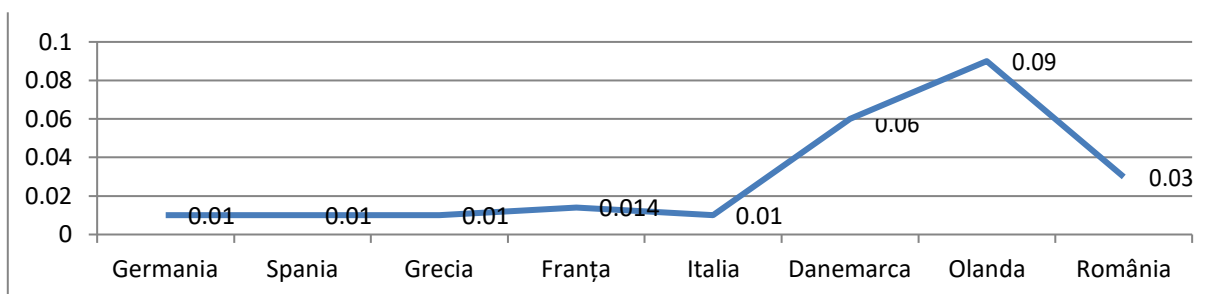
For turnover in billions of euros, the European Union ranks first with 52.6, followed by Germany with 39.3, and the lowest figure is in Greece with 0.85, which is the weakest country.

Figure no. 3 - Average number of members per cooperative



In figure 3, the average number of cooperative members shows that the Netherlands leads this ranking with a total of 1087.65, and Denmark has the lowest number of 0.53 members.

Figure no. 4 - Average turnover per cooperative



In figure 4, shows that the Netherlands has the highest turnover with 0.09 followed by Germany, and the lowest average turnover in the cooperative is in Romania with 0.03 billion euros.

In some Member States of the European Union, cooperative agri-food chains are developed by organizing cooperatives and cooperative associations horizontally and vertically.

Horizontal cooperation is carried out by economic agents in each branch of the chain from the primary level to the tertiary level.

Establishment of farmers in associative forms opens new opportunities for economic development by attracting local benefits and by using regional or regional power to increase collective members of prosperity, their families and communities.

Vertical cooperation takes place between individual farmers and associations that carry out different activities along the chain. And the two forms of cooperation are joined together. The European Union's agricultural cooperative sector has high market shares, but vary from country to country and from product to product.

CONCLUSIONS AND RECOMMENDATIONS

Agriculture is the main source of income in rural areas. Agricultural cooperatives play an important role in supporting agricultural producers and marginalized groups such as young people and women. They develop rural areas in a sustainable way by creating jobs and implementing business models that are resistant to economic fluctuations.

Through cooperation, manufacturers have access to a wide range of services: new markets, natural resources, information, technology, lending, training and training, etc.

It also facilitates the participation of producers in decision-making at all levels and also supports them legally and in negotiating contracts with suppliers of raw materials and agricultural machinery.

Although the advantages of associative forms are undeniable throughout the world, Romanian farmers hesitate when it comes to joining an agricultural cooperative. At present, under 1% of Romanian farmers are part of an associative form. Compared to the European Union, the average of the organization is 34%.

In recent years, due to concentration or development strategies, farmers face a fundamental basis for strategic decisions, namely choosing how to act better under uncertain conditions to make viable, cost-effective holdings Markets and financial efficiency by accessing funds. Alternatively, farmers have developed different forms of association, including cooperatives, producer groups and producer associations.

The reason may be that in our country the term "cooperative" is usually regarded with suspicion, since the establishment of those "cooperatives" in communism has de-owned the peasants, and instead of cultivating the spirit of association and Trust (ie the basic pillars of a co-operative enterprise), the organic communities were dismantled, completely altering human relations through massification and uprooting resulting from collectivization.

The recent economic crisis has led our country to develop cooperatives. From the analysis carried out, in 2015 cooperatives and cooperative societies with agricultural profile in operation in Romania 511 were identified. Of the total of 511, cooperatives were evaluated 284, approximately 56% of the total.

Agricultural cooperatives in Romania are encouraging the association of farmers, who, through diversification and horizontal and vertical integration, benefit from the possibility of purchasing inputs at lower prices (up to -35%), the application of a performing technology, the organization of production and their quantitative increase Qualitative, concentration of supply of agricultural products and markets, resulting in increased economic efficiency of producers.

BIBLIOGRAPHY

1. www.insse.ro
2. www.madr.ro
3. www.europa.eu
4. [http://www.ies.org.ro/agricultural cooperatives](http://www.ies.org.ro/agricultural%20cooperatives)
5. [http://www.qreferat.com/reports / economic / type-of-association-profesional46.php](http://www.qreferat.com/reports/economic/type-of-association-profesional46.php)
6. [http://www. the farm magazine.ro/articles / topical / we-cooperative-farm-active-in-romania](http://www.the%20farm%20magazine.ro/articles/topical/we-cooperative-farm-active-in-romania)
7. [http://madr.ro/docs/Rural development / NRDN / bulletin-themed / PT17.pdf](http://madr.ro/docs/Rural%20development/NRDN/bulletin-themed/PT17.pdf).

MODELS FOR SHORT FRUITS' CHAIN

ION RALUCA ANDREEA¹

Abstract: *The paper presents models for short chains of fruits, considering integration as the main mechanism of coordination agents' activities on the chain. The research answer the question how efficient are activities of fruits' chain in this particular form of integrated activities of collecting fruits, store and process them in juices and jams and sell them to the market, in a single economic unit. The objective of the research is to assess the efficiency of such a business. In achieving this purpose, economic data regarding investment, production, revenues and expenses have been analysed, for an associative form of processing and selling fruits, which develops such a business. The results show that investment is feasible, because revenues are higher than expenses, the rate of return is 5%, and the return of investment is 5.66 years, less than the machineries' period of operation. The model is useful for farmers owning orchards, who want to apply for structural funds and to develop, as such, their business in the direction of integrating activities downstream the chain.*

Key words *short chain, fruits, efficiency, integration*

JEL classification: *Q13*

INTRODUCTION

The paper aims to identify models for short fruits' value chain within the wider concern for increasing performance. It offers solutions for farmers encountering problems in selling the output. Previous research (Manole, 2006; Turek, 2008) found the difficulties that farmers encounter in delivering their small quantities of fruits, difficulties to enter the hypermarkets and supermarkets, which require large and homogenous batches of products. These problems can be solved by integrating post-harvest activities into one single economic unit, creating, as such, the short value chain of fruits.

The fruit value chain is defined as the sum of activities and operators and relationships among them. Each activity adds value to the product and changes its usefulness (sometimes agricultural products are not useful to consumers in the form they are harvested, so they are subject to storage, processing). The short value chain means reducing the number of activities and / or the number of operators. Since activities add value to products, they cannot be reduced. What can be reduced is the number of operators. Reducing the number of operators and maintaining the number of activities implies that the agents remaining on the chain carry out several operations, by integrating upstream or downstream activities, a phenomenon known as vertical integration. In order to cope with the growth of business complexity by integrating more activities, it is recommended that agencies at the same level of the value chain join a cooperative or association to have more economic power, a phenomenon known as horizontal integration.

The short value chain development model proposed by this paper is where the activities are integrated vertically and horizontally. The model is integrated both vertically, because in the cooperative or association all post-harvest activities of collection, reception, storage, sorting, processing, conditioning, packaging, marketing are carried out in a single economic unit, and horizontally, because the cooperative comprises several farmers, which are located at the same stage of the value chain.

In order to finance the investments necessary for the implementation of the model, the members of the cooperative can access the funds of the National Rural Development Program, measure 4.2. Support for investment in the processing / marketing and / or development of agricultural products, the objective Establishment and / or modernization of processing and

¹ Associate Professor, PhD. Ion Raluca Andreea, The Bucharest University of Economic Studies, Department of Agro-food and Environmental Economics, raluca.ion@eam.ase.ro

marketing units. The beneficiary is an associative form, so it is entitled to 50% of the eligible expenditure of the project to be financed through the National Rural Development Program.

The model can be implemented in any fruit-growing area in the country, most notably those in the sub-Carpathian regions of Arges, Valcea, Prahova, Dambovita, Buzau, Olt and Dolj counties, as well as in the North-West of Romania, Satu-Mare, Bihor and Maramures. The total area occupied by fruit plantations in 2014 was 145,000 ha. There is a reduction in the area occupied by fruit plantations from 206,000 ha in 2007 to 145,400 ha in 2014. Fruit production increased in the analyzed period from 1,085,800 tonnes to 1,115,200 tonnes, which means, in terms of surface reduction, an increase in average fruit production. The apple plantations occupy an area of 57,500 ha, plum plantations occupy an area of 70,700 ha, and the other fruit trees occupy an area of 17,200 ha. We appreciate that the areas planted with plums in Romania are high compared to the consumption requirements of the population expressed during the harvest period. Plums are very perishable, and it is recommended to process them and to capitalize, as such, the production.

