

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

## Proceedings

Agrarian Economy and Rural Development - Realities and Perspectives  
for Romania. 5th Edition of the International Symposium, November  
2014, Bucharest, Romania

## 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.) (2014) : Agrarian Economy and Rural Development - Realities and Perspectives for Romania.  
5th Edition of the International Symposium, November 2014, Bucharest, Romania, The Research  
Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest

This Version is available at:

<https://hdl.handle.net/10419/111657>

### 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 5<sup>th</sup> Edition  
November 2014

**5<sup>th</sup> 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 2014  
Bucharest**

**Copyright @ 2014**, 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**

**5<sup>th</sup> Edition of the International Symposium**

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

**in collaboration with**

**THE INSTITUTE FOR AGRARIAN ECONOMY  
Belgrade, Serbia**

**THE INSTITUTE FOR ECONOMY, FINANCE AND STATISTICS  
Chisinau, Republic of Moldova**

**THE UNIVERSITY OF AGRARIAN SCIENCES  
AND VETERINARY MEDICINE  
The Faculty of Management, Economic Engineering in Agriculture  
and Rural Development, Bucharest, Romania**

**THE BUCHAREST ACADEMY OF ECONOMIC STUDIES  
The Faculty of Agro-food and Environment Economy, Bucharest,  
Romania**



**under the patronage of**

**THE ACADEMY OF AGRICULTURAL  
AND FORESTRY SCIENCES "Gheorghe Ionescu Șișești"**

## SCIENTIFIC COMMITTEE

**ALECU IOAN NICOLAE**, *President of Section “Agrarian Economy and Rural Development” - Academy of Agricultural and Forestry Sciences “Gheorghe Ionescu Şişeşti” - Bucharest, Romania*

**CVIJANOVIC DRAGO**, *Prof., PhD, Director of Institute of Agrarian Economy, Belgrade, Serbia*

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

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

**EFTIMIE MARIANA**, *Prof., PhD, Dean of Faculty of Economic Sciences, University “Petrol-Gaze”, Ploiesti, Romania*

**FÎNTÎNERU GINA**, *Prof., PhD, Pro-rector of University of Agronomic Sciences and Veterinary Medicine, Bucharest, Romania*

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

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

**ISTUDOR NICOLAE**, *Prof., PhD, Pro-rector of the Bucharest Academy of Economic Studies, Bucharest, Romania*

**LĂPUŞ AN ALEXANDRU**, *Prof., PhD, Director of the Research Institute for Agriculture Economy and Rural Development, Bucharest, Romania*

**MERCE EMILIAN**, *Prof., PhD, University of Agronomic Sciences and Veterinary Medicine, Cluj Napoca, Romania*

**MOROZ VICTOR**, *Dr., Head of „Food Economy and Rural Development” Section, Institute of Economy, Finance and Statistics, Chişinău, Republic of Moldavia*

**NICOLESCU MIHAI**, *Prof., PhD, Vice President of Academy of Agricultural and Forestry Sciences “Gheorghe Ionescu Şişeşti”, Bucharest, Romania*

**SIN GHEORGHE**, *Prof., PhD, President of Academy of Agricultural and Forestry Sciences “Gheorghe Ionescu Şişeşti”, Bucharest, Romania*

**STRATAN ALEXANDRU**, *Prof., PhD, Director of The Institute of Economy, Finance and Statistics, Chişinău, Republic of Moldavia*

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

**TABARĂ VALERIU**, *Prof., PhD, Vice President of Academy of Agricultural and Forestry Sciences “Gheorghe Ionescu Şişeşti”, Bucharest, Romania*

**TUDOR VALENTINA**, *Prof., PhD, The Faculty of Management, Economic Engineering in Agriculture and Rural Development, Bucharest, Romania*

**URSU ANA** *PhD, Researcher gr. II, Scientific Secretary of the Research Institute for Agriculture Economy and Rural Development, Bucharest, Romania*

## CONTENTS

<b>SECTION 1 - THE CONCEPTS, EVALUATION AND STRATEGIC DIRECTIONS IN RURAL AND AGRI-FOOD ECONOMY.....</b>	<b>1</b>
<b>Emilian MERCE, Cristian Călin MERCE, Iulia MUREȘAN, “Comparative study regarding the edilitar fund in romanian village between the interwar period and communist period”.....</b>	<b>2</b>
<b>Talida GIAMBAȘU, Ioan Nicolae ALECU, “Conceptual approaches of the rural space”.....</b>	<b>8</b>
<b>Lenuța COSTIN, “Impact of the national economy restructuring on the rural development”....</b>	<b>13</b>
<b>Sorinel Ionel BUCUR, Elena Carmen BUCUR, “Influence factors of economic growth in the romanian agrofood sector”.....</b>	<b>20</b>
<b>Alexandru LĂPUȘAN, “Innovative model of cooperation for small agricultural producers”....</b>	<b>25</b>
<b>Mircea TOMA, “The value added tax. The impact of procedures applied to agricultural producers (reverse charge, quota reducing and the exemption from vat). Case study: wheat, flour, bread and bakery products”.....</b>	<b>36</b>
<b>Ioan Nicolae ALECU, Felix-Dimitrie CIOCAN, Horia Nicolae CIOCAN, “Amicable settlement of conflicts between agri-food producers and consumers”.....</b>	<b>49</b>
<b>Alexandru STRATAN, Victor MOROZ, Anatol IGNAT, “Modernization of the agri-food sector of the Republic of Moldova in the context of international trade development”...</b>	<b>55</b>
<b>Boris GAINA, Galina COBIRMAN, Xenia PASCARI, “Economy of Moldavian wine complex in context of European Union integration”.....</b>	<b>61</b>
<b>Tamara LEAH, “Response policies and strategies for intensification processes of land degradation and desertification in the Republic of Moldova”.....</b>	<b>64</b>
<b>Aurel LUP, Liliana MIRON, “Fighting against drought in Dobrogea by protective forest belts”.....</b>	<b>69</b>

<b>Ancuța MARIN</b> , “ <i>Education and specialized training - ways to increase performance in agriculture</i> ” .....	74
<b>Predrag VUKOVIC, Jonel SUBIC, Drago CVIJANOVIC</b> , “ <i>Importance of education and training local population in process of development rural tourism in Serbia</i> ” .....	79
<b>SECTION 2 - ECONOMICS, MANAGEMENT AND MARKETING IN AGRICULTURE</b>	85
<b>Camelia GAVRILESCU</b> , “ <i>Agricultural commodities and processed products ratio in the Romanian international agrifood trade</i> ” .....	86
<b>Dan-Marius VOICILAȘ</b> , “ <i>Cereal market in Romania-regional competitiveness</i> ” .....	94
<b>Mariana GRODEA</b> , “ <i>The romanian trade with dairy products – the need to increase the export potential</i> ” .....	104
<b>Alain POULARD, Xenia PASCARI, Boris GAINA</b> , “ <i>Influence of non-saccharomyces yeasts on white dry wines</i> ” .....	111
<b>Lidia IURCHEVICI, Rodica CHETROIU</b> , “ <i>The importance of traceability in certification the quality of animal products</i> ” .....	115
<b>Ancuța MARIN</b> , “ <i>Risk analysis in the critical pigmeat control points</i> ” .....	119
<b>Georgiana ROTARU, Mariana NĂSTASE</b> , “ <i>Analysis of sunflower production, at macro and microeconomic level. Case study</i> ” .....	127
<b>Georgiana CRUDU, Mohamed Dhary Yousif EL-JUBOURI, Raluca NECULA</b> “ <i>The maize crop technology characterized by its main indicators at the country level and in Călărași county</i> ” .....	133
<b>Ion BOZGĂ, Olimpia PANDIA, Ion SĂRĂCIN</b> , “ <i>Physiological proprieties from corn influenced by the differentiate application of nitrogen and phosphorus</i> ” .....	141
<b>Ion BOZGĂ, Olimpia PANDIA, Ion SĂRĂCIN</b> , “ <i>The corelation between the doses of nitrogen and phosphorus appliend on the non irrigated system and physiological processes of the crop hybrid Champion – year 2012</i> ” .....	146

<b>Mihaela Cristina VLAD, Rozi Liliana BEREVOIANU, “Assessment of public good energy environment - Soy”</b> .....	152
<b>Diana Maria NECULA, “Economic efficiency in protected vegetable cultivation”</b> .....	156
<b>Mihaela Cristina VLAD, “Use planning analysis on agricultural holdings according to their physical size. Case studies”</b> .....	163
<b>Rozi Liliana BEREVOIANU, “Computer model for agricultural holdings- useful tool in the evaluation and implementation of a high performance management”</b> .....	169
<b>Petruța TUREK- RAHOVEANU, “Technical-economic analysis of a family farm Case study – Gheraseni Parish, Buzau county”</b> .....	173
<b>Gheorghe Adrian ZUGRAVU, Maria Magdalena TUREK RAHOVEANU, Liliana Mihaela MOGA, Mihaela NECULITA, “The price trend and their impact on profit margin and safety of the protein for feed in Romania”</b> .....	178
<b>Elisabeta ROSU, “Environmental management in Natura 2000 Sites Case study: Braila county”</b> .....	185
<b>Irina SENICOVSCAIA, “Soil biota as a natural resource for the restoration of degraded chernozems”</b> .....	190
<b>Anda-Irina ANGELESCU, Ioan Nicolae ALECU, Adriana BADEA, “Organic farming, a viable and feasible component of the romanian agriculture”</b> .....	194
<b>Olimpia PANDIA, Ion SĂRĂCIN, Ion BOZGĂ, “The ecological control of pests at cabbage using <i>Artistolochia Clematitis</i> plants from spontaneous flora”</b> .....	202
<b>Victor OLTEANU, “Green energy”</b> .....	207
<b>Petruța TUREK- RAHOVEANU, “The impact of the solar energy collecting systems on an individual agricultural household”</b> .....	213

<b>SECTION 3 - RURAL DEVELOPMENT AND AGRICULTURAL POLICY.....</b>	<b>217</b>
<b>Ioan Nicolae ALECU, Felix-Dimitrie CIOCAN, Adriana BADEA, Horia Nicolae CIOCAN,</b> <i>“The right of foreigners to purchase agricultural lands in Romania. Cross-border conflict mediation”</i> .....	218
<b>Mihaela Cristina VLAD,</b> <i>“Subsistence and semi subsistence agriculture in Romania”</i> .....	223
<b>Darius STAN,</b> <i>“Study on the importance of credit as financial leverage in agricultural development”</i> .....	231
<b>Florentin BERCU,</b> <i>“Evolution of agricultural cooperatives in Romania in 2014”</i> .....	236
<b>Darius STAN,</b> <i>“Business environment analysis of Romania”</i> .....	242
<b>Rozi Liliana BEREVOIANU,</b> <i>“Computer model for evaluating performance and economic risk at the level of farms of different sizes”</i> .....	247
<b>Nada MIJAJLOVIC, Slavica ARSIC, Bojana BEKIC,</b> <i>“Beekeeping development opportunity for Serbian Danube”</i> .....	255
<b>Marijana JOVANOVIC, M. SC. Slavica ARSIC, B. SC. Duro PAJGIN,</b> <i>“Improvement of natural grassland as a factor of rural development in lower Danube Region”</i> .....	259
<b>Radu Andrei IOVA, Elena LASCĂR,</b> <i>“Sustainable development of Ostrov area, Constanta county through rural and wine tourism”</i> .....	266
<b>Elena SIMA,</b> <i>“Rural and historical tourism in Dobrogea”</i> .....	272
<b>Diana NECULA, Raluca NECULA,</b> <i>“Analysis of the importance of the Merei Parish in the tourism and agrotourism in Buzau County”</i> .....	278
<b>Florin UNGUREANU, Ioan Nicolae ALECU,</b> <i>“Studies on the present situation of agricultural heritage the Archdiocese of Bucharest”</i> .....	283

<b>SECTION 4: ADER Project 211 - "<i>Determination of the technical and economical technologies for crop and animal production applied in order to increase environmental performance (cost, productivity, profitability, gross margin)</i>"</b> .....	291
<b>Rodica CHETROIU, Lidia IURCHEVICI, "<i>Contributions of livestock holdings to the environment objectives improvement</i>"</b> .....	292
<b>Rodica CHETROIU, Ion CĂLIN, "<i>The system of indicators of estimation the economic efficiency in the production of goat milk</i>"</b> .....	296
<b>Victor OLTEANU, "<i>Interpretation of the results of the technical indicators of agriculture-specific economic</i>"</b> .....	305
<b>Lidia IURCHEVICI, Rodica CHETROI, "<i>The economic efficiency of beef cattle in extensive system</i>"</b> .....	310
<b>Ana URSU, "<i>Economic efficiency analysis of vegetable production systems during 2011-2014</i>"</b>	315
<b>Ana URSU, "<i>Study on growth / conservation economic efficiency of production plant growth arrangements regarding environmental performance</i>"</b> .....	321
<b>Diana NECULA, "<i>Analysis economic indicators main crops in the South-West Oltenia</i>"</b> .....	327
<b>Elena COFAS, "<i>Computer system for farms (SITEFA) - an opportunity for performant agricultural management</i>"</b> .....	332

## **SECTION 1**

### **THE CONCEPTS, EVALUATION AND STRATEGIC DIRECTIONS IN RURAL AND AGRI-FOOD ECONOMY**

# COMPARATIVE STUDY REGARDING THE EDILITAR FUND IN ROMANIAN VILLAGE BETWEEN THE INTERWAR PERIOD AND COMMUNIST PERIOD

EMILIAN MERCE<sup>1</sup>, CRISTIAN CĂLIN MERCE<sup>2</sup>, IULIA MUREȘAN<sup>3</sup>

**Abstract:** *The archaic Romanian village was and still is ontological mentioned, if not as a human place, than as a safe and beauty place. We forgot a fundamental truth, proved by time and space: „many peasants, high misery”. Making such a mistake, the Romanians reached to praise and idolize the misery which the providence will remunerate. Us the Romanians we did not have the ability, and based on this not even the calling to modernize the agrarian structures. In 1901 England had only 9% of the population involved in agriculture, while we lament about the depopulation of the Romanian villages after the Second World War, when 80% of the population was living in the country side. At the beginning of the XVI century, Thomas Morus stated that England is the country “where sheep are eating the people”. The depopulation of the English villages had happened in that time. That had specific consequences, but at the same time leaded England to become the most powerful industrial country. The truth is that during the communist period the Romanian villages suffered the most major modernization from their entire history. For the total number, 70% of the dwelling stock of the Romanian villages went into use during 1948-1989. Exceptions from this fact are the Swabians and Saxon Villages, part of the Hungarian Villages and some villages from Mărginimea Sibiului, Țara Făgărașului and Bucovina de Nord.*

**Key words:** *Romanian village, dwelling stock, inter-war period, communist period.*

## INTRODUCTION

The archaic Romanian village was and still is ontological mentioned, if not as a human place, than as a safe and beauty place. We forgot a fundamental truth, proved by time and space: „**many peasants, high misery**” [3]. Making such a mistake, the Romanians reached to praise and idolize the misery which the providence will remunerate: “*It (the village) kept its virginal autonomy untouched in its misery and its mythology over centuries until it can become the sure foundation of authentic Romanian history*” [1].

The nostalgia of the Romanian poor and primitive leaded among the people, including the intellectuals, to an opportunistic behavior with serious consequences for Romania's modernization strategies. Us the Romanians we did not have the ability, and based on this not even the calling to modernize the agrarian structures. In 1901 England had only 9% of the population involved in agriculture, while we lament about the depopulation of the Romanian villages after the Second World War, when 80% of the population was leaving in the country side: “*Humility contempt ancestral faith and traditions under the communist regime which alienated the Romanian peasant himself trying to turn it forced industrial worker*” [2]. Oh, how much lack of realism. At the begging of the XVI century, Thomas Morus stated that England is the country “**where sheep are eating the people**” [5]. The depopulation of the English villages had happened in that time. That had specific consequences, but at the same time leaded England to become the most powerful industrial country.

Romanian village in the dirt secular, has been preserved by his poverty, poverty was often shield against numerous invasions because it was tempting. Romania remained by this way the country with the most primitive social structure of the peasant state, across Europe.

*“I will not bother to recall in the most different occasions that we were the longest European peasant society and what sets us apart in the landscape of European integration is the status of post-peasant society more than society post-communist. In other words, the banality that we come from peasant - and yet we pulled everything [4].*

---

<sup>1</sup> Dr. Merce Emilian, USAMV Cluj-Napoca, [emerce@usamvcluj.ro](mailto:emerce@usamvcluj.ro)

<sup>2</sup> Dr. Merce Cristian Călin, USAMV Cluj-Napoca, [ccmerce@yahoo.com](mailto:ccmerce@yahoo.com)

<sup>3</sup> Dr. Mureșan Iulia, USAMV Cluj-Napoca, [icmuresan@gmail.com](mailto:icmuresan@gmail.com)

In fact those that transformed, at least partial Romania in a post-peasant society, were the communists. After 1989 the Romanians did not know to take advantage of this progress. Too bad for the sacrifices!

Nostalgic projections on traditional Romanian village may be quoted, at best, in a playful register. In the media, in the political circles and, unfortunately, even in those of scientists, can be heard statements about the destruction of the Romanian village and its traditions. It is often said that the evolution from the communist Romanian village installed a long period of stagnation. That most villages were amazed legally urban, as they were inherited from generation wars because peasants had no economic power to build new homes or to upgrade existing ones. Statistical data show that it is not so.

## MATERIAL AND METHOD

Scientific truth can be revealed only by evaluating the concrete realities of the Romanian village throughout history. The figures represent an important part of the research. The data about this kind of information can be found in the Agricultural Register of any city halls, holding rigorous information on property owners and on the realization of the houses year. Were analyzed the urban background data on a sample of 12 villages located in different geographical areas of the country, and by total 2705 households.

The main method of investigation and data processing was the index method. The evolution of the Romanian village municipal fund was investigated by comparative analysis between the interwar period (1919-1947) and the communist period (1948-1989).

## RESULTS AND DISCUSSIONS

The statistical analysis of the two periods mentioned, prove unquestionably that some judgments about material degradation during the communist Romanian village are exaggerated and propagandistic. It is true that the Romanian village is still lacking basic facilities for a decent living, but this handicap has very deep historical roots. When the communist regime, peasant villages properties Romanians were not even in the back garden landscaped private primitive. Field research on a sample of 12 villages in Transylvania and Moldova, representing 2705 households using data from the Agricultural Register municipalities have led to results which confirm the municipal fund modernization of the Romanian village in the communist period (Table 1).

Table 1

Evolution and structure of the municipal fund of Romanian village, two historical periods							
No.	Village	Year of commission					
		Number of households			Percentage (%)		
		Until 1947 <sup>4</sup>	1948-1989 <sup>5</sup>	Total	until 1947	1948-1989	Total
1.	Ghiglișeni (Bihor)	16	255	271	5.90	94.10	100,00
2.	Valea de Jos (Bihor)	5	133	138	3.62	96.38	100,00
3.	Sârbești (Bihor)	12	111	123	9.76	90.24	100,00
4.	Lunca (Bihor)	17	295	312	5.45	94.55	100,00
5.	Cămărașu (Cluj)	37	340	377	9.81	90.19	100,00
6.	Cătina (Cluj)	40	229	269	14.87	85.13	100,00
7.	Sâmboleni (Cluj)	25	186	211	11.85	88.15	100,00
8.	Mastacani (Iași)	11	91	102	10.78	89.22	100,00
9.	Hilița (Iași)	52	63	115	45.22	54.78	100,00
10.	Pustoiaia (Botoșani)	30	162	192	15.63	84.38	100,00
11.	Bilca (Suceava)	112	164	276	40.58	59.42	100,00
12.	Cuza Vodă (Galați)	64	282	346	18.50	81.50	100,00
T O T A L		421	2284	2705	15.56	84.44	100.00

<sup>4</sup> Inter-war Period

<sup>5</sup> Communist Period

In the historic areas there are some differences, historical prints generated by different rulers and could not be completely eliminated even during the communist period (Tables 2 and 3)

Table 2

Evolution and structure of the municipal fund Romanian village in Transylvania

No.	Village	Year of commission					
		Number of households			Number of households		
		Until 1947	1948-1989	Total	Until 1947	1948-1989	Total
1.	Ghighișeni (Bihor)	16	255	271	5.90	94.10	100.00
2.	Valea de Jos (Bihor)	5	133	138	3.62	96.38	100.00
3.	Sârbești (Bihor)	12	111	123	9.76	90.24	100.00
4.	Lunca (Bihor)	17	295	312	5.45	94.55	100.00
5.	Cămărașu (Cluj)	37	340	377	9.81	90.19	100.00
6.	Cătina (Cluj)	40	229	269	14.87	85.13	100.00
	TOTAL	127	1363	1490	8.52	91.48	100.00

Table 3

Evolution and structure of the municipal fund Romanian village in Moldavia

No.	Village	Year of commission					
		Number of households			Number of households		
		Until 1947	Until 1947	Until 1947	Until 1947	Until 1947	Until 1947
1.	Sâmboleni (Cluj)	25	186	211	11,85	88,15	100,00
2.	Mastacani (Iași)	11	91	102	10,78	89,22	100,00
3.	Hilița (Iași)	52	63	115	45,22	54,78	100,00
4.	Pustoaia (Botoșani)	30	162	192	15,63	84,38	100,00
5.	Bilca (Suceava)	112	164	276	40,58	59,42	100,00
6.	Cuza Vodă (Galați)	64	282	346	18,50	81,50	100,00
	TOTAL	294	948	1242	23,67	76,33	100,00

The truth is that during the communist period the Romanian villages suffered the most major modernization from their entire history. By comparison, the housing of the communist period is 84.44%, 15.56% dated to before 1948. Exceptions from this fact are the Swabians and Saxon Villages, part of the Hungarian Villages and some villages from Marginimea Sibiului, Tara Fagarasului si Bucovina de Nord.

Regional differences demonstrate in Moldova was retained a substantial share of the interwar urban fund (26.67%), the main housing being held in the geographical area of the communist period (76.33%). The development rhythm in the communist period was less substantial in Moldavia, with less industrial area, with fewer employees to other areas, which resulted in a rate of less spectacular urban fund.

## CONCLUSIONS

The analysis of the Romanian village still has strong connotations centered particularly on the analysis of unilateral communist period.

Romanian-Romanian War deep affected and the Romanian village. And if he survived the communist period and revived economic destruction has been sealed in the post-revolutionary attitude array of naive and opportunistic propagandists were garnished with governing bodies of this country and Romania have made a captive country.

We need to have the lucidity and courage to tackle the country's future in close agreement with the peculiarities of our secular economic and social history, to end the war between Romania and Romanian, preserve Romania's economic victories few different historical periods. Glorifying some historical periods and authors blame Nazi "in integrum" other, both unrealistic attitudes we

prepared, in fact, the ground for our wanderings through the transition. Economic development strategies and social harmonization of the country were mired in the transition period in a few axioms and slogans loaded false perceptions about Romania wars and economic history of the country and the world in general. Propaganda initiatives fate Romanian village in the communist period, as confirmed by statistics, is a typical, but not the only one handling the effects today are beginning to look more and more obvious "fruits".

Striking contrast between the slogans uttered on the destruction of the Romanian village in the communist period and realities on the ground, proving that we are possessed of globalization handling. The mood of the intelligentsia, especially, is affected by censorship consensus. I mean, no one dares to make an objective analysis of economic development in communist Romania. Communism, as a practical reality in Romania was "a game against nature." This means that in a communist period has not worked, that were achieved significant economic objectives. But mostly it is unfounded to say that Romanians, mostly, lived better before communism.

To bring its real historical truth and true coordinates, submit to the reader and a series of images about the plight of the Romanian village in the interwar period.



*House and coop*  
Nadășu, jud. Cluj, 1926, Denis Galloway

---

<sup>6</sup> *House and coop* - Nadășu, jud. Cluj, 1926, Denis Galloway



7

*Dinner*  
Poienița Voinii, jud. Hunedoara, 1927, Denis Galloway



8

*Alley*  
Poienița Voinii, jud. Hunedoara, 1927, Denis Galloway

---

<sup>7</sup> *Dinner* - Poienița Voinii, jud. Hunedoara, 1927, Denis Galloway

<sup>8</sup> *Alley* - Poienița Voinii, jud. Hunedoara, 1927, Denis Galloway



*Yard*

Poenița Voinii, jud. Hunedoara, 1926 (?), Denis Galloway



*Casă cu arminden*

Lunca Cernii de Jos, jud. Hunedoara, 1928, Denis Galloway

## BIBLIOGRAPHY

1. BLAGA Lucian (1937) – Elogiul Satului Romanesc... discurs de primire în Academia Română;
2. DANIEL Preafericitul Părinte (2011) - Cuvântul inaugural rostit cu ocazia primirii titlului academic de Doctor Honoris Causa din partea Universității Babeș Bolyai, Cluj-Napoca;
3. MERCE Emilian (2011)– Tranziția la români; Editura Academiei Române, București;
4. MIHĂIESCU Vintilă (2014) - Strigarea peste țară, Dilema veche, nr. 520.
5. RICARDO David (2007) - Economistul genial; Editura Risoprint.

<sup>9</sup> *Yard* - Poenița Voinii, jud. Hunedoara, 1926 (?), Denis Galloway

<sup>10</sup> *Casă cu arminden* - Lunca Cernii de Jos, jud. Hunedoara, 1928, Denis Galloway

## CONCEPTUAL APPROACHES OF THE RURAL SPACE

TALIDA GIAMBAȘU<sup>1</sup>, IOAN NICOLAE ALECU<sup>2</sup>

**Summary:** *This paper is a bibliographic study of the rural space concept, from its establishment and until now. In this respect, the following works from the dedicated literature have been studied: scientific works, doctoral dissertations, case studies, books and websites dedicated to this topic. The used method was the bibliographic research and the synthesis of conceptual approaches in own manner. The conclusions that may be drawn from the performed research reveal certain concept dynamics in time, as the functions and services of the rural space were better understood, leading to the conceptual development of the rural space. Also, the approach of the development of the rural-urban dichotomy has outlined the rural space concept more clearly.*

**Key words:** *concept, dichotomy, rural space.*

### INTRODUCTION

The term “rural”, in the conception of the majority, defines the “country”, the peasants and generally, all non-urban territories and activities [11]. Although, from the economic point of view, the agriculture and forestry hold a significant position, the meaning of the word “rural” is larger than agricultural or forestry, containing also other activities, such as: rural specific industry; handicraft, the productive services related to the agricultural production and the unproductive services related to the rural population [8]. In a synthesis definition, the adjective *rural* is used in order to define everything that relates to the life in the countryside, located outside the urban areas [4]. The term *rural* is often used in opposition with the term *urban*, which names everything related to the city [6]. This general definition often creates confusion between the term rural and the term agricultural, which does not meet reality.

The rural space is not a material and uniform space. The uniformity may be regarded under two aspects: the first one is related to the land – topography, subsoil, soil and microclimate; the second one pertains to demography – density, polarization from small communities to big urban areas. Usually, the term *rural* describes an ensemble that is different from the urban one and, at the same time, conventionally delimited by statistic and administrative units [10].

The criteria for defining the urban or rural nature of a collectivity or of a space may be resumed to three features: economic, sociologic and geographic [4].

### MATERIALS AND METHOD

This paper is a bibliographic study, a review of the rural development concept, starting with the shaping of the term and until nowadays, as the study passes through most of the variation periods of the concept, the increasingly better understanding of the functions and services generated by the rural space and by the development thereof, approaching at the same time the dichotomic analysis of the rural-urban space.

The method used for this work was based upon the bibliographic research, which is essential for understanding the concept’s history. 39 bibliographic titles were researched for this study, consisting in: scientific works, doctoral dissertations, case studies, dedicated books and websites.

---

<sup>1</sup> PhD, Talida Daniela Giambasu, University of Agronomic Science and Veterinary Medicine - Bucharest. talida.giambasu@gmail.com

<sup>2</sup> Profesor Dr. Ioan Nicolae Alecu, University of Agronomic Science and Veterinary Medicine – Bucharest. ioan.alecu@usamv.ro

## RESULTS AND DISCUSSIONS

The term *rural* comprises all activities performed outside the urban environment and includes three essential components: the administrative communities formed of rather few members having mutual relationships; the acute dispensation of the population and of the collective services; the particular economic role of agriculture and forestry [9].

A more complete definition of the rural space occurs by taking into account the following types of criteria: morphologic (number of inhabitants, density, environment type), structural and functional (types of activities and relationships).

From this definition of the rural space, at least the following elements are outlined: the rural space is characterized by a weak population density; the human establishment forms are villages and communes, which are characterized by the individuality and discontinuance of the built space; the productive activity is predominantly agriculture and forestry, however it does not exclude the processing industry and the rural trade; the relationships between individuals are mainly based upon the mutual acquaintance in all matters; the environment is much less polluted than in the urban areas etc.

The final form of the definition of rural space is found in the Recommendation No. 1296/1996 of the Parliamentary Assembly of the Council of Europe related to the European Carta of the rural space, in the following version: the phrasing (term/notion) "*the rural space comprises an inner or coast area that includes villages and small towns, where most of the land is used for: a. agriculture, forestry, aquaculture and fishing; b. the economic and cultural activities of the inhabitants of such areas (handicraft, industry, services etc.); c. the organization of non-urban areas for leisure and entertainment (or natural reservations); d. other use purposes (except for dwelling purposes)*" [38], [39].

Usually, the term *rural* characterizes an ensemble that is different from the urban one and at the same time conventionally delimited by statistic and administrative units.

For instance, in the US, depending on the percentage of the agricultural population, the categories *agricultural rural* and *non-agricultural rural* might be distinguished, while in France, the strict delimitation of the industrial and urban development areas has allowed the shaping of the rural space as a territory where the agricultural production is dominant, and the elements of nature are in a closer state to the original one [22].

In Belgium, the rural space is considered to define a certain kind of landscape, *landschaft*, which is a territory cultivated by humans [4].

In Russia, the rural areas are considered the ones where the main functions are represented by agriculture, forestry, fishing and the industrial activities for primary processing such branches.

In other countries (UK, USA, Brazil), the definition is given depending on the preponderant occupation of the majority of the active population [4].

The analysis of the dynamics of the development of the rural space is not simple at all. The references to rural, the conceptions, the scientific theories, all of it may be influenced by the political and ideological context drawing the interpretation of the city/village relation.

Retrospectively looking, in 1955 Maurice Halbwachs defines the antagonism according to which [13] "there are rich and poor people in the villages, there are class differences.

The preoccupation to maintain their level, and even to climb on the social ladder, mostly explains their condition. But they also have, in addition, the feeling of being a peasant before the city inhabitants".

The historiographer Labrousse [13] sees in the superiority from the city the contact civilization, the speed, the power, which is opposed to the "temper" of the rural. The discrepancies of nature permanently showing us the inelasticity of the rural civilization and the elasticity of the urban civilization, the stability, the relation, the fixed nature, the prudence in the case of the rural and the active movement of the elites, a risk only in the case of the urban.

Various authors have been influenced by the dichotomic evolution of the rural space.

In a publication from 1963 F. Tönnies speaks about the community and the countrymen association characterized by the lack of knowledge, psychic and social immobility, cultural homogeneity.

The labour of the geographers at the time was influenced by the idea of the dichotomic evolution and the “urban domination” almost advances as a postulate [18].

The pupils of Pierre George: R. Dugrand, M. Rochefort, Y. Babonaux, B. Kayser, present in their thesis as a certainty the classification of the urban as [13] “a form of exploiting of the villages”. The big European cities, seen as a whole, have the power of a real dominator. But this does not force us to consider the relationship with the secondary centres, where the rural means are the image of a radical unavoidable opposition”.

At the same time, we might follow up the intelligent analysis of Nicole Mathieu, who explains that [13] “starting with the 60’s and as the city growth has come to know an acceleration without precedent, a period of increase of the jobs, consumption and life standards begins, and an analysis model becomes dominant: the urbanization of the villages”.

We finally meet the contradictory relationship previously mentioned: a space discontinuance between the cities and the villages no longer exists and the integration is predominant – the assimilation by the cultural distribution of the urban products and traditions. The rural exodus is certain, but secondary compared to the modernization process that homogenizes space [2]. The development of the concept of rural space continuum starts from here.

In 1974, Raymond Ledrut dedicates its seminary in Toulouse to the study of new forms of spatial structures [13]: “the division of space along the city-village cleavage is not essential” he claimed. Ten years later, Georges Day states that [13] “it is obvious that the old sharing between the city and village is changing under our very own eyes...between the city and the village the merger accelerates”.

“We start from the hypothesis”, wrote Henri Lefebvre [12] that the urbanization supplements society. The traditional groups characteristic for the country life are transformed, wider units absorb or convert them. The urban fabric proliferates, spreads, corrodes the remains of the country life. In this conception, a highway, a supermarket located in a field are a part of the urban fabric.”

Henri Mendras (1959) wrote [16]: “City inhabitants and countrymen form in certain matters a single society, they participate to civilization in the same time. The city inhabitants and the countrymen form in certain matters a single society, they participate to civilization in the same time. Ultimately, all statistics prove, on the contrary, differences of intensity and not of contrasts”.

The continuum theory has rather old roots. It is expressed to the Council of Europe by G. Moss in 1980 [13]: “The terms rural and urban assign the manners of using the land and we are eventually defined by them; hence, the terms apply to both land and people. Together, they form what is considered nowadays a continuum system, a rural-urban continuum with no distinction between them that purports different levels of the social and economic activity. In the rural exodus continuum, the ecologic processes and the natural resources are equally predominant and intensified”.