Since the largest areas are cultivated with apples and plums, it is justified to develop short value chain models for apples and plums. Therefore, the investment objective is to set up a fruit marketing and processing cooperative with apples and plums. Fruits' value chain and market in Romania were studied in numerous papers (Ion, 2005, Manole, 2005, Turek, 2008). This piece of research emphasizes, particularly, the role of integration and it aims at designing a model for short chain in agriculture. The hypothesis tested in this piece of research is that short value chain of fruits is efficient. The short value chain is a business where post harvest activities are integrated and performed in one single economic unit (Ion, 2016). In order to test the hypothesis, economic data regarding investment, production, revenues and expenses have been analysed and indicators of economic efficiency have been assessed. The research objective is to identify the feasibility of the business which integrates post harvest activities of collecting and processing fruits and selling juice and jams.

MATERIAL AND METHODS

The need to make an investment in fruit processing is based on consumer demand for fruit juice, a product with added value, which has another consumer utility compared to fresh apples. Fruit processing is also necessary due to the high perishability, which is subject to continuous degradation processes from the time of harvesting, and seasonality, by processing, the apple consuming period being extended.

The technical objectives of the investment are:

- to establish a fruit-processing plant to extend its life, mitigate the seasonality of the supply of fruit and obtain higher added value products demanded by consumers;
- to establish a local fruit collection network for the raw material supply of the processing plant;
- to ensure the temporary storage, sales, bookkeeping and marketing services for cooperative members.

The financial objectives of the investments are:

- to purchase machineries and equipments for fruit processing;
- to purchase land for the location of the plant;
- to build the construction of the factory and the warehouse.

The structure of production is presented in Table 1. The cooperative produces 980,880 litres of apple juice per year and 7,280 kilograms of plum marmalade. The apples are harvested from August to October and the apple juice is produced from August to November. The plums are harvested and the marmalade is produced from July to September.

Table 1 Production structure

Product	VII	VIII	IX	X	XI	Total
Apple juice (l/year)		166160	160800	332320	321600	980880
Apple juice pieces.BaginBox3l/year)		55386.7	53600.0	110773.3	107200.0	326960
Plum marmalade (kg/year)	2400	2480	2400			7280
Plum marmalade (jars/year)	4081.6	4217.7	4081.6			12381

Source: author's calculations

Market and marketing mix

Product policy is focused on getting two products, apple juice and plum marmalade. The goal of product policy is to diversify the range by introducing into production and launching new products on the market, depending on consumer demand. Thus, as the market matures and grows the notoriety of the cooperative products, pear juices, cherries and other fruits, or combinations thereof, and marmalade of other fruits can be introduced into production without the need for additional investment in machinery. The product policy focuses on the traditional recipe for the production of apple and marmalade juice without the addition of chemicals. This information can be used in communication policy and justifies the setting of higher sales prices than those of competition.

In terms of product packaging and conditioning, the Bag in Box is chosen for apple juice, due to the lower price compared to other materials and smaller sizes before use. In the case of the marmalade product, although the best economic results are recorded in the packing of marmalade in wood boxes, the glass jar was chosen to be the packaging material, since the sale in the box implies the existence of a vendor to split the product. Considering that the current purchasing model in Romania is self-service (supermarket and hypermarket), where the buyer is in front of the products without a seller, the marmalade product will be packed in jars. They can easily be placed on the store shelves where the consumer can buy the product himself without the help of a seller.

Promotion policy. The products are launched under a brand name, which will be accompanied by the specification of "cooperative". The main values transmitted through the promotion policy are the safety, freshness and quality of the products given by the use of fruits collected from local producers, members of the cooperative, of natural ingredients, without the addition of chemical substances.

The main marketing tools used in the promotion policy are online marketing, participation in fairs and exhibitions, promotional sales and prize competitions.

Pricing policy. Product prices are slightly higher than those perceived by consumers as similar. Therefore, in order to differentiate the products of the cooperative from those of the competition, the target audience, mainly by brand and label, is informed about the source and quality of the raw materials used. The price surplus is justified because it is perceived by consumers as an emotional investment in the development of Romanian agricultural production and in supporting the phenomenon of association.

Distribution policy. The distribution channel is short: producer (cooperative) - retailer - consumer. The main customers are small grocery stores and large supermarket and hypermarket stores. At present, Carrefour, Metro and Mega Image are running programs to provide their own stores with products from local manufacturers. The cooperative will apply to these programs.

The revenues are presented in Table 2. If the quantity of each assortment and the selling price remain unchanged, the annual product revenue is equal to 4,312,385 lei per year. The revenue structure is 98% revenue from the sale of apple juice and 2% revenue from the sale of plum marmalade.

The value of the total investment is 1,171,718 lei, consisting of the contribution of the members of the cooperative and the non-reimbursable assistance from the European Fund for Agriculture and Rural Development (EFARD). The share of the investment from the members' contribution is 60.5% and that of the EFARD is 39.5%. The investment is allocated in the first year of operation of the cooperative so that the total value of the income, which is the sum of the

operating revenues and the total investment, is 5,484,103 lei in the first year and 4,321,385 in the following years.

Table 2 Revenues from operational activity and investment (lei)

Specification	Year 1	Year 2	Year 3	Year 4	Year 5
Total revenues, of which:	5484103	4312385	4312385	4312385	4312385
Apple juice	4250480	4250480	4250480	4250480	4250480
Plum marmalade	61905	61905	61905	61905	61905
Investment financing	1171718				
- Own contribution	709440				
- Grant from (EFARD)	462278				

Source: author's calculations

The cooperative's total operating expenses include fixed and variable costs (Table 3). Fixed expense refers to wage and amortization, and variable to raw material and material expenses. The total expenses include the operating and investment expenses, which are found to be related to the EFARD project for the purchase of fixed assets in the amount of 1,171,718 lei. In the total operating expenditures, the highest weight is held by the material ones, namely 72.8% in the first year of operation (when the investment expenses were taken into account) and 93.5% in the years 2, 3, 4 and 5.

Table 3 Expenditure from operational activity and assets' acquisition (lei)

Specification	Year 1	Year 2	Year 3	Year 4	Year 5
Total expenditure, of which:	5277188	4105470	4105470	4105470	4105470
Materials	3842475	3842475	3842475	3842475	3842475
Salaries	174007	174007	174007	174007	174007
Amortization	79387	79387	79387	79387	79387
Other expenditure	9600	9600	9600	9600	9600
Assets acquisition	1171718				

Source: author's calculations

RESULTS AND DISCUSSIONS

The total annual revenues are 4,312,385 lei, the total annual expenses are 4,105,470 lei, which includes the amortization, and the profit, calculated as a difference of the two indicators, is 206,915 lei (Table 4). Thus, the rate of return (resource consumption rate), calculated as a ratio between total profit and total expenditure is 5%, and the profit margin (calculated as a ratio between net profit and total income in this case) of 4.7%, which indicates that the business is profitable.

Furthermore, the economic efficiency of investment is assessed, based on data from Table 5. It was considered that the effective duration of machineries' operation is the standard operating period of the equipments of 10 years. Regarding the normal production capacity expressed in terms of value, it is expressed as the annual income.

Table 4 Economical and financial results

No.	Specification	Year 1	Year 2	Year 3	Year 4	Year 5
1	Total revenues (lei)	5484103	4312385	4312385	4312385	4312385
2	Total expenditure (lei)	5277188	4105470	4105470	4105470	4105470
3	Results (lei)	206915	206915	206915	206915	206915
4	Rate of return (%)	3.9	5	5	5	5
5	Profit margin (%)	3.7	4.7	4.7	4.7	4.7

Source: author's calculations

Table 5 Investments' indicators

No.	Indicator	Value (lei)
1	Investment value (I_t)	1171718
2	Production capacity expressed in terms of value (Q), of which:	4312385
2.1	Apple juice	4250480
2.2	Plum marmalade	61905
3	Expenses (Ch)	4105470
4	Profit (P_a)	206915
5	Effective duration of machineries' operation (D_e), years	10

Source: author's calculations

In assessing the economic efficiency of the investment, the annual income by product type was also taken into account in order to determine the value of their specific investment. Also, yearly production expenditure on total activity and annual profit were considered.

Table 6 Economic efficiency of investment

No.	Indicator	Value
1	Specific investment ($I_s = I_t/Q$, lei)	0.27
1.1	Apple juice	0.27
1.2	Plum marmalade	19.23
3	Profit ($P_a=I_t$)	206915
4	Total profit ($P_t = P_a \cdot D_e$)	2069150
5	Final profit ($P_f = P_t - P_r$)	1862235
6	Economic return on investment ($R = P_f/I_t$) %	159
7	The term of recovery of the investment (I_t/P_a , years)	5.66

Source: author's calculations

In Table 6, the economic efficiency of investment is assessed. The specific investment is 0.27 lei. It is noticed that the annual profit ensures the recovery of the investment in 5.66 years. Considering the fact that the business assumes the creation of a complex unit, combining production, processing and marketing activities, demanding from a financial point of view, the business is feasible. This is fully confirmed by the economic return on investment that exceeds the value of the investment: the total profit (recorded over the entire period of use of the machineries) is higher with 59% than the investment.