In order to tone it more, J. C. Chamboredon, in his contribution to the “History of Urban France”, oscillates between two theses, but manages to formulate finely and toned a theory that might be summarized under the following ideas [14]:

1. the transformation of exchanges between the world of the rural and the urban and their social and economic integration leads to a redefinition of the city – village opposition;
2. the labor division between the two worlds is growing, from the social and cultural point of view, and it never appeared clearer or more excessive, the rural – urban dichotomy, consists more precisely in the two poles of an axis along which a position continuum is developed;
3. these positions are characterized in the future by individuals and not by social systems, micro societies or cultures;
4. the countrymen society becomes a secondary social stage, complementary to the urban scene, a double affiliation, the multi-loyalty characterized by such individuals;

5. however, by its cultural and symbolist function, the countrymen society generates a rejuvenation of its own identity, accentuated by the territorial affiliation.

N. Mathieu had a corollary, namely that [13] “the death of the rural is identified as a fulfilled past”. He also said that the rural environment today is affirmed as a new identity and specificity, becoming again a perpetual oscillation between continuum and dichotomy”.

Currently, a concept and mentality change is required regarding the rural dynamics, correlated with the local and regional autonomy and with the subsidiarity principle.

The new conception about the rural specifies the fact that the rural space in Europe represents a precious landscape, the fruit of a long history, whose salvation is a constant preoccupation of society. The rural space may fulfil its supply, relaxation and balance functions, desired more and more by society only if it remains an attractive life environment, endowed with a good infrastructure, a viable agriculture and forestry, local conditions favorable to non-agricultural economic activities, an intact environment with a clean landscape [20].

## CONCLUSIONS

✓ The rural space is characterized by a weak density of the population; the human establishment forms are the villages and communes, characterized by the individuality and discontinuance of the built space; the productive activity is predominantly agriculture and forestry, however it does not exclude the processing industry and the rural trade; the relationships between individuals are mainly based upon the mutual acquaintance in all matters; the environment is much less polluted than in the urban areas etc.

✓ The village-city dichotomy comprises the transformation of the exchanges between the rural and urban world and their social and economic integration leads to the redefinition of the village-city opposition; the labor distribution between the two worlds grows, from the social and cultural point of view. The rural-urban dichotomy consists, more precisely, in the two poles of an axis along which a position continuum is developed; such positions are characterized in the future by individuals and not by social systems, micro societies or cultures; the countrymen society becomes a secondary social stage, complementary to the urban stage, a double affiliation, the multi-loyalty characterized by such individuals; however, by its cultural and symbolist function, the countrymen society generates a rejuvenation of its own identity, accentuated by the territorial affiliation.

## BIBLIOGRAPHY

1. Alecu, I., & Merce, E., & Pană, D., & Sâmbotin, L., & Ciurea, I., & Bold, I., & Dobrescu, N. (1997) - *Management in agriculture*, Bucharest: Ceres.
2. Beciu, S. (2013) – *Sustainable rural development. Current trends and perspectives of Romania's North-East Region*, Bucharest: Ceres.
3. Bold, I., & Crăciun, A. (1995) – *Agricultural exploiting: organization, development, exploiting*, Timișoara: Mirton.
4. Bold, I., & Buciuman, E., & Drăghici, M. (2003) – *Agricultural exploiting: definition, organization, development*, Timișoara: Mirton.
5. Brînzan, O. (2006) – *Rural development*, Arad: Aurel Vlaicu.
6. Ciparisse, G. (1999) - *Thésaurus Multilingue du Foncier*, Rome: FAO.
7. Chamboredon, J., C. (1970) - *Le métier de sociologue*, Paris.
8. Dona, I. (2006) - *Rural development – class notes, syntheses*, Depart. ID, Bucharest.
9. Enache, M. (2011) - *Priorities and strategies of sustainable rural development in Romania. Case study*. Doctoral dissertation, Bucharest.
10. Hâncu, C. (2004) – *Rural development*, Bucharest: Matrix Rom.
11. Le petit Larousse (1998), Paris.
12. Lefebvre H. (1970) – *Du rural a l'urban*, Paris: Editions Antropos.
13. Kayser, B. (1990) – *La renaissance rurale, Sociologie des campagnes du monde occidental*, Paris: Armand Colin Editeur.
14. Kayser, B. and collab. (1994) – *Pour une ruralite choisie*, Datar: Edit. Aube.
15. McNamara., D. (1973) – *Past and present trends in sociology of education*, New Mexico.

16. Mendras, H. (1970) – *La fin des paysans, Changement et innovations dans les sociétés rurales françaises*, Paris: Librairie Armand Colin.
17. Mosher, C. (1976) – *Evaluating Community participation urban development project*, London: Pergamonn Press.
18. Nedelcu, A. (2009) – *Community development in the rural space from Romania*, Doctoral dissertation, Bucharest.
19. Otiman, P.I. (1999) – *Rural economy*, Timișoara: Agroprint.
20. Popescu, A. (2002) – *Rural development*, Bucharest: Ed. Univers.
21. Vincze Maria (1999) – *Agricultural policies worldwide*, Presa Universitară Clujeană.
22. Vincze Maria (2000) – *Regional and rural development – ideas and practices*, Presa Universitară Clujeană.
23. \*\*\*-Council Regulation (EC) No. 1257/1999 of 17 May 1999 on support for rural development from European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulation, 1999
24. \*\*\* - Council Regulation (EC) 1260/1999 of June 1999 laying down general provisions on the Structural Funds, 1999
25. \*\*\* - Council Regulation (EC) 1750/1999 of July 1999 laying down detailed rules for the application of Council Regulation (EC) on support for rural development from EAGGF
26. \*\*\* - Communication from the Commission to the member states, laying down Guidelines for the
27. \*\*\*Community Initiative for rural development (LEADER+), Brussels, 1999.
28. \*\*\*The Romanian Government, the Ministry of Agriculture and Nourishment – *Rural development in Romania – Green Carta*, Bucharest, 1998.
29. \*\*\* - The Romanian Government, the Ministry of Agriculture and Nourishment – *The diagnosis of the Romanian rural space*, Bucharest, 1998.
30. \*\*\*Romania's National Strategy on Environmental Changes 2013 – 2020
31. \*\*\*The National Strategy for Labour Force Occupancy 2013-2020 (draft)
32. \*\*\*The National Strategy for Sustainable Development in Romania. Horizons 2013-2020-2030
33. \*\*\*The National Strategy for the Preservation of Biodiversity
34. \*\*\*The National Strategy on Romania's Digital Agenda (ongoing)
35. \*\*\*The National Research, Development, Innovation Strategy 2014-2020 (ongoing) / The strategy for Intelligent Training
36. \*\*\*The National Competitiveness Strategy 2014 – 2020 (ongoing)
37. \*\*\*The National Strategy to Reduce Poverty 2014-2020 (ongoing)
38. European Commission (2010) – *Europa 2020, A European Strategy for smart and sustainable growth favourable inclusion*, Brussels  
<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:RO:PDF>
39. European Commission (2013) , *Partnership Agreement*, Brussels  
[http://www.fonduriue.ro/res/filepicker\\_users/cd25a597fd-62/2014-2020/acordparteneriat/Acord\\_de\\_parteneriat\\_01.10.2013.pdf](http://www.fonduriue.ro/res/filepicker_users/cd25a597fd-62/2014-2020/acordparteneriat/Acord_de_parteneriat_01.10.2013.pdf)

# THE RESTRUCTURING IMPACT OF THE NATIONAL ECONOMY OF RURAL DEVELOPMENT

Lenuța COSTIN<sup>1</sup>

## Abstract

*The study is intended as a brief foray into the issue of economic restructuring effect of the matrix on rural development and failed to show that it is favorable to human primary role in human resource of entrepreneurial role assumed, being the main driver of competitive advantage of Romania.*

*In Romania the labor force employed in agriculture is steadily decreasing, there is a danger of abandonment areas, unless urgent action is taken and powerful multifunctional development of agriculture, creating an integrated economic activity, entrepreneurial culture.*

*But we must look at this in terms of resources focusing on the long-term impact, which will result in small rural training centers including in the context of developing infrastructure links and economic interdependence.*

**Keyword:** *the restructuring, rural development, human factor, entrepreneurship*

## INTRODUCTION

Through this study we aimed to analyze and evaluate the impact of the restructuring of the national economy on rural development. The work brings to the fore the common denominator of both operating mechanisms of economic restructuring plan and the plan for rural development: the human factor as a decisive vector.

For this purpose, the aim is to identify the major directions that support predictability necessary changes in the agricultural policy by a broader consideration of the principle of competitiveness in agriculture, in particular by encouraging entrepreneurial skills of the human factor.

The study undertaken starts motto:

***"Do not tilt, can not replace, not tear down, you can not build, I do not deny, but you can create." Nicolae Iorga***

and is built on a theoretical approach of documentary sources used, which aims to find the answer to questions :

- *What are the consequences of economic restructuring programs implementation on the human factor?*
- *Knowledge of the problems of rural development policy creates the potential application of consistent and effective restructuring?*
- *What are the prospects of implementing agricultural sector programs on Romanian territory by PNDR 2020?*
- *What is the role of measures to increase the competitiveness of the agricultural sector aboradrea entrepreneurial capacity of the human factor?*

## MATERIAL AND METHOD

The elaboration of this study, an action required documentation, which involved the study, analysis and synthesis of the papers (papers of authors consecrated in international and national specialized literature, articles and studies published in various periodicals listed in the field or set at various international scientific meetings, theses that addressed this issue, or

---

<sup>1</sup> Ec. Research Institute of Agricultural Economics and Rural Development – ASAS; costin.lenuta@iceadr.ro

the like, etc.), in areas such as economics, sociology, statistics, strategies and policies. To do the work we have used various methods and means, both classic and modern.

Since the theme is the impact of economic restructuring on rural development, common methods used were the method of analysis, synthesis and comparison. They used statistical data collected from population and housing censuses, statistical yearbooks, and economic data provided by the sites.

We hope that this document will contribute to the work of policy makers and researchers working in the field of sustainable development and employment in rural areas.

## **RESULTS AND DISCUSSION**

### **Restructuring of the national economy versus human factor**

The restructuring of the national economy means changing the management of economic resources, ie potential elements of economic growth. Therefore, this issue should be seen in the light of new forms of property, which is basically the engine reference all changes made by restructuring.

The restructuring of the national economy also raises the problem of dimensioning entities. Since parallel coexistence of large companies that can provide mass production under maximum economic efficiency (due to mechanization and automation of complex) with small businesses that can quickly adapt to market fluctuations and serve themselves as employees of first introduction this dual economy expresses a feature of building a market economy.

"The restructuring of the national economy should not be done at all costs, those measures should be adopted for improving the output on the market and in other areas such as the financir-banking, competition, entrepreneurship education and public awareness, respect for law. "[3]

Reality statistics show that restructuring were performed, most often through reorganization measures that have been applied strictly in the sense just follow the legal procedure without seeking human factor is crucial premise of this process.

The intention was good policy on State aid in the breakdown of staff, to create small or family associations, but all the reality shows that the existence of these companies in rural areas could not cope with competitive pressures of the market, the tax and any redreasare had no chance.

World experience shows that the main driving force of change, restructuring is the human factor.

As modern as current production equipment and technology, economic activity can not take place under conditions effective and still can not improve without the active participation of the human factor. The restructuring of the Romanian economy based on efficiency and profitability and its alignment with the standards and modern market economy, generating significant restructuring of human resources.

The process of adapting labor supply to restructure the economy is extremely complex and has multiple, diverse and complex determination based on extensive quantitative and structural mutations - qualitative human factors.

Regarding the human factor, the effect of restructuring has resulted from reductions in personnel, so that in 1995 the application of selective restructuring programs resulted in the layoff of 44,300 people, and restructuring of companies and some autonomous in 1997, resulted in the layoff of approximately 90,000 employees.

Depreciation of the recoil of the labor market it was still the following effects:

- cessation of industrial activities, the decline in production by transferring activities and the emergence of brownfield areas.

- reduce employment and increase in unemployment that resulted and maintained migratory flows of the population.

- intensification of migration of young people abroad.

- serious social problems, such as: poor development of the health system; reducing school population, the number of schools, teachers and increasing dropout; involution cultural life; reducing commuting; increasing number of retirees and homemakers; ruralization space adjacent to the city;

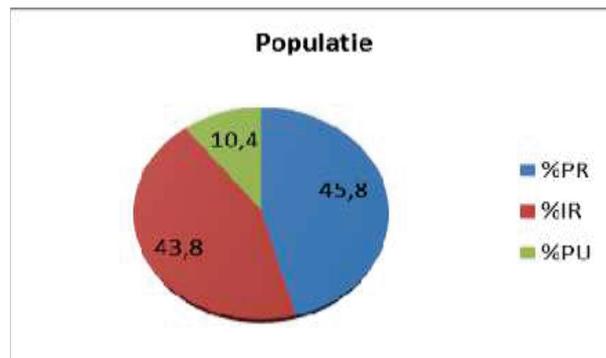
In the context of the restructuring of the economy, agriculture has become, after 1990, the main source of income for a significant share of the rural population that acted as a safety net for those made redundant or are unable to find a job.

The practice subsistence or semi-subsistence became a defining feature of Romanian rural area. [1]

To make a comparison of the proportion of urban and rural population will call the statistics for the years:

- Year 1970 urban population accounted for 40.8% and 59.2% rural population, source (Connor 1974: 128).

- In relation to Eurostat data from 2008, 45.8% of the population is predominantly rural area, 43, 8% in intermediate regions and 10.4% in predominantly urban area.



- In 2012, rural areas have an area of 207,522 km<sup>2</sup> (87.1%) and lived in this territory 45.0% of the population [10].

Although the number of population employed in agriculture has decreased in recent years with nearly 1 million from 3.44 million people in 1992 to 2.5 million people in 2008, its values are kept at very high levels compared with the figures recorded in the European Union.

Previous research has shown that, in absolute terms, the rural population employed in non-agricultural activities at the beginning of XXI century stood at values close to those recorded in the 30s and about half the values recorded in the 70s.

In the period 1998-2000 rural population employed in agriculture recorded maximum values (over 75% of the total rural population employed), because in recent years to reduce up to 60% [10]

Given that agricultural production recorded a sharp decline after 1990, over-agricultural employment (3.5 million persons employed in agriculture in 1992 to 2,500,000 in 2008) and fragmentation of farms are the main impediments to agricultural recovery.

In terms of professional status of employed rural population, rural development after 1990 is marked by significantly reducing the number of employees due to post-revolutionary economic transition that resulted in major dramatic reduction of activity in industry.

Thus, out of 4 million people employed in rural areas recorded in early 2008, only accounted for 1.56 million employees, compared with 4.6 million in urban areas. At the same time, the number of rural people employed in agriculture is more than 80% higher than employees in all other economic sectors. Romania is the EU country with the highest share of rural population, followed at a significant distance from Poland and Bulgaria [12]. However, in Romania there are more than one third of registered farmers at EU agricultural output value is only a tenth of that recorded for the Community area (World Bank, 2005). In particular, this is explained by the fact that the Romanian rural area continues to be defined based on the predominant agricultural employment of the population, mostly located in the self-consumption and subsistence or semi-subsistence [2].

In light of the widespread practice subsistence agriculture based on traditional forms of work, Romanian rural area is dominated by dual economy model (Boeke, 1953 apud. Aligică, 2003 Averitt, 1987, Proto, 2007).

The modern forms of market economy coexist with conventional farming, widely practiced to ensure self-consumption population. Subsistence agriculture has expanded since 1990, as a direct result of the restructuring of the socialist economy and lack of alternatives for a significant share of the rural population (Guice, 2008).

The data show that the rural population declines demographic is steadily declining and aging. In the period 2005-2012, the rural population fell by 65,646 people, and according to demographic forecasts will continue its decline moderately in 2015, followed by a sharp decline in the period 2015-2050.

Socio-economic transformations have made the post-December Romanian rural evolve differently, the uneven development became a reality of contemporary Romanian society. Many of these rural communities contribute in a small way, to economic growth, but retains the social and traditional way of life.

### **Rural Development Identify problems caused by impact**

The concept of rural development encompasses all actions aimed at improving the quality of life of people living in rural areas to preserve natural and cultural landscape and ensure the sustainable development of rural areas according to specific conditions and those lands. Rural Development Programme contains, depending on conditions and needs, development of infrastructure, agriculture, tourism, small and medium enterprises and the creation of jobs and ideas on environmental protection, education, community development.

In rural development the primary role of the human factor lies in both the situations and different roles: local communities, participants of economic and social, ecological and cultural landscape values. The concept of areas can be defined and center-periphery relationship, so basically means rural development suburbs development and preservation of their values. The consequences of the restructuring of the economic system make it possible to shift from a sectoral policy (agricultural) towards an integrated approach to rural development.

It is normal and natural for the human factor to require more attention for solving problems of socio-economic indicators disclosed potentiates implementing solutions visible impact in this area: [5]

- unfavorable demographic structure in rural areas. In the EU-27, the share of the population between 15 and 64 years is significantly higher in urban areas and percentage of people 65 and older is often higher in predominantly rural areas, but the age structure varies greatly between Member States.

- lower education level and more difficult access to education in rural areas. Human capital is a key factor for the development of rural areas. The problem of illiteracy affects rural areas. In addition, the quality of education is lower in rural areas

due to poorer educational infrastructure and low skill level of staff. Access to education until the end of the second level (secondary education) is provided in most regions, but the level of education is significantly lower in rural areas.

- Revenues are lower in rural areas than in urban areas. Urban jobs are better paid than those in rural non-agricultural employment provides higher wages than farm, men earn more than women. Activities that require low-skilled locate in rural areas and those requiring high qualifications are concentrated in urban areas, thus increasing rural employment lead to the concentration of jobs with low pay and low skills in rural areas.

- Lower level of entrepreneurship in rural areas. Entrepreneurship is less developed in rural areas than in urban areas. Business Opportunity generally occurs less often in poor and rural areas. The small number of businesses in rural per capita of population and their small size is insufficient to create significant growth. In addition to general constraints apply to all SMEs, both in urban and rural areas, rural entrepreneur also faces other obstacles: low level of education and training, difficult access to finance for business, insufficient transport infrastructure. [7]

- Poor infrastructure in rural areas. Absence of transport affects access to goods and services in regional centers and the ability to bring goods to market. Lack of transportation can be a barrier to employment and labor market participation. Broadband Internet infrastructure is less developed and adopted by the population is slower than in urban areas.

- Development of services is lower in rural areas. Almost all available goods and services are more expensive in rural areas, while lower income because of dependence on agriculture and other low-income producing activities. Education and health services are expensive and better services provided in the context of market economy.

- Migration and commuting from rural to urban areas. Commuting can help reduce unemployment in rural areas but at the same time can divert demand for key services to the urban local suppliers, resulting decline in local service delivery.

And in the agricultural field and restructuring involves concrete measures should focus on deepening structural reforms with particular emphasis on strengthening farms, rural privatization of companies where the state is the majority.

PNDR 2020 program financed by European Union rural development policy that seeks: modernization and articulation of production and marketing sectors in accordance with quality standards and EU norms; strengthening optimal scale farming and diversification of non-farm complementary nature; social infrastructure development - rural and urban providing advice and the training to farmers, owners of private land and forest. [11]

### **Proposed solutions for rural development Romanian**

In the context of social change recorded in the Romanian society in the last two decades, rural areas through a phase of redefining sinuasă determined by a number of socio-economical analysis methods such as reîmproprietărirea, restructuring the economy, urban-rural migration movement, emigration, intensive development of towns located in the vicinity of large cities or isolated depopulation.

It is necessary to develop complex rural areas in aim of stabilizing the the workforce [4]. To enhance the productivity and competitiveness of agriculture, it is essential reduce agricultural labor force and the development of alternative economic activities in rural areas. from crop production, employment should migrate to the breeding, food processing and other economic and social activities [4].

Further aspects concern related fields like:

- \*\* improvement of quality food products
- \*\* because it grown cereals, maize and sunflower on surfaces too large to be diversified agricultural production structure / changed.
- \*\* economic diversification of of rural areas and increasing the added value by developing fruit and vegetable sector.
- \*\* ecological agriculture - an alternative with multiple benefits for the sustainable development of Romanian rural areas and a way to for the capitalization of resources of local communities.
- \*\* Biodiesel and biomass of energy cultures might be another option of developing the competitiveness of agricultural holdings.
- \*\* Valorisation of renewable energy sources is an important goal of the EU and Romania poticii has important potential for of renewable energy sources.
- \*\* Forestation of the agricultural areas of poor productivity, degraded land or exposed areas to the erosion.
- \*\* Diversification of activities of rural economy
- \*\* The rural tourism and agritourism are further possibilities of economic diversification rural areas with high potential for Romanian.
- \*\* The services sector is considered another field in the rural area where you can creating new jobs, as in the present situation are missing of basic services for rural population because of to low demand.

Analysis of IMMs in rural areas relieve their low ability to meets the need for provide jobs for rural population. Small Business Development is acknowledged as most important source of jobs / obtaining income in rural areas, both for already developed economies as well as for the emerging. Of SMEs active non agricultural profile nationally only 18.1% in the rural area appeared in 2011, which denotes a small share of SMEs involved in the rural non-agricultural activities (industry, services and tourism areas). Although during the period 2005-2011, the number of SMEs profile non-agricultural areas increased by 16%, effects of economic crisis were felt in the last three years analyzed, it was decreased by 7492 of these units, leading to the 77,315 non-agricultural SMEs (secondary and tertiary sector) in 2011. [10]. In 2010, the credits granted for agriculture was below 3% of total credit to the non-governmental sector in the economy. [10].

In previous programming period, While there were financing mechanisms (IGS), certain beneficiaries who signed the finance contracts have failed to accessing appropriations for investment. Access SMEs to finance remains challenging. In terms of territoriality, financial services are generally less accessible to rural enterprises and agricultural sector (especially small farms) with high credit costs.

Creation of new SMEs with non-agricultural activities, cultural, recreational and cooperation rural areas, creating new jobs is the potential of a market in full development, both internally and externally, which could be exploited.

## CONCLUSIONS

For the future development and revitalization of rural areas, the focus should be on creating an attractive business environment that and by implication job growth that generates developed positively of all socio-economic indicators. The development of the human factor developing agriculture and rural areas influencing each other. The rural areas have preserved the traditions that were developed by hundreds of the generations and which is itself a treasure for human development it should not disappear. The traditional products and traditional methods of production are generally ecological and so conducive to human development.

Development of rural zones is based on the quintessence of the human factor for acquiring entrepreneurship:

-providing skills to start their own business, analytical tools and knowledge appropriate economic and business management;

- improving the knowledge TIC, territorial marketing and managing projects for access to EU funded projects; In rural areas in the development of several migrants returning from abroad with our professional work experience and bring new skills and a new entrepreneurial culture in the local economy.

In rural areas in the development of several migrants returning from abroad with our professional work experience and bring new skills and a new entrepreneurial culture in the local economy.

Rural entrepreneur is the main actor of the support measures granted by PNDR 2014-2020: upgrading of the human resources, encouraging the young to install the in rural and development of a business, the entrepreneurial the development through the continuing vocational training.

What if the course syllabus managerial skills is decisive for the new curriculum of professional training courses to acquire entrepreneurial skills, learning from of oversea experience in America, Professor Robert B. Cialdini from the prestigious Harvard University:

*"If to lead means, essentially, thou shalt put others to work (with helpful), then power of persuasion is one of the best important instruments of the manager. Many people in leading positions have assumed that this is not at your fingertips a tool and it is available only to the charismatic and eloquent ..... master for principles and use them wisely and ethically - managers can learn the art to capture at subtler attention of to a public, to influence the undecided in their opinions and convert those that oppose it. "[8]*

## BIBLIOGRAPHY

1. **Applied Economics Group** (2008), Manual for assessing the of regional competitiveness [http://www.gea.org.ro/documente/ro/proiecte/manual\\_2007.pdf](http://www.gea.org.ro/documente/ro/proiecte/manual_2007.pdf)
2. **Dragan Gabriela** (2005), European Union between federalism and intergovernmentalism. EU common policies, courses in digi form, [www.ase.ro](http://www.ase.ro),
3. **Daniel Daianu** Aspects of Bankruptcy in the Romanian economy, European Institute of Romania, study 8, Bucharest 2004
4. **Zahiu, L. Lazar, T. :** Agriculture Romania in the European agricultural integrating. Ex Ponto, Constantza. (2000)
5. **National Forecast Commission**, "Regional Disparities in 2010", <http://www.cnp.ro/user/repository/a4bbdbfe7f08371a6804.pdf>
6. **Alexandri, Cecilia & Luca, Lucian**, 2008. *"An assessment of the impact of possible CAP reform scenarios on Romanian agriculture," 2008 International Congress, August 26-29, 2008, Ghent, Belgium* 44022, European Association of Agricultural Economists.
7. **Verboncu I.** "Management, Questions and Answers" Holding Reporter Publishing House, Bucharest, 1996
8. **Robert B. Cialdini** , „Harnessing the Science of Persuasion”, Harvard Business Review , article product number: [R0109D](https://doi.org/10.1086/208999), Oct 1, 2001
9. <http://www.gazetadeagricultura.info/editorial-2/1759-agricultura-romaneasca-la-coada-europei.html>
10. **Statistical Yearbook of Romania**, INS, Bucharest, 2000-2008-2012
11. **Green Paper**, Rural development in Romania, Ministry of Agriculture and Food National Forecast Commission, "Regional Disparities in 2010", Bucharest, 1998 <https://ideas.repec.org/f/pal510.html>
12. [http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/main\\_tables](http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/main_tables)

# INFLUENCE FACTORS OF ECONOMIC GROWTH IN THE ROMANIAN AGROFOOD SECTOR

BUCUR SORINEL IONEL<sup>1</sup> BUCUR ELENA CARMEN<sup>2</sup>

**Abstract:** *The determinants of economic growth in a national economy or in an activity field were the subject of many discussions between specialists, starting from identifying the indicators considered to be the engine of economic growth, but also to the correlations between them, and to the interpretation of the results. The aim of the present approach is to identify some factors with direct influence on economic growth in the Romanian agrofood sector. Our research used common statistical methods, on the basis of public information, from the National Institute of Statistics and National Commission for Prognosis. Regarding to the agricultural sector, were identified as indicators/factors with influence on the economic growth the following: final consumption, the value of exports, the value of production for market, variation of stocks, the value of taxes on products. Analysis of the data series of the indicators mentioned above and correlations between them reveal their involutions in terms of efficiency and productivity levels, being still far from ensuring sustainable economic growth in the agrofood sector.*

**Key words:** *influence factors, economic growth, agrofood sector.*

## INTRODUCTION

As an important part of the national economy, the agrofood sector has a number of specific characteristics with various oscillation of activity, with direct impact on the sector's contribution to gross domestic product and the degree of satisfaction of the requirements of domestic consumption of the population. High seasonality of production, correlated with significant degree of fragmentation of agricultural land, to which may be added such conditions, more or less subjective determinants influence the way down 'intensive or extensive effect on sectoral growth sustainable.

## MATERIAL AND METHODS

From the methodological point of view, we mention that the present analysis refers to the period 2001-2011 from two point of views: firstly, related to the provision of complete data sets and second, in terms of possibility to ensure comparability. From this perspective, the analysis performed so far revealed the following issues.

It also should be noted that the present approach took into account the calculation of derived indicators whose analysis reveals significant changes occurred in the structure, generated by the evolution of the primary indicators that underpin their determination.

## RESULTS AND DISCUSSIONS

As an economic indicator, economic growth in the agrofood sector can be assessed in terms of the rate of increase of gross value added produced in the sector or the value of agricultural production in whose development we consider that the most important role have the following factors (determinants), respectively:

- the level of production achieved for the market;
- the intermediate consumption;
- the product taxes;
- the total final consumption;
- the level of exports.

As an aggregate index that characterizes the degree of economic growth, the *value of production for the market* performed agrofood sector recorded within 12 years a significant increase in all components of the agrofood economy levels. The greatest growth is marked by fisheries and

---

<sup>1</sup> Research assistant, Institute of Agricultural Economics, Romanian Academy, [bucursorinelionel@yahoo.com](mailto:bucursorinelionel@yahoo.com);

<sup>2</sup> Scientific research III<sup>d</sup>, Institute of Agricultural Economics, Romanian Academy, [elenacarmenbucur@yahoo.com](mailto:elenacarmenbucur@yahoo.com).

aquaculture production market which increased from 30.8 million (2000) to 288.7 million (2011). Second place is occupied by forestry and logging, as the last place to be found tobacco products (**Table No.1**).

Table no.1. Evolution of the production for market from the agrofood sector on main activities in the period 2000-2011 (mil.lei prices 2011)

	Agriculture, hunting and support services	Silviculture and forestry	Fishing and aquaculture	Food industry	Beverage production	Tobacco production
2000	14683.5	1008.8	30.8	9117.8	3031.9	687.3
2001	25638.7	1293.0	43.3	13631.7	5728.7	1002.8
2002	26858.9	1613.9	51.3	17741.7	6475.9	1213.9
2003	32747.5	2219.3	76.4	20879.6	8790.3	1142.1
2004	45303.1	2217.0	70.8	24128.3	8607.2	1081.6
2005	34455.5	2230.8	77.8	27381.1	9452.0	678.2
2006	37428,5	2329.9	85.7	29762.8	10289.8	1004.7
2007	35567.9	2499.9	97.4	35446.8	11191.6	1157.0
2008	46564.1	2632.6	155.5	39633.0	12166.1	1210.1
2009	44987.3	2810.4	370.9	36800.6	12925.0	1341.1
2010	60287.4	3344.5	181.0	35538.0	12892.2	1302.7
2011	56975.0	4892.4	288.7	33056.3	9142.3	920.5
<b>2011/2000 (%)</b>	<b>288.0</b>	<b>385.0</b>	<b>836.3</b>	<b>262.5</b>	<b>201.5</b>	<b>33.9</b>

Source: Calculations on the Tempo-Online databases, INS, 2013.

On the component activities, the share of agriculture in total value of production for the market made from agrofood sector increased 4 percent during 2000-2011, from 55.1% (2000) to 59.0% (2011). At the same time, food, beverage and tobacco industry marked a 4 percent decline in total agrofood sector (from 44.9% in 2000 to 41% in 2011). In the analysis of economic growth in the food sector, a very important indicator that cannot be ignored is the tax value of the product. From this perspective, the period 2000-2011 is characterized by a strong trend of increasing tax rates, mainly in activities within the scope of agriculture. We refer here mainly to fisheries and aquaculture activities, closely followed by agriculture, hunting and related services. A relatively paradoxical situation is found in the manufacture of beverages where the product taxes increased over 12 years with only 25.6% (**Table no. 2**).

Table no.2. Evolution of the taxes on products in the agrofood sector on activities in the period 2000-2011 (mil.lei prices2011)

	Agriculture, hunting and support services	Silviculture and forestry	Fishing and aquaculture	Food industry	Beverage production	Tobacco production
2000	245.9	34.8	3.1	1240.1	1765.1	971.7
2001	227.6	42.1	4.4	1552.5	1001.0	1508.7
2002	1560.0	60.9	5.7	1783.7	1423.4	1631.8
2003	2007.9	72.2	7.0	2227.3	1544.1	2617.0
2004	2176.5	75.0	7.4	2682.4	1668.5	3082.2
2005	2907.4	101.8	10.0	3091.8	2128.8	3510.8
2006	3132.9	102.7	8.8	3423.9	2210.6	3255.2
2007	3572.0	118.9	10.2	3747.2	2449.8	3667.0
2008	4019.1	134.1	11.5	4157.3	2598.7	4840.5
2009	3523.2	117.6	10.1	3621.0	2367.2	6881.8
2010	3142.3	178.1	36.8	3353.1	2185.6	6539.1
2011	3688.4	221.6	61.9	3999.5	2217.2	8070.7

Source: Calculations on the Tempo-Online databases, INS, 2013.

Unlike the market value of production, taxes on products are made in the food sector mainly by food, beverages and tobacco. However, during 2000-2011, the share of taxes on products decreased by 15.1% in the food, beverage and tobacco, ranging from 93.3% (2000) to 78.2% (2011), the same percentage increasing in instead the share of taxes in agriculture. Expression utilization of available resources in the training of gross value added, the intermediate consumption in the period 2000-2011 showed a significant growth in both agriculture and the food industry, the highest percentage in the food sector returning agriculture percentages that varied from 52.5% (2000) to 64.4% (2011) (**Table no.3**).

Table no.3. Evolution of the intermediate consumption in the agrofood sector on activities in the period 2000-2011 (mil.lei prices 2011)

	Agriculture, hunting and support services	Silviculture and forestry	Fishing and aquaculture	Food industry	Beverage production	Tobacco production
2000	13810.0	815.1	31.8	8118.9	3535.6	1629.2
2001	19688.4	1028.0	52.7	10019.8	4084.0	2537.6
2002	21207.5	1490.9	72.3	13998.4	4327.4	2655.8
2003	28598.2	2005.4	145.8	18064.9	6184.1	3701.6
2004	37259.5	2046.9	174.1	21510.4	6401.6	4037.0
2005	31282.3	2117.3	195.1	23447.3	5800.4	4036.2
2006	31494.3	2206.6	187.0	23774.8	6959.1	3975.1
2007	28173.7	2411.4	249.6	28447.6	7499.2	4057.7
2008	39733.5	2669.8	364.0	30694.3	10143.7	5206.6
2009	39011.2	2796.1	470.0	28810.6	10149.8	5509.7
2010	46175.9	1772.6	236.0	16524.6	9684.7	5625.8
2011	52257.4	3187.3	377.5	15930.0	8251.2	6679.3

Source: Calculations on the Tempo-Online databases, INS, 2013.

The *exports of goods and services* of the agrofood sector has registered an upward trend in the period 2000-2011, primarily in the food industry, beverages and tobacco. With no exception, including here the agricultural sector, the exports of goods and services from this area marking significant increases (**Table no.4**).