CONCLUSIONS

The paper aimed at answering the question how efficient is the short fruits' value chain, when activities of collecting fruits, store and process them into juices and jams and sell them to the market are developed in a single economic unit. The economic and financial results show that such a business is feasible, because revenues are higher than expenses, the rate of return is 5%, and the return of investment is five years, less than the machineries' period of operation. As such, the hypothesis we assumed that short value chain of fruits is efficient is validated. The model of short value chain can be implemented by farmers in their efforts of reduce losses, ensure income stability and developing, as such, their businesses. The European Fund for Agriculture and Rural Development offers opportunities for financing part of such businesses of farmers who want to integrate activities down-stream agriculture.

BIBLIOGRAPHY

1. Ion, R.A. (2016). *Models for short vegetables chain* In The Research Institute For Agriculture Economy And Rural Development *Agricultural Economics and Rural Development - Realities and perspectives for Romania* (pp. 397-402). Bucharest, Romania: Editura ASE.
2. Ion, R. A. (2005). *Performanța sistemului agroalimentar din România*. Bucharest, Romania: Editura CERES.
3. Istudor, N. (2000). *Modele de organizare a piețelor agroalimentare – pe exemplul legumelor și fructelor*. Bucharest, Romania: Editura Economică.

4. Manole, V., & Ion, R. A. (2006). *Coordination Models for Agro-food Chains. Economics of Agriculture. LIII/1, 63-71.*
5. Manole, V., Istudor, N., Boboc, D., & Ion, R. A. (2005). *Filiiere agroalimentare.* Bucharest, Romania: Editura ASE.
6. Turek Rahoveanu, A., Turek Rahoveanu, M., Zahi, L., Ion, R.A, Zaharia, C., Dachin, A., Istudor, N., Manole, V., Dobre, I., & Ignat, R. (2008). *Analiza filierei sectorului legume-fructe în România.* Bucharest, Romania: Editura Cartea Universitara.
7. National Program for Rural Development, 2016.
8. Project 16.1.2. – Models of developing short chains for production-services-storage-processing-market, financed by the Ministry of Agriculture and Rural Development of Romania, 2015.

ECONOMIC EFFICIENCY OF INVESTMENTS IN FRUITS PROCESSING

DOBRE IULIANA¹

Abstract: *The aim of this paper is to find out the economic efficiency of an associative unit in fruits processing and trading field. In this order a scenario by loan is taken into consideration. Indicators such as production, incomes and expenditures, profit, also investment indicators are studied. The paper consists into the establishment of a processing fruits to prolong their life, and get products with higher value added consumer demand; establishing a network for collecting local fruits, supply of raw materials for the processing; providing storage services and marketing associative members. Technical objectives of the investment are to purchase machineries and equipments for processing apples and plums; the purchase of land for their location, building factory and deposit. The financial objectives refer to investment. The results show the relevance of associative units for producer integrating and investment feasibility.*

Key words *associative unit, fruits processing, investment, economic efficiency*

JEL classification: Q13

INTRODUCTION

The food and economic relevance of fruits to the population makes it necessary to study them in order to increase efficiency at the producer and market levels. For this, it is needed to know the characteristics of the fruit and the market, as well as the ways in which the efficiency can increase through investments. It must be borne in mind that the fruit is perishable in most of the cases and the quality differences for the same product are high. Also, fruits have rhythmicity in terms of obtaining and marketing. Fruit production is seasonal and off season, which requires its organization on geographic areas and regulatory requirements.

In Romania, many of the fruit products are obtained in large commercial farms, but also in individual farms. Commercial farms have easier access to the market and are integrated on the chain. In individual farms, yields are reduced in quantity, and they do not have quality standards, but they contribute to supply the markets with natural products. Also, fruit from small farms is marketed indirectly, using intermediaries, which affects the entire sales process, with reference to producers' losses. Therefore, it is necessary to create a short food chain to capitalize on fruit production by eliminated intermediates.

Generally, Romanian fruit products are traded on traditional markets, with access being more difficult in shopping centres due to difficulties in production, technical endowment and management. To this the lack of collection centres, storages and fruit processing factories is added, all generated by the low investment level. This has an impact on the production cost of the fruit, in the sense of its increase, and thus on the increase of the imported quantities, because the selling price of the imported fruits, the traditional ones of the Romanian consumption, is lower compared to the one practiced by domestic producers.

In view of the above, it is necessary to reconsider the fruit sector, in order to support investment and to create a framework that integrates the producers into the economic circuit of the market. As a result, the possibility of developing an associative unit in fruits processing and trading under sub-programs for the financing of the fruit sector (National Rural Development Program 2014-2020) was created.

¹ Associate Professor, PhD. Dobre Iuliana, The Bucharest University of Economic Studies, Department of Agro-food and Environmental Economics, iulya_dobre@yahoo.com

MATERIAL AND METHODS

Fruit processing is necessary because of the high degree of perishability, which are subject to continuous degradation processes from the time of harvesting, and seasonality, by processing extending them on harvesting period. Also, the need to make an investment in fruit processing is based on consumers' demand for fruit juice, on one hand, and because of added value, on the another hand. Due to this, the investment refers to create an associative unit in apples and plums processing and trading.

The farmers, as members of associative units, are main suppliers of fruits. The objectives refer to setting up an apples processing to extend its life, mitigate the seasonality of the supply of this and obtain higher-value products demanded by consumers; setting up a local collection centre for the raw material supply of the processing apples and plums; providing temporary storage, sales, accounting and marketing of associative units members. Also, the objectives will take into consideration an investment regarding the purchase of land for the location of the factory; the purchase of machinery and equipment for apples and plums processing; the construction of the factory and the storage. The production program which contains the quantity on month and year is below (Table 1).

Table 1 Production structure

Product	VII	VIII	IX	X	XI	Total
Apple juice pieces.BaginBox3l/year)		55386.7	53600.0	110773.3	107200.0	326960
Plum marmalade (jars/year)	4081.6	4217.7	4081.6			12381

Source: author's calculations

Taking into account the annual yields of apple juice and plum marmalade and their technological recipe, the quantity of raw materials required for the production process is 1472756 kg of apples. The average yield on apple plantations is 10 t / ha, which means that the need for material resources can be ensured on an area of 147 ha. Therefore, it is recommended that the associative form be set up in a fruit-growing area, where the surfaces will be concentrated at the level of locality. Plum marmalade production implies a 6822 kg requirement. The average plum production is 7 t / ha, which means that plums can be grown on an area of 0.97 ha.

Table 2 Revenues from operational activity and investment (lei)

Specification	Year I	Year II	Year III	Year IV	Year V
Total revenues, of which:	5484103	4312385	4312385	4312385	4312385
Apple juice	4250480	4250480	4250480	4250480	4250480
Plum marmalade	61905	61905	61905	61905	61905
Investment financing	1171718				
- Loans	709440				
- Grant from (EFARD)	462278				

Source: author's calculations

In case of investment above, if the members of the cooperative do not have the necessary financial resources and can the sum not be accessed through the NRDP is resort to a bank credit. The eligible expenditures are 924556 lei, of which 50%, amounting to 462278 lei, represents non-reimbursable public aid. The total investment is 1171718 lei, which means that for the difference of 709440 lei a credit is obtained with an interest rate of 5.01%, for which a monthly rate of 5559 lei is paid. The total amount to be reimbursed is 1003098 lei, for a period of 180 months. The total incomes are represented in Table 2.

In the first year of operation of the associative unit, the total incomes are of 5484103 lei and comprise the operating income or the production activity and the financing of the investment from external sources. As a result, the incomes from financing of the associative activity account

21% of total incomes. In terms of total expenditure, these include production costs, depreciation, contracted loans and interest, investment costs (Table 3).

Table 3 Expenditure from operational activity (lei)

Specification	Year I	Year II	Year III	Year IV	Year V
Total expenditure, of which:	5343896	4172178	4172178	4172178	4172178
Materials	3842475	3842475	3842475	3842475	3842475
Salaries	174007	174007	174007	174007	174007
Depreciation	79387	79387	79387	79387	79387
Other expenditure	9600	9600	9600	9600	9600
Loans and interest	66708	66708	66708	66708	66708
Assets acquisition	1171718				

Source: author's calculations

As the cooperative applies to a loan, the volume of total expenditures increases as the economic unit only uses its own contribution and non-reimbursable funds. In the first year the increase is 66708 lei, which means approximately 1.2%. The total expenses are 5343896 lei for the first year and 4172178 lei for the 2nd, 3rd, 4th and 5th years. Total expenditures include materials, salaries, depreciation, loans and interest on credit. The volume of material expenses is 72% in the first year (including credit), and in the years 2,3,4,5 they are in equal proportions of 92%. The depreciation of the equipment for which the investment was made was calculated in equal shares, which means that it is annually 79387 lei, 1.4% in the first year and 1.9% in the years 2,3,4,5. The salary expenditures amounting to 174007 lei per year represent 3.2% of the total expenditures in the first year and 4.1% in the next years. The amount of contracted loans and related interest is 66708 lei per year, which represents 1.2% of the total expenditures in the first year and 1.5% in the next years. Other expenditures refer to marketing and accounting expenses, amounting to 9600 lei per year.