Table no.4. Evolution of the exports of goods and services of the agrofood sector on activities in the period 2000-2011 (mil.lei prices 2011)

	Agriculture, hunting and support services	Silviculture and forestry	Food industry	Beverage production	Tobacco production
2000	746.2	173.5	409.0	69.5	7.8
2001	1195.1	80.0	654.0	101.0	42.0
2002	1349.9	60.4	632.9	131.7	65.9
2003	1597.2	106.7	853.6	140.6	40.4
2004	1717.9	114.5	1022.2	139.0	15.5
2005	1688.9	88.9	1086.0	116.9	17.0
2006	1754.9	88.6	1195.4	120.5	27.6
2007	2077.3	97.5	1233.2	135.6	64.4
2008	3883.0	79.6	1875.3	181.7	71.8
2009	5262.9	147.1	2309.6	244.7	161.3
2010	7972.9	289.3	3639.4	281.3	1644.1
2011	9904.6	632.4	5082.3	340.0	1944.5
<b>2011/2000 (%)</b>	<b>1227.4</b>	<b>264.5</b>	<b>1142.7</b>	<b>389.3</b>	<b>24753.7</b>

Source: Calculations on the Tempo-Online databases, INS, 2013.

Finally, the *food inventories* registered a fluctuating trend and diverging from one year to another, but also from one activity to another. Thus, except for the manufacture of tobacco products where changes in inventories is part of a downward trend for other activities this indicator is characterized by dynamic increasing (**Table No.5**).

Table no.5. Evolution of the inventories of the agrofood sector on activities in the period 2000-2011 (mil.lei prices 2011)

	<b>Agriculture, hunting and support services</b>	<b>Silviculture and forestry</b>	<b>Fishing and aquaculture</b>	<b>Food industry</b>	<b>Beverage production</b>	<b>Tobacco production</b>
2000	193.6	35.1	3.2	138.5	11.4	6.7
2001	591.7	190.0	11.8	486.6	51.4	37.9
2002	68.4	55.3	3.6	280.7	45.5	63.0
2003	194.9	-3.7	11.7	130.4	38.3	23.6
2004	2811.8	74.7	15.2	424.2	76.7	31.6
2005	106.8	85.5	15.8	51.0	13.0	-0.2
2006	677.0	98.1	50.5	297.3	33.9	1.5
2007	496.7	97.4	62.2	339.4	40.7	12.3
2008	58.9	7.6	7.7	-294.4	-15.0	-18.8
2009	952.0	38.0	48.9	3552.9	1166.7	1983.0
2010	1181.9	90.3	40.4	381.1	155.7	-219.0
2011	1706.0	35.5	37.6	787.4	89.8	-530.2
<b>2011/2000 (%)</b>	<b>781.2</b>	<b>1.1</b>	<b>1067.1</b>	<b>468.4</b>	<b>691.0</b>	<b>-7954.9</b>

Source: Calculations on the Tempo-Online databases, INS, 2013.

As a result indicator, the *value of agricultural production*, expressed in prices of 2011 increased compared to 2000 by three times, reaching in 2011 to 76,508.7 million. Reported to the intermediate consumption, the agricultural output registered a slight decline in 12 years and from 1.9 lei production / 1 leu intermediate consumption (2000) to 0.88 lei production / 1 leu intermediate consumption (2011), a phenomenon explained by the accelerated rhythm of the intermediate consumption growth in contrast with the production value obtained.

A similar analysis can be performed given the gross value added in the food, based on statistical information available from the national accounts. It should be noted that currently the national accounts provide information to the level of 2010, however, to ensure comparability of data were used for agriculture and estimates made by the National Commission for Prognosis for 2011. The gross value added of food sector for 2011 was estimated taking into account the average annual growth in the period 2000-2010.

Due to methodological explanations above, gross value added was deflated using the same GDP deflator, analysis of data obtained leads to the following conclusions. The period 2000-2011 is characterized by a visible trend GVA growth in the agrofood sector, both in terms of agriculture and especially in the manufacturing sector (**Table No.6**).

Table no.6. Evolution of the agrofood gross value added in the period (mil.lei prices 2011)

	<b>Agriculture</b>	<b>Food, beverage and tobacco industry</b>
2000	13459.0	7956.2
2001	22705.9	12497.1
2002	23885.1	13668.3
2003	29993.1	15874.1
2004	37577.1	18354.8
2005	28221.3	20295.2
2006	28929.0	21448.6
2007	24303.2	23407.6
2008	32216.9	25870.9

	<b>Agriculture</b>	<b>Food, beverage and tobacco industry</b>
2009	32645.3	26950.2
2010	30531.4	29574.2
2011	36400.0	34365.5

Source: Calculations on the Tempo-Online databases, INS, 2013.

Reported to the intermediate consumption, gross value added registered a slow recoil, generated by accelerated growth rate of intermediate consumption to that of GVA. The level of agriculture GVA / 1 leu intermediate consumption decreased by 17.2% in 2011 compared to 2000, while food, beverages and tobacco industry, witnessing a growth of 0.5 lei GVA / 1 leu intermediate consumption (2000) to 0.7 GVA / 1 leu intermediate consumption in 2011.

## CONCLUSIONS

As a continuing topic of debate, generated by the need to identify new influencing factors and their impact on the formation of added value in the economy, the issue of economic growth in the food and determinants of intensive or extensive nature still arouses heated discussion taking account the specific characteristics of the industry and its importance in ensuring the domestic demand of food for the population. Starting from general economic theory, this approach attempted to identify a number of determinants (factors) that influence the intensive and extensive growth of the Romanian agrofood sector. In this regard, given the peculiarities food economy, including both agriculture and food, beverage and tobacco industry present approach revealed the existence of significant correlations between gross value added and a number of factors whose evolution puts full mark on sectoral growth. From this perspective, it should be noted that among the determinants of the extensive nature may be included intermediate consumption, final consumption and taxes on product level, while determinants category cannot miss the intensive agricultural production, value of production for the market, changes in inventories and export value. Although in the literature there is a significantly higher number of determinants of economic growth, their analysis and customization in the food sector revealed a weak influence on the level of gross value added sector.

The analysis of data revealed that the total agricultural production and the gross value added relative to 1 leu intermediate consumption registered during 2000-2011 a downward trend, particularly in the agriculture, which reflects the in further extensive value Romanian agrofood sector.

## BIBLIOGRAPHY

1. Barro R. J. (1997). Determinants of Economic Growth: A Cross-Country Empirical Study, Cambridge MA, MIT Press.
2. Cătăneț, D.et.all.(2007). Determinanții creșterii economice și competitivitatea României. o analiză empirică, în volumul: "România în Uniunea Europeană. Calitatea integrării. Creștere. Competență. Ocupare".
3. \* \* (1990-2013). Baza de date Tempo-Online, INS.
4. \* \* (2013). Prognoză pe termen mediu 2013-3016, Comisia Națională de Prognoză.

## INNOVATIVE MODEL OF COOPERATION FOR SMALL AGRICULTURAL PRODUCERS

ALEXANDRU LĂPUȘAN<sup>1</sup>

**Abstract:** *The present study has the objective to elaborate an innovative model of cooperation that can represent a general structural solution, beneficial to small agricultural producers, being one of the very few real solutions that can connect them to the agricultural market and to development resources. In the first part of the paper, it is presented a retrospective of the agricultural cooperation route in Romania. The prospects of agricultural cooperation are oriented toward directions and domains of agriculture, for that the innovative cooperation model proposed can represent the functional and advantageous solution for the small agricultural producer. By the interpretation of the RGA data, 2002, 2010, regarding agricultural holdings, corroborated with theoretical and legislative aspects, it was pursued to realize an analysis of the agriculture particularities from our country, highlighting the necessity to develop a cooperation structures (1-st degree cooperative) in agriculture. The perspective analysis of small farmers to join, can be interpreted starting from the questions (Who are the small producers?, Why must find a solution for them? What is their direction of evolution? Why do not associate?) relevant found in SWOT analysis of small individual farms. In the last part of the paper it is defined the legal framework for cooperation of small individual producers, in this context developing the innovative cooperation model, operating principles and conditions for this model to be viable.*

**Keywords:** *innovative model of cooperation, agricultural cooperation, individual agricultural holdings, small agricultural producer*

### INTRODUCTION

The first cooperatives appeared in the middle of XIX-th century in the Great Britain (Pioneers from Rochdale in 1844, in the domain of leather-shoes production) and Germany (cooperation of Raiffeisen type in 1846 and Schulze-Delitzsch type in 1847, in the domain of rural credit). Agricultural cooperatives have developed rapidly, in Germany and the Netherlands, with the expansion of colonial liberation movements, as an effect of defense for small farmers against the policy of redirection of large companies' capital toward European agriculture.

The agricultural cooperatives (particularly those aimed at collecting, storing and capitalization of cereals, providing complex equipment necessary to the working technologies, processing and capitalization of some products: milk, meat, etc.) were the saving solution that associated have identified and sustained differentiated, accepting the principle of equal vote. In other words, only when the threat of existence was perceptible, it was agreed the association, in which that with greater potential, voluntarily contributed more to the establishment of cooperative, accepting the compromise of equal vote (one man one vote). Under these conditions, between associated could exist only persons that had the same purpose and therefore the same interests.

The first definition of cooperation is attributed to Robert Owen (1771-1858), but the definition of cooperation as a general or specific organization (for various objects of activity), is reflected in the concerns of a long series of researchers, in various compendiums, dictionaries and clear in legislation.

The definition of cooperation given by Centenary Congress of the International Cooperative Alliance (ICA) in 1966 is much broader, general, allowing the inclusion in the international structures of the diversity of cooperative legal entities: *Cooperative is an autonomous association of persons united voluntarily to meet the economic, social and cultural needs and aspirations, through a institution jointly owned and controlled systematically.*

#### **Cooperation in Romania, in the prewar period**

In Romania, among the promoters of cooperation, were Ion Ionescu de la Brad (1818-1891) and Spiru Haret (1851-1912), the latter being considered the founder of the popular

---

<sup>1</sup> PhD Eng., Director of Research Institute for Agriculture Economy and Rural Development – ASAS, Bucharest, 61 Mărăști Blvd., e-mail: lapusan.alexandru@iceadr.ro

cooperative banks and the initiator of the first law of cooperation. In the interwar period, political personalities with concerns in the cooperation domain are:

I.G. Duca, Ion Mihalache, Virgil N. Madgearu, Gromoslav Mladenatz etc. I.G. Duca, Minister of Agriculture and Domains underlined in the letter for King Ferdinand, after the approval of *Decree-Law 3922 / 31.12.1918, relative to the establishing of central body of cooperation ...*

*"Sire, ... Indeed, the cooperation started at us in so unfavorable conditions and had to overcome so great difficulties that the State had to take under its direct care of the whole movement. Without close mixture, without wide help, without thorough control of the State, nor popular Banks, or village Cooperatives of all kinds, no leasing or purchasing Communities could have... to bring to rural population the benefits brought them, the most thorough, maybe, from all the gains that our peasantry whom from the establishing of the modern Romanian State. It is true, however, that this tutelage of the State is not an ideal ... and that trend should be like the movement to be led by its own means and its own power. "*

Table no.1: **Agricultural cooperatives of production and consumption - 1937**

Province	No. coop.	No. members	Capital thousand lei
Moldova	83	5.562	4.389
Muntenia	155	12.337	5.185
Dobrogea	60	4.739	3.877
Oltenia	29	2.597	2.085
Basarabia	65	5.071	3.284
Bucovina	40	2.695	1.449
Transilvania	77	4.792	4.964
Total	509	37.793	25.233

Source: L'agriculture en Roumanie, Atlas Statistique, Bucharest 1938

The Great Unification of 1918 meant the reunification in a unitary coordination of the cooperative movement in all provinces. Due to the concerns of the state: adoption of a favorable legislation, establishment of specific coordination institutions, insuring mechanisms and resources to finance agriculture, the cooperation has a significant development. Compared to 1918, following the inventory made in 1931, the number of cooperatives will double. On 1 January 1931 the number of cooperatives was 7,436, of which 6.879 in the rural area (A.G. Galan). Of those working in rural areas, 4824 representing 70.12% of total were credit cooperatives (popular banks) and only 2,055 were agricultural cooperatives for services or forestry. O relatively similar situation is maintained also at the end of 1937, when recorded 7741 stock cooperatives, of which 5,183 were credit unions (66%).

Table no.2: **Agricultural associations for renting land - 1937**

Province	No. associations	No. members	Capital thousand lei	Surfaces rented
Moldova	37	4.125	5.652	8.792
Muntenia	149	12920	5.993	24.993
Dobrogea	x	x	x	x
Oltenia	35	3.064	1.975	3.221
Basarabia	2	246	37	562
Bucovina	1	65	500	87
Transilvania	7	408	557	3.846
Total	<b>231</b>	<b>20.828</b>	<b>14.714</b>	<b>41.501</b>

Source: L'agriculture en Roumanie, Atlas Statistique, Bucharest 1938

The other cooperatives in number of 2,087 (34%) covers the following areas: consumer cooperatives (13%), supply and delivery (4.6%), communities for purchase and lease (2.46%), forestry (3.24%), other profiles (10.7%). Due to disfunctionalities in the system (generated by the system rigidity, but mostly because of political struggle and corruption), in 1932, a law for the conversion of agricultural debts was adopted and in 1934 the law on agricultural and urban debts

conversion, leading to stopping the financing of small producer. The National Bank tried to compensate the lack of liquidity (providing funds for farmers, through the Popular Bank and private banks).

The approval of the Law on the cooperation reform (23 July 1938) and the coverage by the state of losses (2.5 billions lei) after conversion law enforcement, on external tensions finalized with the beginning of the World War II, meant the decline of Romanian agricultural cooperation. Unlike European experiences, where, after establishing of the new cooperative structures, the authorities encouraged freedom of initiative, in Romania, the state was a disturbing and inhibiting of their evolution. Political struggle and corruption occurred also in the cooperation, causing large imbalances both in terms of organization and finance.

The Minister of agriculture and domains, Vasile P. Sassu, ordered during 1938-1939 an analysis of Romanian cooperative system, conducted by the Danish expert M.Gormsen. Some of the conclusions of analysis at the time, are viable solutions for the current situation of agriculture: *limitation by law of divisibility of agricultural properties, merging properties, cadastre generalization, generalization of crop rotation, local roads, plants and animals of superior varieties and breeds, agricultural education, elimination of landowners interests, correct and disinterested operation of courts and central and local administrations etc.*

One of the great Romanian specialists of the time, Marin Chirițescu - Arva (1889-1935), considered that "*organizing the agricultural peasant production based on cooperatives, with preserving the private property*" could be the solution that would give perennity to agricultural cooperation. An element to note, less important at all, is that the organization and development of structures with beneficial effects for agriculture, particularly those aimed at agricultural cooperation, were promoted by outstanding personalities of the time, have been implemented and have developed with support from the state and have fallen due to ignorance of the realistic solutions of moment, the exacerbation of the political struggle and corruption.

### **The necessity of occurrence of cooperation**

People acted jointly since ancient times to achieve objectives such as: food security, defense, expansion, etc. As the joint actions passed from the state of native motivation in the conscious, the society outlined two broad categories of activities: state administrative (state power) and economic / lucrative / commercial (which produced goods and services for all society). Persons (individual and legal) are associated for the common development of patrimony / lucrative activities (in order to obtain profit) or non-patrimony / non-lucrative (non-profit). For the lucrative activities, the consecrated form of association is represented by the **commercial society**, in its various forms of organization, defined by Law 31/1990 (R): joint stock company (SA) with limited liability (SRL), etc.

**The goal of commercial societies is to obtain profit**, in order to develop the company and / or distribution as dividends to shareholders. The right of expression for associates and the right for benefits in the company are established by statute, but in all cases these rights are proportional with the contribution to the capital. Upon liquidation of companies, after the payment of all obligations, the assets remaining (if there exists) is divided (in value) according to the percentage contribution of each partner to share capital. In contrast to the commercial societies, are the non -patrimonial / non-lucrative / non-profit **associations and foundations**, defined by Government Ordinance 26/2000, amended by a series of subsequent laws. These legal entities (minimum three persons for associations and one or more persons for foundations) aimed at developing activities for public interest or for community, and (only for associations) activities in their own interest (non-patrimonial purpose). *The initial patrimony (which has a level determined by the law) is established by the associates' contribution and is not eligible for refund in case of liquidation of the sssociation / foundation.*

With the evolution of society and the modernization of lucrative structures, the state was put in a position to adapt the mechanisms for surveillance, knowledge and taxing each economic

sector's income. The dilemma between the necessity to tax any income and to support activities which took over a part of public needs and could reduce certain costs incumbent the state, led to the adoption of differentiated tax systems.

The economic and social structures have known a great development while the evolution of democracy.

*The cooperatives have emerged as a social economic necessity, addressing the needs of the large class of small producers. Taking specific elements from the objectives and the purpose of companies and non-profit entities, the cooperatives were able to shape a distinctive purpose that has proven its viability and offer future development prospects.*

***Agricultural cooperatives in Romania, in 2010***

From the analysis of existing public data, in 2010 results that fewer cooperatives have over 10 members, and at the country level, the total number of producers associated in agricultural cooperatives is around 1,000 people. Most of the existing cooperatives are not established on cooperation principles, do not have the motivation of operation in this structure and therefore the organizational and economic performances are not encouraging.

**Table no. 3: Agricultural cooperatives from Romania**

No.	County /(No. of counties)	No. agr. coop. / county	Total agr. coop. (No.col.1x col 2.)
0	1	2	3
1	CJ, NT, TL, HD, VS (Nr.=5)	0	0
2	GL, BT, GJ, CS, BN, GR (Nr.=6)	1	6
3	IS, PH, AR, SB, MS, MM, VL, MH, AB, CV (Nr.= 10)	2	20
4	BC, SJ, HR, IF, TM (Nr.= 5)	3	15
5	BV, AG, BZ, SM (Nr.= 4)	4	16
6	DJ, BR, BH (Nr.=3)	5	15
7	SV, DB, IL (Nr.= 3)	6	18
8	CL, TL (Nr.= 2)	7	14
9	OT (Nr.= 1)	10	10
10	VN (Nr.= 1)	16	16
11	CT (Nr.= 1)	19	19
12	TOTAL	x	149

Source: Data processing after MADR-ANCA – Agricultural cooperatives 2010

The number and structure of agricultural cooperatives by counties reflect the slow process of their formation (Table 3), the last two years not registering any new cooperative. The structure of the cooperation on production activities reflects a very different coverage (Table 4). The entities from agriculture, including agricultural cooperation, are represented at European level through institutions partners to the executive authorities. Immediately after the signing of the Treaty of Rome for establishing the European Economic Community (EEC, 25 March 1957) which already contained a number of provisions of the future Common Agricultural Policy (CAP), was established on September 6, 1958 the Committee of Professional Organisations from Agricultural (COPA) and in September 29, 1959 the General Confederation of Agricultural Cooperatives (COGECA), institutions representing companies (farms), agricultural cooperatives respectively, in relation with the European authorities. From September 1, 1962, the secretariats of the two representative institutions join and establish COPA-COGECA. The National Federation of Romanian Farmers (FNPAR) is a member of the European COPA-COGECA.

**Table no. 4: The structure of agricultural cooperatives by production activity**

No.	Main object of activity	No. coop.	No.	Main object of activity	No. coop.
1	Production of vegetables (including greenhouses)	23	9	Cultivating potatoes	3
2	Vegetal production (cereals)	18	10	Raising pigs	2
3	Beekeeping	18	11	Raising poultry	1
4	Raising sheep (processing sheep milk)	13	12	Slaughtering/ processing meat	3
5	Raising cattle (producing/ processing milk)	10	12	Raising snails	1
6	Horticulture	10	14	Other agr. coop. for mixt production: vegetal-animal), processing, comerce etc.	30
7	Producing wine	7	15	Services for agriculture	5
8	Fishing	5	<b>TOTAL agricultural cooperatives 31.12.2009</b>		<b>149</b>

Source: Data processing after MADR-ANCA – Agricultural cooperatives 2010

*In Romania, there have not been created up to present cooperation structures, similar to those from the old Member States of the European Union. It is obviously that no specific structures of representation there are. The lack of a clear attitude of the political class to reflect in the government engagement programs and the lack of adequate legislation to stimulate the establishing and development of cooperatives could mean, for 65% of Romania's agriculture not only further reduce of the chances of benefiting from European funds, but most likely, the degradation of the situation pursuant to the new CAP regulations since 2014.*

### **Legal organization of agricultural holdings in Romania**

The agricultural holdings from Romania are organized in farms with legal personality and without personality which are divided into authorized physical persons (OUG no. 44/2008) and individual agricultural holdings. To use this analysis we refer to individual agricultural holdings.

The changes in the structure of agricultural holdings in the period 2002 – 2010 result from the data contained in the tables below.

**Table no. 5: The number and size of agricultural holdings in Romania**

	UM	2002	2010	2010/2002 +/-
<b>Total agricultural holdings without legal personality, of which:</b>	<b>thousands</b>	<b>4.299</b>	<b>3721.8</b>	<b>-577.2</b>
Individual agricultural holdings		4277.3	3686,7	-590.6
Individual agricultural holdings	%	99.5	99.1	x
<b>Total agricultural surface of holdings</b>	<b>th. ha</b>	<b>15.708</b>	<b>15.867</b>	<b>+159.0</b>
Individual agricultural holdings		8.454	8194	-260.0
Individual agricultural holdings	%	53.8	51.6	x
<b>Agricultural surface used of agricultural holdings</b>	<b>th. ha</b>	<b>13.931</b>	<b>13.298</b>	<b>-633.0</b>
Individual agricultural holdings		7708.8	7154.2	-554.6
Individual agricultural holdings	%	55.3	53.8	x
<b>Average agricultural surface used of agricultural holdings</b>	<b>ha</b>	<b>3,11</b>	<b>3,45</b>	<b>+0.3</b>
Individual agricultural holdings		1,80	1,94	+0.16
Cooperative units	no.	87	67	-20

Source: General Agricultural Census, 2002, 2010

The number of individual farms has decreased in the period 2002-2010, with - 590 000 (-13.8%), calculated as a dynamic of the number of agricultural holdings in 2010 compared to 2002. The share of individual agricultural holdings in total number of agricultural holdings is almost constant, ranging from 99.5% in 2002 to 99.1% (-0.4%) in 2010. The total area used by farms is reduced by -633 000 ha (4.5%) between 2002-2010, which means an average size of 3.11- 3.45 ha / farm (+0.3 ha). The share of individual holdings in total agricultural area (UAA) is reduced by 1.5% between 2002-2010.

The number of people who worked in agriculture decreased from 9,007,000 in 2002 to 7,159,000 in 2010.

There are a total of 67 agricultural cooperatives using an average agricultural surface of 122.03 ha / farm. Although the number of agricultural associations in 2010 was 127 units, not all have farms, but have other types of services for members.

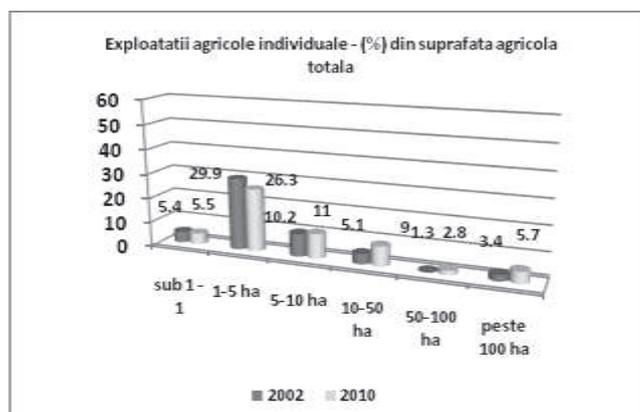
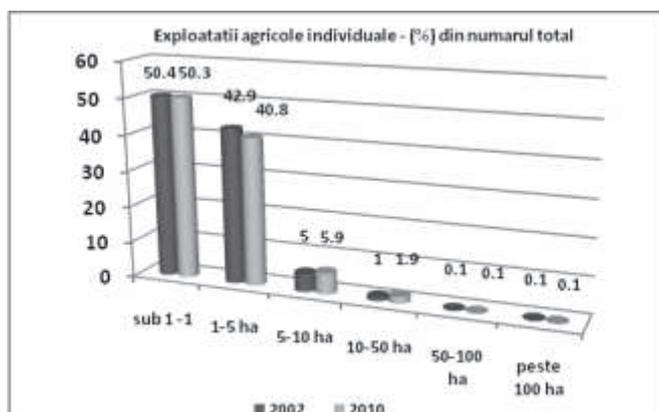
From the analysis of the *General Agricultural Census* data, in terms of the number of agricultural individual holdings, by size classes, it appears that in the period 2002-2010, the small farms in class 0.1 to 1 ha, have the highest share of over 50% (in 2010), using 5.5% of the agricultural area, which is a clear indication of the persistence of phenomenon of subsistence farming. From the individual analysis, by size classes, it can be observed the downward trend in individual holdings (for range below 1 ha - 5 ha) in favor of larger sizes. The size class between 10-50 hectares has the highest share of ranking (+ 3.9%), followed by the class over 100 ha (+ 2.3%) and the class 50-100 ha (+1.5%). (Table 6)

The size class size between 10-50 hectares has the highest share of ranking (+ 3.9%), followed by class over 100 ha (+ 2.3%) and class 50-100 ha (+1.5%). (Table 6)

**Table no. 6: Situation of individual agricultural holdings in Romania**

Size class (ha)	2002			2010		
	Number of individual agricultural holdings (th.)	% of the total number	% of UAA	Number of individual agricultural holdings (th.)	% of the total number	% of UAA
under 0.1 -1	2166.0	50.4	5.4	1871.0	50.3	5.5
1 - 5	1846.1	42.9	29.9	1518.3	40.8	26.3
5 - 10	215.7	5.0	10.2	219.0	5.9	11.0
10 - 50	44.5	1.0	5.1	69.5	1.9	9.0
50 - 100	2.8	0.1	1.3	5.4	0.1	2.8
over 100	2.2	0.1	3.4	3.6	0.1	5.7
Total	4277.3	99.5	55.3	3686.7	99.1	53.8
Average size (ha)	1.80			1.94		

Source: RGA 2002, 2010



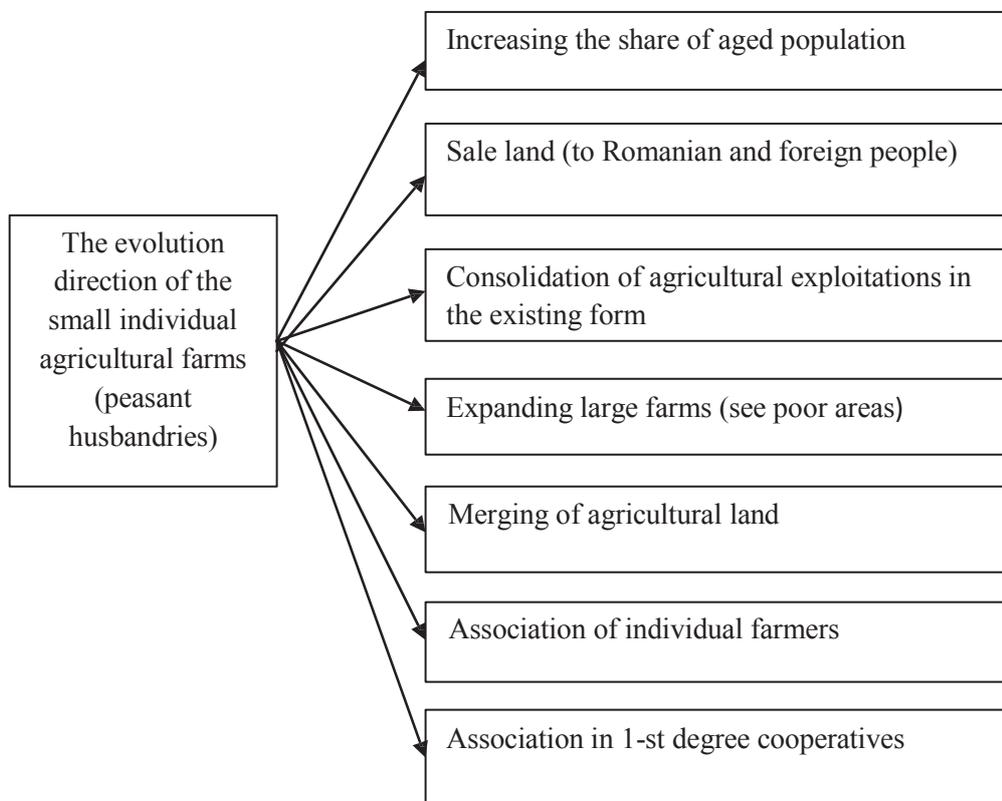
**Who are the small producers?** Because there is no definition of the small farms, for the use of this analysis we will consider the holdings under 5 ha. The 3.3 million holdings, under 5 hectares, mean 91% of the farms, working 47.4% of the national agricultural surface. These small farms have a dual role for the rural world, because it provides food and social security, contribute to environmental preservation through the use of traditional production methods and to ensure a certain social protection for rural residents who worked in the former agricultural cooperatives of production and whose pensions are insufficient for a decent living. Overall in 2010, individual farms were exploiting 53.8% of UAA, the remaining of 47.2% being of the holdings with legal personality.

In the livestock sector, over 90% of animals are in the individual agricultural holdings, except porcine species (65.5%) and poultry (61.4%). RGA data presented in 2010 confirm the family character of the majority of agricultural holdings.

**Why we need to find a solution for the small producers?** The small producers, both in the plant sector and in animal husbandry have a considerable share in the total number of farms (over 90%), both as land area and as livestock. The average size of individual farms (country level) increased by 0.14% in 8 years. The negative consequences are related to excessive parceling of the land, which leads to hard administration of the production quotas, subsidies, and in general of any agricultural policy measures.

**Which is their evolution direction?** The general trend of evolution can hide a wide variety of situations depending on geographic location and technical and economic orientation of the holdings. We appreciate that the evolution direction of small individual farms can turn to (Fig. No.1):

**Fig. no. 1 Possible (theoretically) evolutions**



**Table no.7: The SWOT analysis of small individual farms (peasant husbandries)**

STRENGTHS	WEAKNESSES	OPPORTUNITIES	RISKS
<ul style="list-style-type: none"> <li>➤ significant agricultural area with a high percentage of utilized agricultural area</li> <li>➤ high percentages of those working in agriculture;</li> <li>➤ tradition in the domain of raising animals</li> <li>➤ allocation of significant financial packages for farm development</li> <li>➤ Romanian market for agricultural products has a high growth potential.</li> <li>➤ the offer for healthy products is of great variety</li> <li>➤ high potential for adaptation and response to public support perceptible.</li> </ul>	<ul style="list-style-type: none"> <li>➤ large number of small farms (subsistence and semi-subsistence) using a large share of UAA and a large part of the workforce.</li> <li>➤ have not been defined the types of farms, peasant husbandries, which are intended to be supported differentially by public policies</li> <li>➤ reticences to association for capitalizing the production obtained from agriculture.</li> <li>➤ legislation for agricultural cooperation, confused and disincentive.</li> <li>➤ inefficient operation of the market for agricultural products in some sectors. Lack of local market structures.</li> <li>➤ weak development of non-agricultural activities generates dependence of rural population on subsistence agriculture.</li> <li>➤ low level of household income.</li> <li>➤ There are no programs for:</li> <li>➤ integration of agricultural production with processing, industrialization and marketing of agricultural products.</li> <li>➤ development of local cooperative network.</li> <li>➤ principles which state support to agricultural producers should be based on</li> <li>➤ low access to financial resources;</li> <li>➤ insufficient infrastructure (material and informational).</li> <li>➤ after 1989 did not exist programs to develop cooperative networks</li> </ul>	<ul style="list-style-type: none"> <li>➤ can have access to markets (establishment of forms of cooperation).</li> <li>➤ access to PNDR 2014-2020 program</li> <li>➤ easier access to information about domestic and foreign markets.</li> <li>➤ important financial allocation for Romania in the CAP.</li> <li>➤ development possibilities of processing and distribution activities in rural areas</li> <li>➤ creation and development of local supply chains for food products and sales networks that connect producers and consumers, including ensuring a better link between rural and urban areas.</li> <li>➤ increasing the quantity and quality of agricultural products.</li> <li>➤ possibility of using the risk management tools in agriculture (crop, animals and plants insurance, the establishment of mutual funds, income stabilization).</li> <li>➤ increasing the production yields of farms and producers' incomes through the rational use of resources.</li> <li>➤ economic and organizational consolidation of farms;</li> <li>➤ development of cooperative local networks.</li> </ul>	<ul style="list-style-type: none"> <li>➤ maintain a high degree of fragmentation of farms, with implications at farm level performance and viability.</li> <li>➤ can become victims of large landowners</li> <li>➤ abandonment of activity due to increased costs for agriculture inputs (fuel, chemical products for fertilizing and treatment) and for cost of bank loans.</li> <li>➤ mistrust of small producers in associative forms;</li> <li>➤ there is no adequate and stimulative legislation</li> <li>➤ emphasizing the non-using degree of labor force from rural areas.</li> <li>➤ maintaining a part of the not taxed economy</li> <li>➤ maintain the current state of demographic and managerial aging of farmers.</li> <li>➤ menținerea gradului redus de inserție în fluxurile de piață a gospodăriilor țărănești.</li> <li>➤ maintaining the low level of insertion peasant husbandries in the market flows</li> </ul>

Trying an assessment of the opportunities presented in the SWOT analysis, we can say that:

- the association in producers groups is a solution for specialized producers (vegetables, fruits, etc.);
- the association in 1-st degree cooperatives is a solution for the individual farmer.

***Why the individual small farmers do not associate?*** In our opinion, the small agricultural producers are reluctant to association, due to:

- confusion (maintained) between former CAP and agricultural cooperation;
- 24% VAT and 16% tax on profit;
- absence of programs to stimulate the establishment and maintenance of agricultural cooperatives, etc.