RESULTS AND DISCUSSIONS

As a result of the calculations, there are differences in cash availability. It was calculated as a result of the unit's incomes and expenses and shows briefly the economic and financial results during the period for which the investment was made (Table 4).

Table 4 Economical and financial results of the associative unit, lei

No.	Specification	Year I	Year II	Year III	Year IV	Year V
I	Total incomes, of which:	5484103	4312385	4312385	4312385	4312385
1	Apple juice	4250480	4250480	4250480	4250480	4250480
2	Plum marmalade	61905	61905	61905	61905	61905
3	Investment	1171718				
II	Total expenditures, of which:	5343896	4172178	4172178	4172178	4172178
1	materials	3842475	3842475	3842475	3842475	3842475
2	salary	174007	174007	174007	174007	174007
3	depreciation	79387	79387	79387	79387	79387
4	other	9600	9600	9600	9600	9600
5	loan and interest loans	66708	66708	66708	66708	66708
6	FEADR	1171718				
III	Results	140207	140207	140207	140207	140207

Source: author's calculations

The data shows the economic results of the associative unit. Total incomes are 4312385 lei, total expenditures, including loan and interest loan, are 4172178 lei, which means a gross result of

140207 lei. Thus, a return rate of 3.3% and a profit margin of 3.2% are recorded, which indicates that the business is profitable.

Investment efficiency indicators

At the basis of the calculation of investment indicators are data from table 5. It was considered that the effective operating time is the standard operating time of the machines equal to 10 years. Regarding the normal production capacity expressed in terms of value, it is reported by the annual income.

Table 5 Investments' indicators

No.	Indicators	Value lei
1	Investment (I_i)	1171718
2	The annual production capacity expressed in value (Q), of which:	4312385
2.1	Apple juice	4250480
2.2	Plum marmalade	61905
3	Annual expenditures (Ch)	4172178
4	Annual profit (P_a)	140207
5	Effective operating time (D_e), years	10

Source: author's calculations

Table 6 Final investment indicators

No.	Indicators	Value lei
1	Investment per product ($I_s = I_i/Q$, lei)	0.27
1.1	Apple juice	0.27
1.2	Plum marmalade	19.23
3	Profit to recover ($P_a = I_i$)	140207
4	Total profit ($P_t = P_a \cdot D_e$)	1402070
5	Final profit ($P_f = P_t - P_r$)	1261863
6	Economic return of investment ($R = P_f/I_i$) %	108
7	Period to recover investment I_i/P_a , years	8.35

Source: author's calculations

The results of investment are presented in table 6.

As a result of the calculations, it shows that at the total level the specific investment is 0.27 lei. It is noticed that the annual profit ensures recovery of the investment in 8.35 years. The activity is feasible because the economic return of the investment exceeds the value of the investment, so the total profit recorded over the entire period of use of the machines is higher than the investment by 8%.

CONCLUSIONS

The paper shown that market for fruit products have peculiarities, which gives it a special, structural and programmed character throughout the product line, including in the field of scientific research, professional training, and managerial consultancy. The specific behaviour of the fruit market is due to the existence of a large number of producers, the seasonality of the products (inducing changes in the consumption of the population), the economic power different from consumer buying, the zoning and the existence of a trading system (which generates a high level of self-consumption, mainly in rural areas). This adds imbalances, at producers' level, from fruit storage and sale activities during the agricultural year, with a negative impact on the market.

Also, fruit products are traded on traditional markets and the access is more difficult in commercial centre. It noticed that is the lack of collection centres, storages and fruit processing factories, all generated by the low investment level. From this point of view the paper presented a case study regarding investment into an associative unit in fruits processing field created through loan and FEADR supporting. The results showed a return rate of 3.3% and a profit margin of 3.2% and a period to recover investment of 8.35 year, which indicates that the business is profitable.

BIBLIOGRAPHY

1. Ion, R.A. (2016). *Models for short vegetables chain* In The Research Institute For Agriculture Economy And Rural Development *Agricultural Economics and Rural Development - Realities and perspectives for Romania* (pp. 397-402). Bucharest, Romania: Editura ASE.
2. Ion, R. A. (2005). *Performanța sistemului agroalimentar din România*. Bucharest, Romania: Editura CERES.
3. Istudor, N. (2000). *Modele de organizare a piețelor agroalimentare – pe exemplul legumelor și fructelor*. Bucharest, Romania: Editura Economică.
4. Manole, V., & Ion, R. A. (2006). *Coordination Models for Agro-food Chains. Economics of Agriculture. LIII/1, 63-71*.
5. Manole, V., Istudor, N., Boboc, D., & Ion, R. A. (2005). *Filiere agroalimentare*. Bucharest, Romania: Editura ASE.
6. National Program for Rural Development, 2016.
7. Project 16.1.2. – Models of developing short chains for production-services-storage-processing-market, financed by the Ministry of Agriculture and Rural Development of Romania, 2015.

RESEARCHES ABOUT THE SITUATION OF THE IMPORT AND EXPORT OF FRUITS IN ROMANIA IN THE PERIOD 2007-2016

MICU Marius Mihai¹, GIMBĂȘANU Gabriela Florentina², MICU Ana-Ruxandra³

Abstract: *Among the main factors that accentuate the decline of the fruit sector are the downward trend in the area of the fruit farms, their aggravated degree of aging, and the existence of many extensive farms. In addition, a generally valid problem at the agricultural level is the weak interest of young people in agricultural activities, as the National Rural Development Program 2014-2020 supports the measures created specifically for the fruit sector, but also to support farm holdings owned by young people.*

Keywords: *fruit, import, export*

Clasificare JEL: *Q17*

INTRODUCTION

The pedo-climatic conditions of Romania offer the possibility of cultivating many species of trees and shrubs, starting from the plain area, to areas with altitudes of about 1000 m. Nowadays, fruit consumption tends to ascend, in the context in which more and more health promotion is promoted, encouraging fruit and vegetable consumption, but still below the European average.

The situation of the fruit farms has suffered a drastic decrease, so that in the last 20 years Romania has become almost exclusively dependent on the fruits brought from the intra-Community and extra-community countries. At present, our country uses apples from Poland, Turkey pears, apricots and nectarines from Greece and Italy, mainly due to high production costs compared to low sales prices.

The ores that remained unsettled after the fall of communism and the restitution of land to the rightful owners are aging, morally exploited, and those who restituted them either did not invest in their maintenance or exploited them until exhaustion without any notable investment. It is thus that these orchards left in the cradle have become true outbreaks of infection for the rest of the orchards around them, and the burden of diseases and pests prevents other fruit growers from obtaining good quantitative and qualitative productions to compete in directly with imported fruit [1]. However, due to competition with products imported from other countries, fruit growers have begun to focus more and more on market niches, in the context in which the existing fruit farms in Romania, until now, mainly focused on plums and apple. At the same time, it should be mentioned that in the winter, exotic fruits, such as bananas or oranges, are highly consumed after by Romanian consumers.

MATERIALS AND METHODS

The research is based on the information obtained by analyzing the existing data on the area of the fruit plantations, the yields of the main fruit plantations, but especially the imports and exports both in terms of quantity and value which allow us to determine the evolution of the areas and productions in the period 2007-2016, in relation to the volume of imports and exports of fruits made in Romania. The information was collected from the INSSE and Trade Map databases and interpreted using the technical-economic analysis methods.

¹ MICU Marius Mihai, U.S.A.M.V. B., email: micumariusmihai@yahoo.com

² GIMBĂȘANU Gabriela Florentina, U.S.A.M.V.B., email: gimbasanugabriela@yahoo.com

³ MICU Ana-Ruxandra, U.S.A.M.V.B., email: micuanaruxandra@yahoo.com

RESULTS AND DISCUSSIONS

For the relevance of the study, we will analyze the evolution of the areas cultivated with fruit trees in the 8 development regions of Romania, the evolution of total fruit production (1990-2015), import, export and trade balance of fruits and nuts (2007-2016).

Analyzing the evolution of the area planted with fruit trees in Romania between 1990 and 2015, we notice that it fell by 40% in 2015 when about 138,000 hectares were cultivated compared to the area cultivated in 1990 when more than 230 thousand hectares have been grown (Table 1).

Table no. 1.