### ***Cooperation***

The legal framework of cooperation of individual small producer is the Law 566/2004. According to this law, the cooperatives are associations of physic persons (cooperatives of I-st degree) or legal persons (cooperatives of II-nd degree: associations of cooperatives of I-st degree), that owning properties and total independence of their production activity, are associated in a new legal entity, to solve common needs (supply, storage, marketing, processing, social, etc.). The members of the cooperative set at establish a patrimony, each of them owning shares in proportion with the contribution brought. In the decisional process, however, each member has one vote. When loss the membership, the former cooperator or its successors receive a part of the share (divisible) of the value of shares had / inherited, the other part (indivisible) remaining for the cooperative development.

The cooperatives had and have the support of public authorities due to at least the following reasons:

- using of local resources in their activities (raw materials, labor force, public utilities, etc.);
- ensure a big volume of products, covering a diverse range of markets;
- are tax paying (for patrimony and commercial activities);
- develop a mutual activity and for the support of local communities that co-operators are bound organic and functional;
- their disappearance could create (at least locally) economic and social imbalances;
- are interest groups with voting right.

Even if there was a differentiated approach of the states for cooperation, it can say that outside of the discriminatory treatment in the application of general economic policies, the cooperation has benefited (and benefits) of fiscal advantages, motivated by the mutual activity.

*Once become a legal entity, the cooperative, or any association of it with third physic or legal persons, must comply with the law, without any discrimination or advantage that would vitiate the economic environment in relation with other market players. The purpose of cooperatives is not primarily the profit obtaining, but satisfying the needs of members. Like any economic entity, to achieve its mission, the cooperative must register a positive economic balance (revenue-expenditures) and therefore a profit, which does not have as unique and priority destination the distribution of dividends.*

***The cooperators put for their base of association the status of owners for production units*** (handicraft workshop, agricultural farm, peasant husbandry, equipment etc., which generally provide the resources of their family) ***and associates under the seven cooperative principles, in a new legal entity called cooperative, to put in value the own production units by: supply*** (rhythmic, raw materials and good quality products, at low price), ***storing production*** (grain silos, warehouses for fruits and vegetables, cold storages etc.), ***marketing of production*** (fresh vegetables and fruits, etc.), ***processing*** (mills, slaughterhouses, dairies, canned products, beverages, etc.), ***funding and activities*** (social or mutual) ***aimed at the community and individual needs. This may be one of the definitions of agricultural cooperatives of I-st degree*** (association of physic persons) ***in its native state, as it emerged and developed*** (over 150 years) ***throughout the West.***

It results that these legal entities are associations constituted of owners of production units (quality that and keep fully and after association), which in this quality associate with other partners to solve common problems. Not any person can associate to form a cooperative. These people should have the same quality in association, the same interests and to agree the seven cooperative principles which are the base of establishing the cooperative.

### Innovative model of cooperation

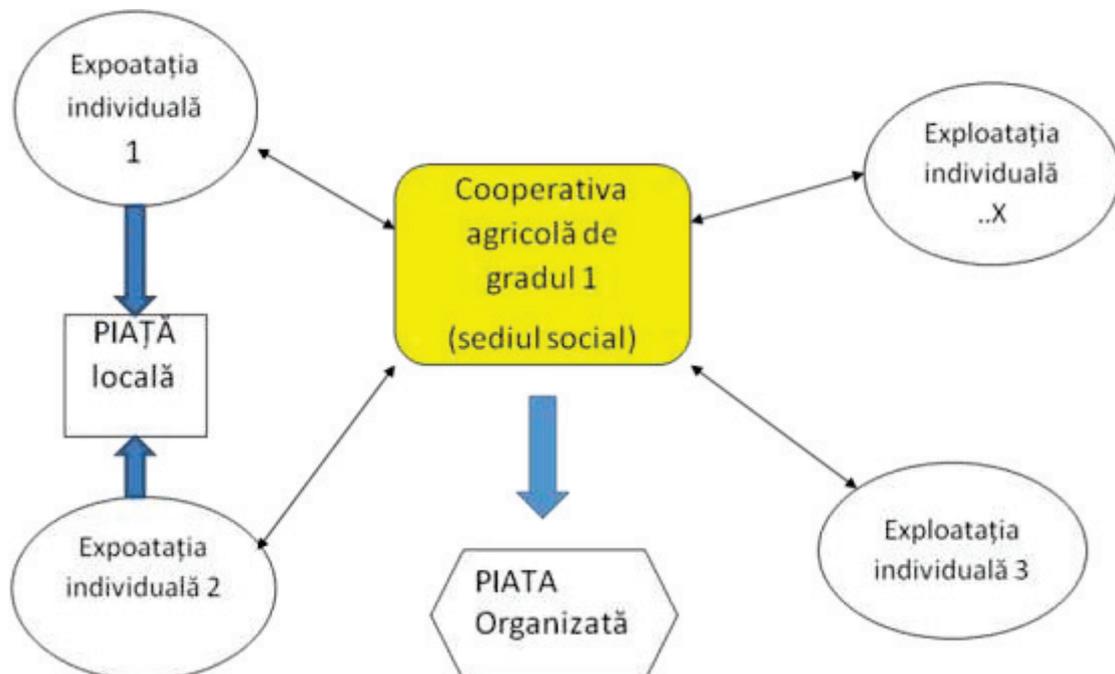
The innovative model of cooperation for small agricultural producers (Figure no. 2) we propose shows the necessity to develop forms of cooperation in order to capitalize production in terms of opening market opportunities for the small producer, by promoting and selling products, individually, or jointly. Direct sale by the small producer is part of this aspect, and this can be done directly from the farm or through markets.

The circuits of selling agricultural products directly or through cooperative can take place in a variety of ways. Thus there may be:

- Variant of producer - local market, which is the shortest distribution channel. In such a circuit, can be found different products, such as vegetables, eggs, meat etc. and bio-organic food.
- Variant of producer - cooperative - organized market. In this case, the cooperative takes goods from producers, through the warehouses, distribution or procurement and reception organized centers, which later, based on arrangements between cooperative and buyer (partnership), it sells. This is the case of fruits and vegetables produced in high season and for fresh consumption.

Support is needed to facilitate the access for small producers on market and to enter and operate in these markets at the required standards, including in food safety issues. Thus, by integrated investment in modernization of production, collection, storage and processing would give small producers the opportunity to sale products on local markets, to expand the range of products and promote the marketing of local products.

Fig. no 2: Innovative model of cooperation



### Principles / conditions of the innovative model of cooperation

#### Principles

- Apply the seven principles of cooperation defined by the Law 566/2004;
- The household as a whole, to be considered as the production unit of the cooperator;
- The relation cooperator - cooperative will be considered as being inside the cooperative (without taxes for movement of goods, contributions, etc.);

- The cooperator will be taxed based on statements (ANAF 221 and 260) giving the possibility of deducting all costs related to agricultural activity (including for own consumption);
- Application of PNDR projects similar to POSDRU Axis 6 (centres of sociale economy - approx. 200 thousand euro / center) for sustaining the establishment of cooperatives;
- The small individual producer, unauthorized individual person will be considered vulnerable for the purposes of prioritizing political programs in this direction.

### Conditions:

- Amend legislation;
- Adaptation of European programs to support agricultural cooperatives;

## BIBLIOGRAPHY

1. Băcescu Marius: **Cooperăția rurală - o șansă pentru revigorarea satului românesc** - *Revista Română de Statistică nr. 6/2010*
2. Bică Valer-Vasile: **Contractul de arendare** - Editura Cermaprint, 2005 ISBN 973-87013-2-5
3. Bohareț Valentin, Dobay Krisztina: **Asociații de marketing în agricultură**, Editura Terra Nostra, Iași 2001 ISBN 973-99399-6-1
4. Bold Ioan, Crăciun Avram: **Structuri agricole în lume** - Editura MIRTON, Timișoara, 1996
5. Cruceru Dan: **Cooperăția în România** - Editura Artifex, București, 1998, ISBN 973-97735-1-6
6. Cruceru Dan: **Istoria și doctrina cooperatistă** - Editura Artifex, București, 1996
7. Dângă Dumitru: **Managementul societăților cooperative** - Editura Artifex, București, 2000
8. Gromoslav Mladenatz: **Tratat general de cooperăție** - București, 1934
9. G. Ionescu - **Țesești: Reforma agrară și producțiunea - cu un program pentru ridicarea agriculturii** - Institutul Economic Românesc, Editura Cartea Românească SA, București, 1925
10. Lăpușan Alexandru: **Structuri agrare** - Banea Press București 2002 ISBN 973-8115-18-3
18. Neagu Victor, Gheorghe Stanciu: **România - Carta europeană a spațiului rural** - Editura Ceres, 1996 ISBN 973-40-0374-7
11. Otiman Păun: **Agricultura României la cumpăna dintre milenii II și III** - Editura Helicon, Timișoara, 1994
12. Popovici Dan Cristian: **Experiența istorică a României în organizarea, funcționarea și dezvoltarea cooperăției agricole-perspective** - Parlamentul României - Camera Deputaților, Monitorul Oficial București, 1995
13. \* \* \* **Why do we need a Common Agriculture Policy** - European Commission, DG - Agriculture and Rural Development, December, 2009
14. \* \* \* **Scenar 2020-II, Update of scenario study on agriculture and the rural world- final report** - European Commission, DG - Agriculture and Rural Development, December, 2009
14. \* \* \* **Cooperative 2010** - MADR, ANCA (pagina web oficială), septembrie 2010
16. \* \* \* **Politica Agricolă Comună după 2013- posibilă configurație din perspectiva României** - MADR, București, 21 aprilie 2010
17. \* \* \* **Legea 31/1990 (R) privind societățile comerciale** - M.O.nr.126-127/1990 M.O. nr.1066/2004
18. \* \* \* **Legea 36/1991 privind societățile agricole și alte forme de asociere în agricultură** - M.O.nr.97/1991
19. \* \* \* **Legea 16/1994- Legea arendării (modificată prin: Legea 223/2006 și Legea 20/2008)** - M.O.nr.91/1994; (M.O. nr. 497/2006 și M.O.nr.170/2008)
20. \* \* \* **Legea 566/2004-Legea cooperăției agricole** - M.O.nr.1236/2004
21. \* \* \* **Legea 1/2005- Legea privind organizarea și funcționarea cooperăției** - M.O.nr.172/2005
22. \* \* \* **OU 99/2006 privind instituțiile de credit și adecvarea capitalului** - M.O.nr.27/2006

# THE VALUE ADDED TAX. THE IMPACT OF PROCEDURES APPLIED TO AGRICULTURAL PRODUCERS (REVERSE CHARGE, QUOTA REDUCING AND THE EXEMPTION FROM VAT)

## Case study: wheat, flour, bread and bakery products

MIRCEA TOMA<sup>1</sup>

**Abstract:** *The introduction or elimination, increase or decrease of taxes and contributions, theoretical and practical, can not ignore the direct and / or underlying effects (collateral) on chain: Financial institutions ⇒ Suppliers of inputs ⇒ Agricultural producers ⇒ En-gross traders ⇒ Processing industry ⇒ En-detail traders ⇒ Consumer ⇒ State Budget. Solutions require transparency, solidarity, equity, social justice in the distribution of efforts and usufruct (profit) for the whole chain participants in achieving useful goods and services to human society. A particularly aspect has VAT with effect from 1 July 1993, as a Romanian fiscal system compatible with EU procedures. By the additions and changes to VAT management procedures for agricultural activities (exemption from VAT of individual producers, the reverse charge in the production of cereals and technical crops, reducing the quota of VAT collected on chain at 9% for bread), fiscal inequity was created between farmers according to the legal status of the organization and operation, between sectors of agricultural production, but also to the users of agricultural production. The most disadvantaged are those of 3,859,000 individual farmers, family farms and associations without legal status, that use*

*7.45 million ha (56% of the total utilized agricultural of 13,306,000 ha).*

**The study conclusion** *is the need of adapting VAT management procedures to the realities of Romanian agriculture by recognizing VAT on inputs used for agricultural production by individual producers, legal unorganized, valorised at the economic agents. By the recommended measures the individual producers' incomes grow by about 13-15% (300-500 lei / ha wheat equivalent) without affecting the cost of raw materials to users of agricultural production, even if it increases the financial effort for its purchase. There are eliminated the discrimination between sectors of agricultural production (crop, livestock, horticulture, wine and fruit growing, fish, etc.), there are created conditions for the consolidation of farms and unblocking the association process and the formation of producer groups and / or agricultural cooperatives and a better use of financial resources and grants. It increases the efficiency and contribution of agriculture to the state budget revenues. Those 3,859,000 of individual producers (individual businesses, family farms, associations) legal unorganized, and the 31 thousand companies with legal personality for the 5.856 million ha (44%) of operation. (RGA-2010) beneficiate the measures proposed. Agricultural production is included in the fiscal system, the receipts and payments are fluidized and reduce the pressure for VAT refunds from the state budget (about 108 million. Lei / year for the wheat used for bread). It reduces the phenomenon of unfair competition and tax evasion area, bureaucracy, abuse and corruption. Fees, taxes and contributions should not be treated as simple budgetary resources, but also as effective tools of orientation farmers, and not only, through the level, mechanisms, procedures of charging and taxing that the state institutions can promote for the stabilization and improvement production and supply of agricultural services as part of a functioning market economy.*

**Keywords:** *VAT, reverse charge, exemption, reduced VAT rate, VAT collection; tax evasion, farms, farmers, financial resources, efficiency, economic crisis, budget revenues.*

## I. The issue of agriculture versus the value added tax

### 1) General considerations

The rural space, with 42% in total population and 28% of the active population, contributes with 6% to GDP and a third of gross value added (GVA). Romania, although it has twice as much arable land per capita than the European average is below the average performance parameters of the EU member states, determined by the poor endowment, low yields and productivity and production is subject to weather hazard, that perpetuate a subsistence agriculture. The road of products from farms to the consumer's table, "from fork to fork", particularly of fresh products, vegetables, fruits, etc., is used by speculators and is in a permanent unfair competition with imported products.

---

<sup>1</sup> PhD, Economist - ASAS

The agricultural producer faces major problems regarding the upstream input prices and the prices of their products, expressed through "price scissors" their lack of financial resources, restrictive procedures and high cost of credits, but also some disadvantages created by laws that did not take into account the changes occurring in the ownership structure and conditions of ongoing economic processes in agriculture.

However the measures taken for improving the agricultural production, both before and after joining the EU, there were no major changes in the farm structure, maintaining polarization in very small and small "households", and a limited number of large holdings. In 2010, 3.859 thousands of agricultural "holdings" were inventoried with a used area (UAA) of 13.3 million hectares, with an average of 3.45 ha / farm. AFIR (Rural Investment Funding Agency) paid 6.43 billion euros (69.1%) until 31 December 2013, out of 9.3 billion Euro allocated by the PNDR 2007-2013. In 2010, 1,092,672 farms received direct support for 9,638,285 ha, but 87% of users were aged over 70 years and those aged over 60 years were working 2.3 mil. ha, of which 1.3 mil. ha under 5 ha. Of the 484,414 applications to AFIR, 95,992 investment projects received grants amounting to 7.1 billion Euro. 46830 PFA were established with an average funding of 7,500 euros (351,225 thousand Euro) for a period of 5 years and producer groups, particularly in the vegetable sector and agricultural cooperatives, the process being ongoing. A report published by the European Commission shows that a Romanian "farmer" remains with about 1805 Euro / year of the grant received, compared to an average of about 10,000 Euros / year for the EU, 6259 Euro in Bulgaria and 14157 Euro in Hungary. A Romanian farmer, by paying taxes and fees, returns to the budget 21% of the subsidy received compared to 50% in Sweden, 43% in Germany and 7% in Bulgaria.

In addition to direct taxes, seemingly small, the individual producer longer bear the VAT rate of 24% corresponding to inputs of about 140 Euro / ha. In Romania a large crop farm receives 8400 Euro / year, a wine farm 2680 Euro / year, a dairy farm 1060 Euro / year compared to an average of 132,810 Euro / farm in Slovakia, 81130 Euro / farm in the Czech Republic. In 2014 the amount requested by the 1.05 million farmers was 692 million Euros for an area of 9.6 million hectares. For the agricultural year 2014/2015 SAPS has 1367527 thousand Euros for an area of 8.7 million hectares, respectively 156.89 Euro / ha with a payment of 170 Euro / ha for 1-5 ha and 210 Euro for 5.1 -30 ha / farm. According to PNDR 2014-2020, agriculture will receive 9.3 billion Euros, of which 8 billion Euros (85.6%) from FEADR, comparable with the period 2007-2013 and with a funding of 85 (95) per cent of a project value. Since the payments from PNDR 2014-2020, will pay special attention to the *active farmer*. Direct payments on area will increase to 170 Euro / ha in 2016, to 190 Euro / ha in 2019, differentiated according to the farm area.