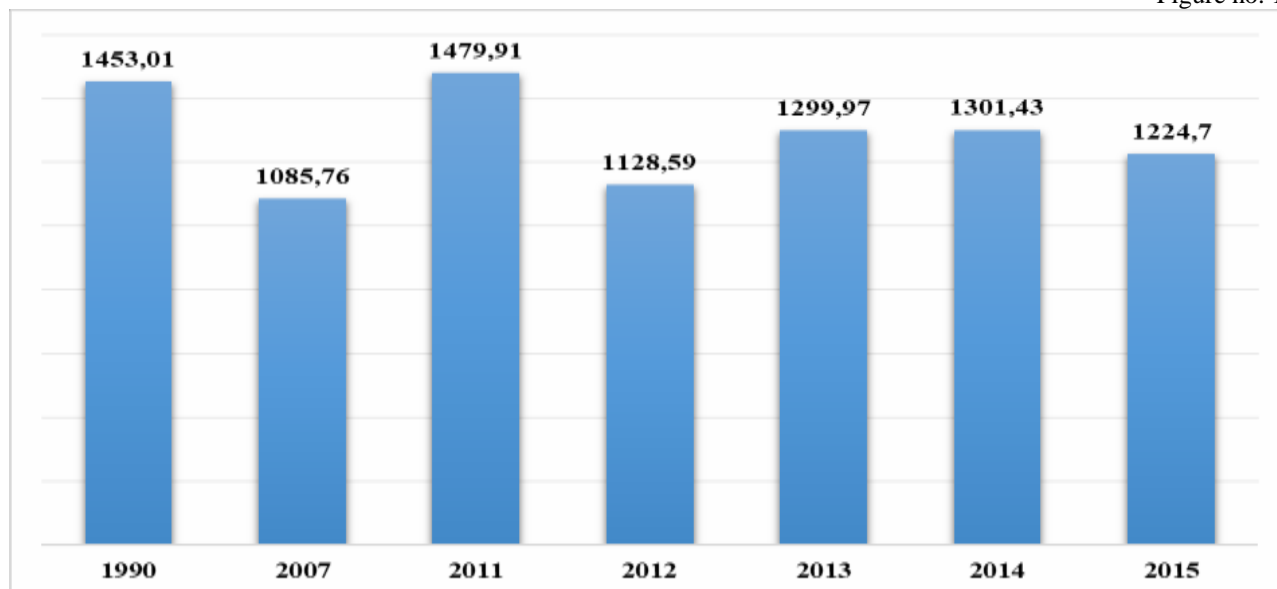
Evolution of the area planted with fruit trees in Romania during 1990 – 2015

Development regions	1990	2007	2011	2012	2013	2014	2015	2015/1990
	UM: Ha							%
TOTAL	230795	156002	140048	142242	147435	140820	138502	-40,0
Region NORD-VEST	40016	29620	23466	24696	26918	25895	25710	-35,8
Region CENTRU	14565	10078	9161	9381	10003	8940	8171	-43,9
Region NORD-EST	23163	16467	12949	13738	14475	13482	12750	-45,0
Region SUD-EST	22320	13038	14515	14292	14491	13910	13716	-38,5
Region SUD-MUNTENIA	54486	44532	41292	40895	42065	40353	40998	-25
Region BUCURESTI - ILFOV	2324	873	434	538	481	475	432	-81
Region SUD-VEST OLTENIA	48790	21884	26291	26151	27121	26049	25486	-48
Region VEST	25131	19510	11940	12551	11881	11716	11239	-55,3

Source: processed data INSSE, access 29.09.2017;

At the level of 2015, in the South-Muntenia region, the largest area with fruit trees of approximately 41,000 hectares was exploited, but still by 25% compared to the area cultivated in 1990. Also, the most pronounced decrease of the surface cultivated in the Bucharest Ilfov region where, if in 1990, an area of over 2300 hectares is exploited, in 2015 it reached only 432 hectares, this decrease being determined by the real estate flow recorded by this region, especially in the last 15 years (Table no.1).

Figure no. 1.

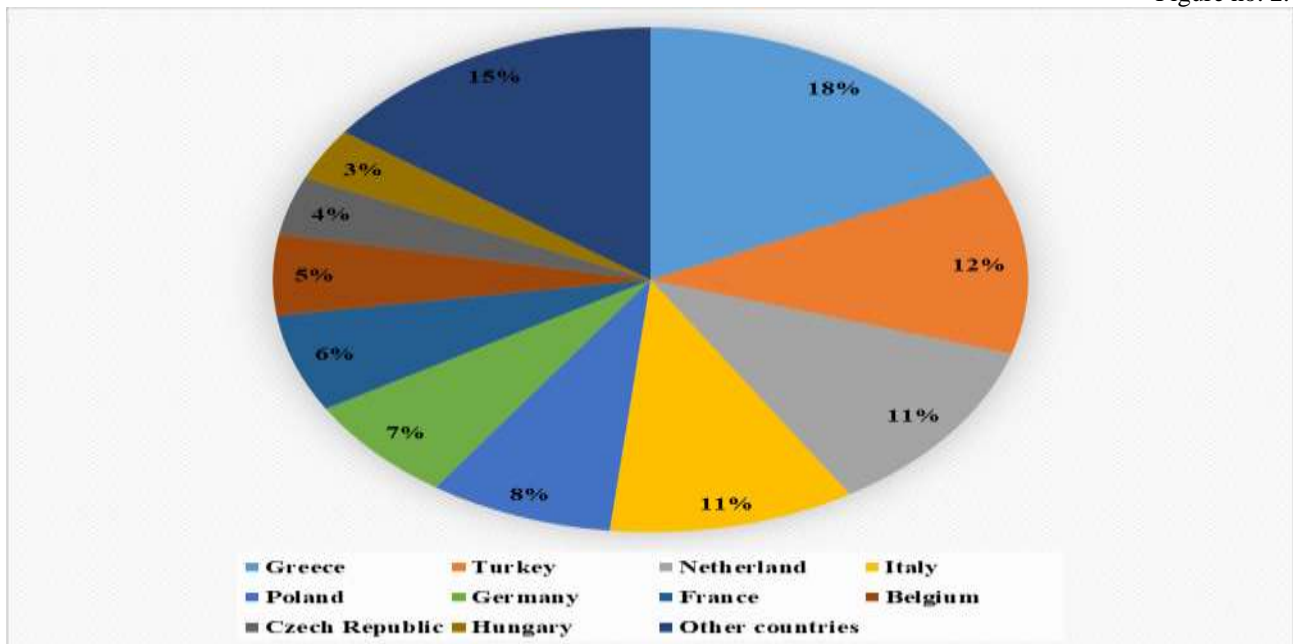


Source: processed data INSSE, access 29.09.2017;

The evolution of the total fruit production obtained in Romania between 1990 and 2015 (thousand tons)

Depending on the cultivated area (decreasing) and the aging of already existing and irreplaceable farms, there is also a decrease in fruit production, so that if in 1990 it was over 1.4 million tonnes in 2015 the production was 1.2 million tons, representing a decrease of 15.7% (Figure no.1).

Figure no. 2.



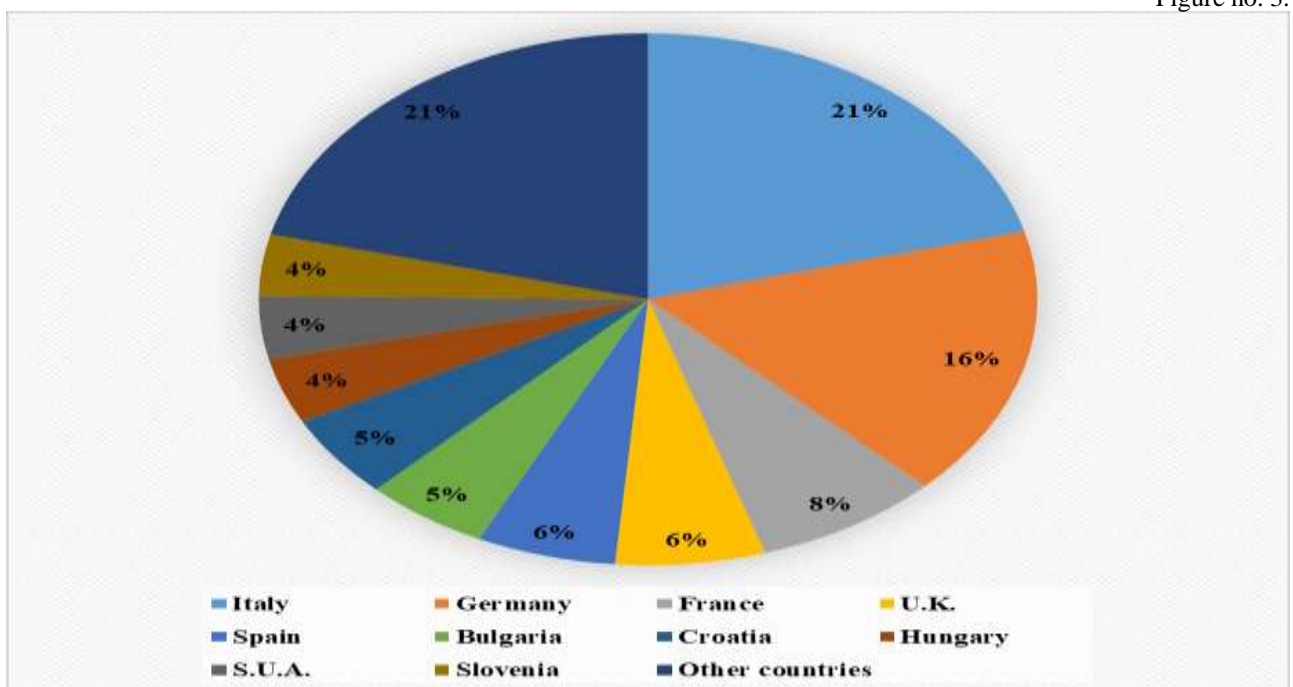
Source: processed data comtrade.un.org, access 27.09.2017;

Percentage distribution of fresh vegetables (value) exports in 2016

It is noteworthy that the evolution of the fruit imports has been on the rise since 2011, so that in the year 2016 in 2007 there is an increase of the import value by over 133%, taking into account the fact that in 2007 they reached a value of 241 million euros, while in 2016 they reached no less than 562 million euros (Figure no. 2).

In the year 2016, among the main countries from which Romania has imported fruits, Greece has an import value of over 120 million euros, up 172% compared to imports in 2007, followed by Turkey with 65.1 million of the euro, up 60% compared to 2007, as well as the Netherlands with imports of EUR 64 million (up 407% over 2007) (Figure no. 2).

Figure no. 3.



Source: processed data comtrade.un.org, access 27.09.2017;

Percentage distribution of fresh vegetable (value) imports in 2016

Concerning the export of fruit and nuts, there is an oscillating trend, so that in 2016 there was an export value of 52.7 million euro, 37.6% more than the value of exports at the year 2007, when they amounted to more than EUR 38.3 million (Figure no. 3).

At the level of 2016, among the main countries to which Romania exported fruit, there is Italy, which imported EUR 11 million (up 121% from the value imported in 2007), followed by Germany with 8, EUR 7 million (up 23% on value imported in 2007), but also France with a value of EUR 4 million in fruit imports (up by more than 1000% compared to value imported in 2007) (Figure no. 3.).

Table no. 2.

Evolution of the trade balance with fruit and nuts in Romania during 2007 – 2016

Country	2007	2011	2012	2013	2014	2015	2016	2016/2007
	U.M: Mii Euro							%
Total	-202715	-113684	-159828	-214007	-247548	-395081	-510109	151,6
Italy	-21842	-13647	-29012	-21648	-23851	-41457	-48498	122,0
Germany	-1842	4179	-5304	-3307	-2887	-15669	-29707	1512,8
France	-244	911	-11598	-19956	-24360	-25513	-31180	12678,7
UK	-83	-135	-806	376	2133	985	2881	-3571,1
Spain	-6313	-3553	-4733	-2740	-3711	-11900	-13870	119,7
Bulgaria	-630	4278	1896	-2068	-5657	-8246	-4861	671,6
Croatia	1881	3458	4449	4477	3263	3514	2433	29,3
Hungary	-1258	-1217	-1972	-1887	-6951	-13400	-16611	1220,4
United States of America	-697	-792	285	-74	-202	-614	-896	28,6
Slovenia	765	-1198	264	-1095	546	-895	-2997	-491,8

Source: processed data comtrade.un.org, access 27.09.2017;

Concerning the trade balance, it presents a year-on-year deficit, so that the deficit in 2016 was 510 million, up 151% over the deficit in 2007 when it reached the value of EUR 202 million (Table no. 2).

However, at the level of 2016, Romania was among the largest trade deficits in the fruit category with countries like Italy (over EUR 48.4 million or France with over 31.1 million euro (Table no. 2.).

CONCLUSIONS AND RECOMMENDATIONS

Due to the scarcely underused areas of fruit trees, the practice of the extensive system, as well as the aging degree of a significant part of the fruit farms, prevent significant production to cover the fruit requirements in Romania, referring to the products that can be obtained in our country taking into account the specific pedoclimatic conditions.

Accessing European funds to develop new orchards or replacing aged farms can be a solution that Romanian fruit producers (Sub-measure 4.1a - Investments in fruit holdings) still have, but the many problems related to bureaucracy or sources of co-financing prevents them from accessing these funds from the EU budget. Small and medium sized farms can access up to 900,000 euros if, through the investments, they will lead to an integrated food chain formed at the level of the holding, consisting of production, processing, marketing).

These funds can also be accessed in order to create storage, conditioning and processing facilities for fruits, a measure dedicated to this fruit sector (Sub-measure 4.2a - Investments in the processing / marketing of fruit-growing products), where the holdings small and medium sizes, can access up to EUR 1.1 million, where investments lead to an integrated food chain consisting of collection, storage, conditioning, processing and marketing.

Both sub-measure 4.1a - Investments in fruit holdings and sub-measure - 4.2a - Investments in the processing / marketing of products from the fruit sector are supported in particular by the associative forms, with additional scoring within the criteria selection.

At the same time, a major problem for agriculture is, in general, the weak interest of young people in agriculture, although measure 6.1 - Support for the installation of young farmers, through

which they can receive up to 50,000 Euros, can be accessed the development of the agricultural holding (including fruit trees) and for which they do not need co-financing.

BIBLIOGRAPHY

1. Micu Marius Mihai, 2014, Research on the association of agricultural producers in the context of sustainable fruit growing;
2. ***INS, Data accessed 29 Sept. 2017;
3. ***Trademap, Data accessed 29 Sept. 2017
4. ***www.afir.ro

THE SITUATION OF THE IMPORT AND EXPORT OF VEGETABLES IN ROMANIA IN THE PERIOD 2007-2016

MICU Marius Mihai¹, MICU Ana-Ruxandra², PETRE Ionuț Daniel³

Abstract: *The state of import and export of fresh vegetables in Romania presents major imbalances, which tend to increase from year to year. Even if it is a vegetable-growing country, Romania imports fresh vegetables from countries like Turkey, the Netherlands or Italy, countries with a tradition of growing vegetables and significant areas of protected areas, benefiting from the benefits of this way of cultivating vegetables. In the present paper, using the technical-economic method of the comparison, based on the statistical data, an analysis was made of the areas cultivated with vegetables in the 8 regions of Romania, according to the main crop systems, the production made, as well as the quantities imported and exported.*

Keywords: *vegetables, import, export*

Clasificare JEL: *Q17*

INTRODUCTION

Vegetables are of particular importance in eating, so they have a positive influence on human health. At the same time, vegetables contribute to ensuring daily nutritional needs through the intake of minerals, salts, vitamins and other substances that vegetables contain.

Cultivation of vegetables can be done both in the field and especially in protected areas that allow for better production, both in terms of quantity and quality, as well as allowing them to be marketed during the pre-season.

The production of vegetables has a huge advantage, as Romania has a great market and a well-established tradition in the field of vegetable-growing research and development through assortment of varieties adapted to the pedoclimatic conditions in Romania.

In Romania, over time, cultivation of vegetables has been a tradition, especially in rural areas, being interrupted by nationalization and collectivization in the communist era. After this period, all the negative effects have been restricted, including on the vegetable sector, which led to retrocessions or destruction of existing greenhouses at that time, where the sector currently has numerous deficiencies.

MATERIALS AND METHODS

The research is based on information obtained by analyzing the existing statistical data on the area cultivated with vegetables, the production system, the yields of the main vegetable crops, but especially the imports and exports both in terms of quantity and value, which allow us determining the evolution of the areas and productions in the period 2007-2016, in relation to the volume of imports and exports made in Romania. The information was collected from the INSSE and Trade Map databases and interpreted using the technical-economic analysis methods.

RESULTS AND DISCUSSIONS

In Romania, at the level of 2015, an area of over 236 thousand hectares was cultivated, down 7% compared to the period cultivated in 2007, when it exceeded the area of 253 thousand hectares. Also, the area cultivated with field vegetables decreased by 12.4% in 2015 (when 137 thousand hectares were cultivated) compared to 2007 when more than 156 thousand hectares were cultivated.

¹ MICU Marius Mihai, U.S.A.M.V.B., email: micumariusmihai@yahoo.com

² MICU Ana-Ruxandra, U.S.A.M.V.B., email: micuanaruxandra@yahoo.com

³ PETRE Ionuț Daniel, U.S.A.M.V.B., email: ptr_ionutdaniel@yahoo.co.uk

At the level of 2015, the region where the largest vegetable area was cultivated was the South-Muntenia region, where over 45,000 hectares were grown with. (Table no. 1).

Table no. 1.

Area cultivated with vegetables according to the cultivation method, by regions in 2007-2015

Main cultures	Regions	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015/2007
		UM: thousands Ha									
Vegetables - total	TOTAL	253	269	267	263	263	259	259	239	236	-7.0
	Region NORD-VEST	29	26	27	24	23	22	24	23	22	-23.3
	Region CENTRU	18	18	19	17	18	17	19	18	20	11.7
	Region NORD-EST	44	48	47	45	47	45	46	43	44	0.6
	Region SUD-EST	42	42	44	44	43	43	43	36	36	-15.4
	Region SUD-MUNTENIA	46	51	50	51	51	50	48	46	45	-1.2
	Region BUCURESTI - ILFOV	5	5	6	5	6	6	6	5	5	6.3
	Region SUD-VEST OLTENIA	40	44	45	47	45	45	40	38	37	-7.2
	Region VEST	30	34	31	29	31	30	33	30	26	-12.4
Vegetables grown in the field	TOTAL	156	167	166	159	161	158	154	137	137	-12.2
	Region NORD-VEST	16	14	15	12	13	13	12	12	11	-29.3
	Region CENTRU	10	9	10	9	9	9	10	9	12	14.8
	Region NORD-EST	27	30	28	27	27	27	27	24	25	-5.8
	Region SUD-EST	29	29	31	31	30	29	29	23	23	-22.1
	Region SUD-MUNTENIA	25	30	28	27	27	26	25	23	23	-7.3
	Region BUCURESTI - ILFOV	3	3	3	3	4	3	3	3	3	5.6
	Region SUD-VEST OLTENIA	27	29	30	32	32	32	27	25	25	-7.5
	Region VEST	19	23	19	18	19	18	19	17	15	-21.4
Vegetables in solariums and greenhouses	TOTAL	2	2	2	3	4	3	3	4	4	84.8
	Region NORD-VEST	0	0	0	0	0	0	0	0	0	888.2
	Region CENTRU	0	0	0	0	0	0	0	0	0	-5.9
	Region NORD-EST	0	0	0	0	0	0	0	0	0	-70.4
	Region SUD-EST	1	1	1	1	1	1	1	2	2	169.1
	Region SUD-MUNTENIA	0	1	1	1	1	1	1	1	1	82.3
	Region BUCURESTI - ILFOV	0	0	0	0	0	0	0	0	0	-0.8
	Region SUD-VEST OLTENIA	0	0	0	0	0	0	0	1	1	145.3
	Region VEST	0	0	0	0	0	0	0	0	0	260.0
Fresh vegetables from family gardens	TOTAL	83	89	89	92	90	88	93	90	86	4.1
	Region NORD-VEST	12	11	11	11	9	9	11	11	10	-15.8
	Region CENTRU	8	9	9	9	8	8	8	8	8	9.5
	Region NORD-EST	14	16	16	16	17	17	17	17	17	20.1
	Region SUD-EST	12	12	12	12	12	12	12	11	11	-1.7
	Region SUD-MUNTENIA	15	16	16	19	18	18	17	16	16	8.9
	Region BUCURESTI - ILFOV	1	2	2	2	2	2	2	2	2	36.9
	Region SUD-VEST OLTENIA	12	14	14	13	12	12	12	11	11	-7.7
	Region VEST	10	10	10	10	11	11	13	13	11	10.4

Source: processed data INSSE, access 29.09.2017;

Analyzing the area cultivated with vegetables in protected areas, the most pronounced increase is observed, so that if in 2007 the area cultivated with vegetables in the solariums and greenhouses was about 2000 hectares, in 2015 the cultivated area exceeded 4000 hectares, registering - an increase of 84.8% (Table no. 1).

Table no. 2.

Area cultivated with the main vegetable crops by region in 2007-2015

Main cultures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015/2007
	U.M: thousands Ha									%
Potatoes	268.1	255.3	255.2	241.3	242.6	223.5	203.4	198.5	185.9	-30.7
Tomatoes	46.0	51.5	49.1	49.8	51.8	49.7	48.4	43.9	43.7	-5.0
Eggplants	5.5	10.5	10.0	10.3	10.0	9.6	9.4	9.2	9.1	65.6
Dry onions	34.1	35.0	35.2	33.8	33.1	33.1	32.2	30.3	30.6	-10.2
White cabbage	46.1	49.0	48.3	47.0	47.0	49.1	54.9	47.8	47.9	3.8
Pepper	18.6	20.2	20.0	21.0	20.0	19.9	19.5	18.2	18.2	-2.5

Source: processed data INSSE, access 29.09.2017;

For the main vegetables grown in our country, in terms of the potato area, in the year 2015 it was 185.9 thousand hectares, decreasing by 30.7% compared to the area cultivated in 2007, ie 268.1 thousand of hectares. In other words, during the period 2007-2015 there is a descending trend of the potato area (Table no.2).

However, it is noted that the area planted with eggplant in 2015 was 9.1 thousand hectares, up 65.6% compared to the area cultivated in 2007 when it was 5.5 thousand hectares (Table 2.).

Table no. 3.

The production of the main vegetable crops during 2007 – 2015

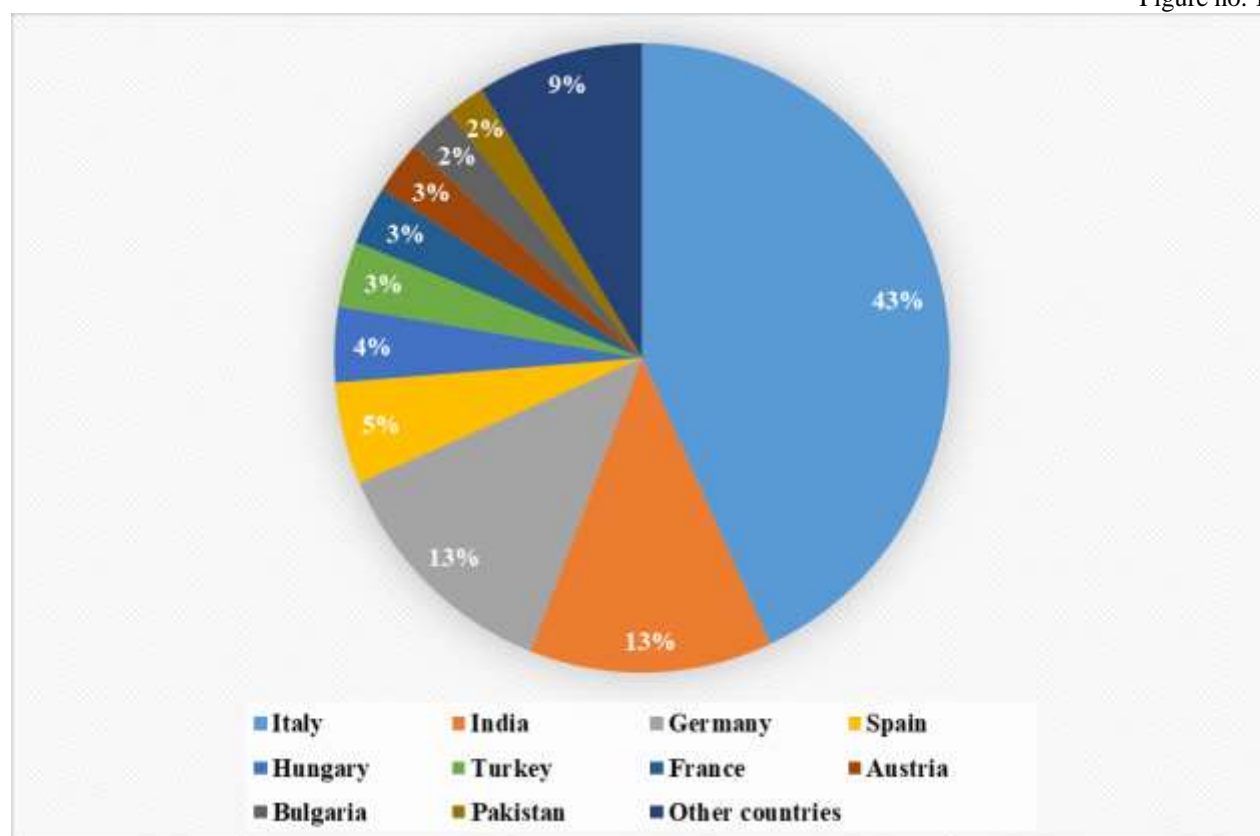
Main cultures	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015/2007
	UM: thousands of tons									%
Potatoes	3712.4	3649.0	4004.0	3283.9	4076.6	2465.2	3289.7	3519.3	2625.0	-29.3
Tomatoes	640.8	814.4	755.6	768.5	911.0	683.3	749.1	706.2	695.2	8.5
Eggplants	63.7	153.7	168.6	144.4	160.0	126.0	123.3	127.6	126.8	98.9
Dry onions	325.0	395.6	378.1	369.1	394.3	345.3	391.8	387.0	353.6	8.8
White cabbage	893.2	964.6	1001.9	981.2	1025.3	987.9	1156.4	1123.1	1066.3	19.4
Pepper	184.9	238.7	245.7	243.5	253.5	207.1	227.7	228.6	222.4	20.3

Source: processed data INSSE, access 29.09.2017;

Corresponding to the potato area, in 2015 there is a decrease of 29.3% compared to 2007, so that if in 2015 the production was 2625 thousand tons in 2007, it was over 3712 thousand tons (Table no. 3).

Also, in the case of eggplant production there is an increase of over 98%, so that if in 2007 the production was 63.7 thousand tons, in 2015 the registered production was about 127 thousand tons (Table no. 3).

Figure no. 1.



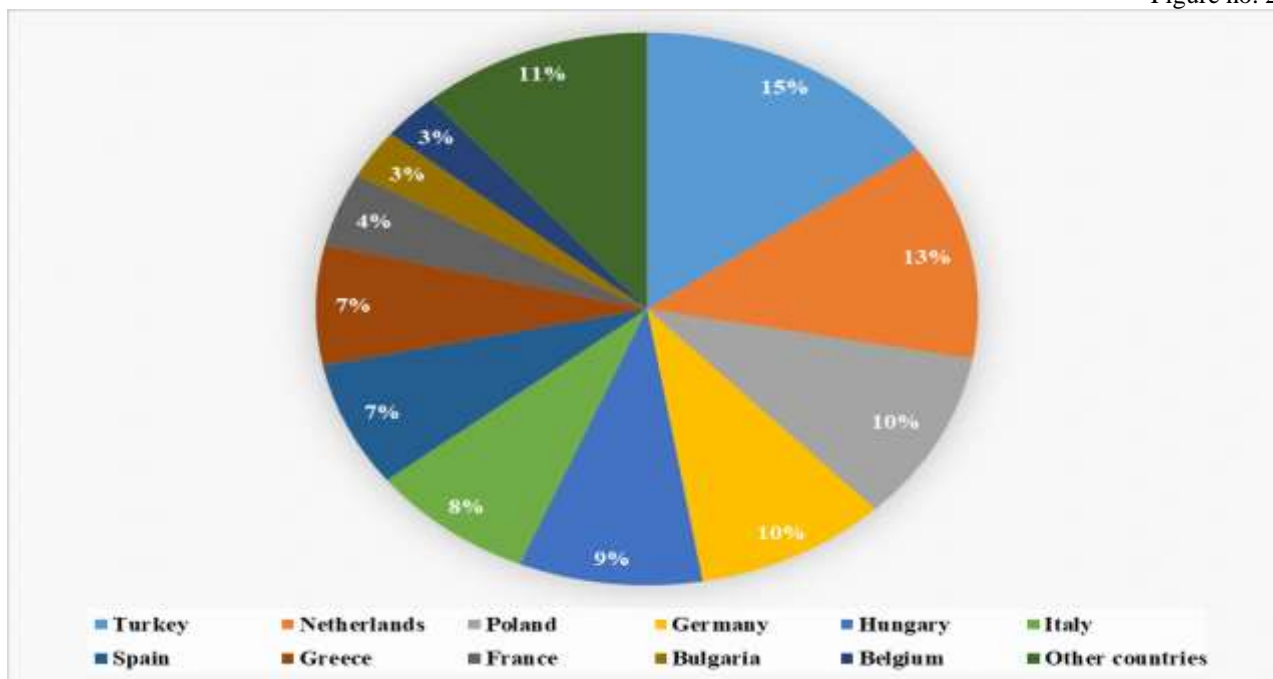
Source: processed data INSSE, access 29.09.2017;

Percentage distribution of fresh vegetables (value) exports in 2016

At the level of 2016, Romania exported vegetables worth 86.7 million euros, up 103.8% compared to value exports registered in 2007 when it was only 42.5 million euro (Figure no. 1).

Thus, in 2016 the representative countries to which Romania exported fresh vegetables include Italy with 37.4 million euros (an increase of 23.4% compared to 2007), India which entered directly the second place in the list of countries importing vegetables from Romania with about 11 million euros, as well as Germany with a value of imports of vegetables in Romania worth 10.9 million euros (Figure 1).

Figure no. 2.



Source: processed data INSSE, access 29.09.2017;

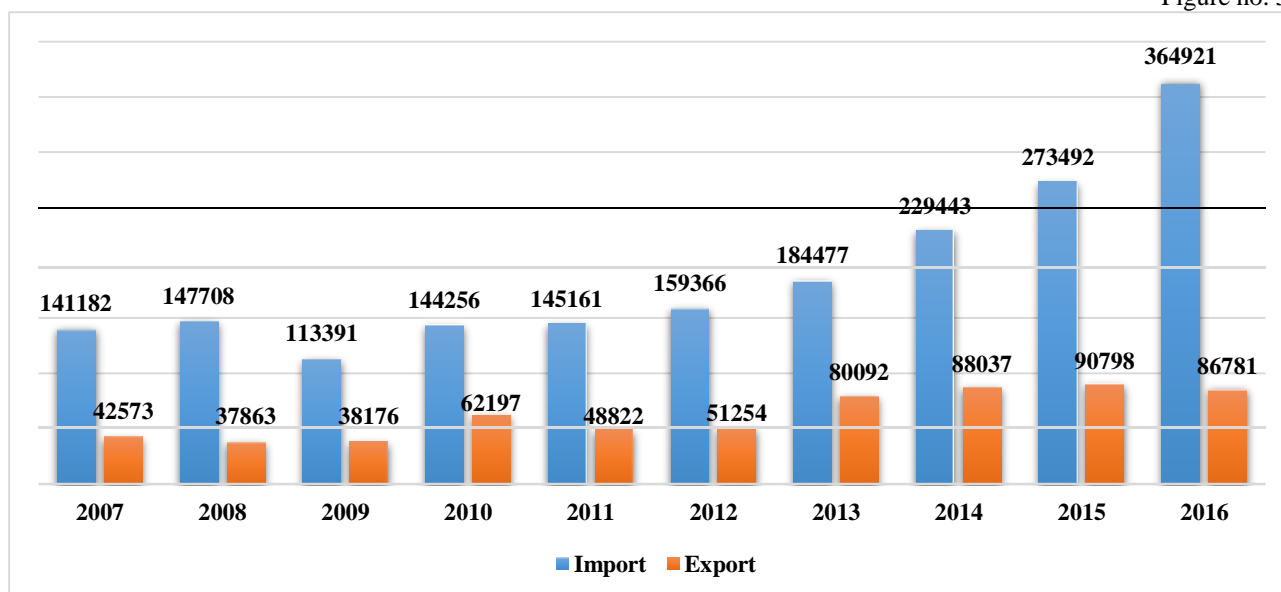
Percentage distribution of fresh vegetable (value) imports in 2016

Even if, as we have seen above, vegetable production in Romania is well developed, even if the specific measures for domestic production are applied at European and national level, it is still not possible to reduce the quantity of imported vegetables.

The value of vegetable imports in 2016 was more than 4 times higher than that of fresh vegetable exports, with a value of approximately 365 million euro, 158% higher than the value of imports in 2007, when totaled not less than 141 million euros (Figure no. 2).

However, the main country from which Romania imports fresh vegetables at the level of 2016 is Turkey, with import values of over 55.4 million euro (19.6% higher than the value of the imports made in year 2007). The podium is complemented by the Netherlands with imports totaling more than € 46.2 million (up 291% over 2007) and Poland with over € 36.5 million (up 320% over 2007) (Figure no. 2).

Figure no. 3.



Source: processed data INSSE, access 29.09.2017;

The evolution of the trade balance of fresh vegetables between 2007 and 2016

Trade balance has an imbalanced situation with regard to the import and export of fresh vegetables, so that if in 2016 the value of the imports stood at EUR 364.9 million while the export value was only 86.7 million Of euro. Since 2007, the very large difference in value of imports and exports of fresh vegetables is maintained during the analyzed period, Romania being dependent on these imports of fresh vegetables (Figure no. 3).

CONCLUSIONS AND RECOMMENDATIONS

It is noted that the area cultivated with vegetables has decreased sharply, except for the vegetables that have been grown in protected areas, which can not contribute to covering the fresh vegetables needs, which is why Romania has to import impressive amounts of vegetables from countries such as Turkey, Italy or the Netherlands, benefiting on the one hand from the pedoclimatic conditions, but above all the important areas of greenhouses where vegetables are grown, allowing them to obtain both superior and qualitative production, but above all that they offer the possibility of producing vegetables during the pre-season period.

The selling price of vegetables, influenced among other things by the production obtained, as well as by the different country-to-country financial aids, according to their objectives, succeeds in making serious competition for indigenous products where the main criterion for the selection of the Romanian consumer, is the 'marketing price' of the product.

Although the value of exports increased in 2016 as compared to 2007, the value of exports is well below the value of imports, so if Romania manages to export quantities of vegetables during the season, during the pre-season the quantities imported by Romania are impressive, cumulating in 2016, not less than EUR 364 million, which is more than 4 times higher than exports, so the development of protected area cultivation systems is an absolutely necessary measure to reduce dependence on imports.

If for some vegetables the level of imports is so high due to the drought and the relatively low production reported by the Romanian farmers, the overall situation remains alarming. Romania imports more vegetables a year, while domestic production either exports (a small part) or is sold at very low prices to agricultural intermediaries.

The measures taken by the Ministry of Agriculture to help tomato growers financially support the cultivation of these plants in order to prolong the tomato season so as to be as little dependent on tomatoes (originally) imported from Turkey, Italy, the Netherlands, seems to be a measure that could help Romania's trade balance for the beginning.

BIBLIOGRAPHY

1. Berevoianu Rozi, colab., Conventional and Organic Agriculture in Vegetable, Floriculture and Medicinal Plants - Conceptual Approaches, Publisher ASE, Bucharest, 2015;
2. Berevoianu Rozi, colab., Technical and Economic Guide - Vegetable Production, prognoses 2017-2018, Publisher ASE, Bucharest, 2017;
3. ***INS, Data accessed 29 Sept. 2017;
4. ***Trademap, Data accessed 29 Sept. 2017