## 2). The impact of introducing VAT

### 2.1 Legal regulation

The value added tax (VAT short) is an indirect tax beard by the final consumer for the good / services used. VAT is a tax due to the state budget, cascading charged by each operator to making a product or providing a service falling within the taxation with the right of deductibility of VAT on inputs purchased and used in the economic activity. VAT is regulated at European level by the European Union Council Directive 2006/112 and in Romania by the Fiscal Code approved by Law 573/2003 with additions and amendments. Taxable transactions are those that meet the conditions provided by art. 126 paragraphs (1), the VAT rates set out in Article 140 and exemptions in Articles 141, 143, 144 or 1441 of the Law no. 573/2003 regarding the Fiscal Code. Deliveries outside Romania are not subject to VAT, even if the taxpayer is in Romania.

Applying VAT is **mandatory** for production delivered and services performed by operators registered as VAT payers, **optional** for those with a turnover, from 1 January 2013, of up to 220,000 lei, VAT chargeable on encashment for operators with a turnover of up to 2200000 lei. **Individual producers**, on their own, **are exempted** from VAT, and for a range of goods, including production of cereals and technical crops, the reverse charge is applied.

**2.2 VAT in Romania versus EU:** VAT is the main source of income in the consolidated budget of the EU member countries. The VAT system introduced in Romania from 1 July 1993 has the VAT rate of 24%, which ranks third in the EU, after Hungary (27%) and Denmark (25%). Next Finland 22%, a group of three countries have 21% and 7 countries with 20%. Cyprus, Luxembourg has the lowest rates with 15% and Greece with 13%. Romania participates with 2.5% of the VAT collected to the EU budget, against 0.5% contribution of Germany.

**2.3 The collection level:** Romania collects for the state budget, according to the studies of European Commission for Taxation (CEF) only 56% of VAT set theoretically, compared to the European average of 83%. In the Netherlands and Finland the collection rate is 95%. In 2013 the gross encashment for the state budget of Romania were 67 billion Lei, of which 16.4 billion Lei were repaid (24.48%). With those 50.6 billion lei net, VAT is the second source to the formation of the consolidated budget revenues. Note that Romania participates with 2.5% (about 1.2 billion Lei) of the VAT collected to the EU budget, compared to 0.5% Germany's contribution to the establishment of funding resources to countries with a high rate of "sovereign debt". (Greece)

**2.4 The collection gap,** calculated as the difference between theoretical and earned income, during 2011-2012, established by the studies of CEF is **44%**, which confirms our calculations presented at the Symposium of ICEADR Bucharest from 11 to 13 November 2013.

In 2012, the losses from VAT collection deficit, estimated by the European Commission for Taxation are 177 billion Euro and represent 16% of the expected revenues of the 26 Member States, compared with 190 billion Euro (1.5% of GDP of 12.669 billion Euro) for the period 2000-2011. The deficit decreased in 11 states while 15 states have increased it.

Romania is nominated with a loss of 8.970 billion Euro in 2011 and 8841 billion Euro in 2012 compared to 10.3 billion Euro in the period 2000- 2011, representing 7.86% of the GDP of 131.1 billion Euro achieved.

A high percentage in tax evasion, claimed by farmers and some employers in Romania, holds the trade in agricultural products as raw materials (cereals, live animals), fresh products (vegetables - fruits) and semi products and preparations (flour and bakery products, meat and meat products) and others.

*The European Commissioner for Taxation, Algirdas Semeta declared: "the states cannot afford to lose the revenue of this magnitude. Commission focuses on fundamental reform of the tax system, to make it more effective and harder to fraud",* that supports the topics discussed: **THE VALUE ADDED TAX. CONSIDERATIONS ON THE IMPACT OF PROCEDURES APPLIED TO AGRICULTURAL PRODUCERS (REVERSE CHARGE, QUOTA REDUCING AND THE EXEMPTION FROM VAT).**

The analysis is justified by the intention of MADR, postponed several times, of application of reverse charge for fruits and vegetables and reducing VAT quota at 9% following the model used for the bread chain. In turn, the meat patronage requires for a reduction of VAT at meat and meat products to 5%. Both the intentions and the requests are motivated by the reducing of tax fraud and improving the functioning of the food products market by eliminating monopolistic practices

**2.5 The causes of gap between theoretical income and the income collected by the state** is determined, in our opinion, in addition to tax evasion, by:

a) **the procedures** and rules established for determining the payment amounts, (as difference between VAT collected and deductible VAT) exempted, delayed or returned, if in case, and the date set for the payment of VAT payable to the state budget, including by payment of VAT at encashment for the economic operators with a turnover of less than 2250000 lei;

b) **the production cycle,** time required to achieve production, determined by the date of supply and consumption of production factors, date of acquisition, storage, delivery and cashing the value of production, respectively the date of payment of VAT on inputs (deductible) and the date of tax encashment (collected) related to the production delivered and the date set for the payment of tax (due) to the state budget.

**2.6 Tax evasion** is manifested by "stealing" food products from tax obligations and fraud by encashment, failure to record the amounts due to the state and use for personal purposes plus

VAT management procedures and lack of capacity and preparation of fiscal authorities to exercise the control of economic operators, the influence peddling and corruption.

## II. MATERIAL AND METHOD

The research method used is the quantitative and qualitative comparative analysis, by studying the documents of the Common Agricultural Policy (CAP), the rules and procedures for the management of VAT, EU Directive 2006/112 and law no. 573/2003-Fiscal Code. The data used are of the European Commission for Taxation (CEF) and national, INS press, MFP, CFR, MADR and BNR regarding the encashment and refunds of VAT to and from the state budget, price trends and agricultural production evolution, the use of European and national funds, media and specialty studies.

**The analysis covers the VAT system applied to agriculture by ownership, organization and operation, and the need to introduce alternative measures for increasing efficiency and enhancing farm through a better use of the own funds borrowed and allocated through PNDR, reducing tax evasion, expressed through the gap between theoretical income and VAT collected, of 44%, set by the EU financial Commission, well above the EU average of 16%.**

The study does not aim to comprehensively address all aspects, focusing on the two dimensions of the adjustment process in agriculture:

a) horizontally, to find and mitigate the effects of the application of VAT management procedures by ownership, organization and operation of agricultural land and increase the performance of agricultural production and agricultural holdings;

b) vertical, natural market integration of small and medium-sized farms by association in the implementation, collection and valorisation of agricultural products.

To assess the impact on the introduction of exemption from VAT, of the reverse charge and reducing VAT rate for some agricultural operations from the agricultural sector of producing cereals and industrial crops, were considered and compared the effects of the two methodologies accepted by EU procedures for managing VAT, in several variants.

**The first working hypothesis:** determining VAT in accordance with the actual methodology for applying VAT, by adding quota to the price of delivery, on the chain of producer - processor - retailer - consumer and establishing VAT payable to the state budget and if the reverse charge and exemption from payment.

**The second working hypothesis:** VAT deduction from the price paid to individual producers (associates) by the users of agricultural production, respectively calculating the VAT rate of 19.355% and 8.257% of the price paid, the quota of 24%, respectively 9% at the invoice payment (the use of the second method of determination and settlement of VAT).

It keeps the principle of neutrality of VAT.

## III. RESULTS AND DISCUSSIONS

To prevent tax evasion manifested and claimed in agricultural production, increasing inflation and prices, the state has adopted, in time, a number of laws which favour consolidation of forms of organization and operation of farms, input supply and valorisation of production by individual producers through direct support of formation of producer groups and the establishment of agricultural cooperatives on market principles\*. Through PNDR 2007-2013 were implemented measures 141 "Support for semi-subsistence farms" and 142 "Setting up production groups designed to speed up the market integration of the small farms". The materialization of these programs has been hindered by the trading practices and by the low administrative capacity of the beneficiaries. Although there have been spent significant amounts for their training and guidebooks, the adoption of legislation in the field of taxation had disadvantaged and disadvantages the activity from the sectors of agricultural production.

Since the introduction of VAT, as a modern form of taxation consumption, although the base and the tax rate and management procedures had several changes, they have not solved the increasing budget revenues and reduce tax evasion. It acted inhibitor and maintained discrimination between agricultural production sectors and between the encashment (cash) of individual agricultural producer (associate) for the delivered production, compared with that legal organized VAT payer, creating more parallel markets:

- *peasant market* – on the relation individual producer relationship (associate) - consumer;
- *regulated market* – on the relation farmers legal organized (companies, agricultural associations) - wholesalers - processors - retailers - consumers;
- *speculative market* – on the relation individual producers - wholesalers (traders) not taxed (speculators) - consumer.

### **3.1). The analysis of the impact of introducing quotas and VAT management procedures on financial resources (own and borrowed) of farmers, on the development and agricultural production efficiency**

In agriculture there are used multiple VAT rates and VAT management procedures as follows:

> **The standard rate of 24%**, permissible to legal regime farms organized as companies and agricultural associations, cooperatives, PFA for most agricultural products, according to art. 140 of the Tax Code, except wheat;

> **The rate of 9%** for flour, bread and bakery products, CAEN code no. 1061 and 1071, introduced by GEO no. 16/2013, approved by Law no.371 / 2013 valid until September 1st 2014, extended period;

> **Exemption from VAT payment** of the individual producers legal unorganized (art. 141 of the Tax Code).

> **The reverse charge** allowed to farms legal organized for cereal and technical crops, introduced by GEO no. 49/2011, valid until 31 May 2014, extended period;

The procedures adopted for the application of VAT in agriculture does not take into account the changes occurring in the ownership and operation of agricultural land, the main means of production – the capital and conditions of realization of agricultural production.

Relevant for farmers are: introducing the reverse charge in the production of cereals and industrial crops (wheat, rye, barley, corn, sunflower seeds and sugar beet), reducing the tax collected at 9% on the bread chain and maintain exemption from payment of the individual producer legal unorganized, obligation to open a bank account for receiving subsidies, registration of grant recipients for PNDR projects, at least as PFA and management the accounting, according to GEO no. 44/2008, maintaining the gap between the agricultural year and the payment of subsidies. So far, only 46 830 farmers are organized in PFA, beneficiating of 7500 Euro for a period of 5 years for a total of 351,225,000 Euros.

**Since 2015, comes into force the rule of *active farmer*, who will receive higher subsidies of 5,000 €, unless it is organized as PFA. This conditioning will exclude a large proportion of farmers from accessing European funds, increases bureaucracy and administration costs for the individual farmer. To organize a farm in the crop production sector, with legal regime, with a turnover of 220,000 lei (equivalent to 220 tons of wheat at a price of 1,000 lei / t), a farmer must hold or to lease an area of 50 ha and achieve a minimum average production of 4400 kg / ha.**

The measures, although they were taken to improve the economic environment, in fact, acted and act as limiting factors and inhibitors in the organization of agricultural production, created fiscal inequity, were made to the detriment of farmer, regardless of its organization and functioning form.

The comparative summary of the VAT impact, according to the legal form of organization and operation, of the quota level and regularization procedures is given in Table 1.

Table 1

SPECIFICATION	1) Companies, Agricultural societies (%)			2) INDIVIDUAL PRODUCER (%)			
	a)	b)	c)	V1	V2	V3	V4
a) Inputus with VAT	56	56	56	56	45	56	56
b) TVA deductible (a x 24%)	(13,44)	(13,44)	(13,44)	13,44	11	13,44	13,44
c) Other inputs (workforce etc.)	29	29	29	29	29	15,56	29
d) Total costs (a+b+c)	85	85	85	98,44	85	85	113,44
e) Profit /loss (-)	15	15	15	1,56	15	15	15
f) <b>Producer's price</b>	100	100	100	100	100	100	123,44
g) VAT 24% / 9%	24	24	9	-	-	-	-
h) Price invoiced /received	124	100	100	100	100	100	123,44
i) VAT chargeable (g-b)	10,56	-	-	-	-	-	-
j) Refunds from budget		(-13,44)	(-13,44)	0	0	0	0
g) Gap	44	0	0	0	0	0	0

Note: own calculations

### 3.1.1). The analysis of VAT rates and procedures applicable to agricultural commercial companies (associations) Farm

**1 a) The standard tax of 24% is the main form of taxation of agricultural production realized by agricultural companies (associations) as a source of revenue for the state budget.** Although act neutrally on the expenditures of farmers, the quota level influences and creates the necessary financial resources to purchase inputs needed for the agricultural production until collection and / or VAT adjustment in accordance with procedures. Farmers act as fiscal agents and contribute to the state budget, on average, with 10.56 per cent of the price of delivery. Contribution for budget differs from one farmer to another in relation to the structure of production, from an agricultural product to another, according to the share of inputs subject to VAT and the technology used, and the price for their production, that determines the profitability rate per product. For farmers with a turnover of less than 220,000 lei / year (65,000 Euro) the registration as a taxable person is optional. The rate level affects the purchasing power of the population and therefore valuing agricultural production. According to our calculations, **of the 24% VAT paid by the consumer, only 56%, respectively from 24 lei paid by the purchaser, only 13.44 lei reach, on the entire supply chain, to the state budget.** The gap between theoretical revenue and encashment at budget from the standard rate is 44%, confirmed by the study published by the European Commission for Taxation for the period 2011-2012.

**1 b) The reverse charge** was introduced by GEO no. 49/2011 as a **mechanism for the marketing of cereals and industrial crops** (wheat production, including wheat for bread with VAT rate of 9% (1.c), rye, barley, corn, soybean, sunflower and sugar beet) within the country to eliminate anticompetitive practices, reducing tax fraud in the agricultural sector. The provisions of the ordinance only benefit economic operators (suppliers and users) registered for VAT. The rules prohibit the economic operators that are subject to insolvency, bankruptcy, and if one of them is inactive, is being discharged or has removed the VAT code.

The agricultural producer, as a supplier, do not invoices the customer with VAT, being obliged to compensate VAT with other products and activities and / or to recover the negative differences set through the VAT expense account, from the state budget. The customer-processing industry records the acquisition tax in the VAT expense account as tax collected and tax deductible, named **self-liquidation of VAT and is recorded in the accounts** (account 4426 = 4427.) The

reverse charge changes the contribution of the economic operators on chain to the formation of the budget revenues (table no. 2).

### a) The impact of introducing of reverse charge on chain (case study at bread)

Specification	a) Standard taxation					No.	b) Reverse taxation				
	produc	milling	bakery	trade	chain		produc	milling	bakery	trade	chain
<b>1 Selling price/chain</b>	800	1600	2500	3200	3200	1.	800	1600	2500	3200	3200
2. Cost. cumulated	695*	1390	2175	2780	2780	2.	695	1390	2175	2780	2780
Costs/ chain	695	590	575	280	2140		695	590	575	280	240
Cost of raw materials/good	-	800	1600	2500	640		-	800	1600	2500	640
<b>3. VAT collected</b>	192	384	600	768	<b>768</b>	<b>3</b>	-	384	600	768	<b>768</b>
<b>4. VAT deductible</b>	122	264,2	454,3	634,3	<b>298,8</b>	<b>4</b>	(122)	72,2	454,3	634,3	<b>189,1</b>
a) raw materials/good	-	192	384	600			-	(192)	384	600	
b) cost/chain	122	72,2	70,3	34,3	176,8		122	72,2	70,3	34,3	176,8
<b>5. VAT comp./rest</b>		-				<b>5</b>	<b>122</b>	-			<b>122</b>
<b>6. VAT chargeable</b>	70	<b>119,8</b>	<b>145,7</b>	<b>133,7</b>	<b>469,2</b>	<b>6</b>	-	<b>311,8</b>	<b>145,7</b>	<b>133,7</b>	<b>591,2</b>
<b>6.1 Net VAT (row6-5)</b>	-	-	-	-	<b>469,2</b>	<b>6.1</b>					<b>469,2</b>
<b>7 colect degree(row6.1:3)</b>	36,4	<b>31,2</b>	<b>24,3</b>	<b>17,4</b>	<b>61</b>	<b>7</b>	0	<b>81,2</b>	<b>24,3</b>	<b>17,4</b>	<b>61</b>

Note:\*) Without subsidies of 154,1 lei/to; own calculations.

At a price of 3968 lei / tone of bread (11.9 lei / loaf of 300 g), the budget receives the same VAT chargeable of 469.2 lei / tone of bread and the collection rate is 61% of the VAT paid by the buyer of 768 lei / tone. By the standard charging, the farmer pays VAT payable in the amount of 70 lei, in reverse, by applying the reverse charge is obliged to compensate with the VAT collected from other activities or to recover from the state budget the amount of 122 lei / tone related to the inputs consumed, based on the negative statement of VAT if the amounts exceed the amount of 5000 lei, based on request within 3 months. In this way, the farmer immobilizes its financial resources, so precarious, while the milling industry (bakery), although it increases the budget payments from 119.8 to 311.8 lei lei / t, it is due to not paying VAT to the agricultural producer, representing a resource drawn in the amount of 192 lei / to and makes a saving of financial resources and / or borrowed of 240 lei (90 lei for wheat for bread) for 1,000 lei cereals and technical crops purchased.

The reverse charge does not keep account of the cycle of obtaining agricultural production.

### b) The consumption of inputs, obtaining and valorization of agricultural production vs VAT (case study-wheat crop)

Unlike other economic operators, from upstream and downstream, which are able to achieve and delivery daily production or on short periods, usually the crop production is obtained in 7 -11 months and is subject to natural factors with implications in using and efficiency of financial resources.

The evaluation of financial effort for purchasing inputs, payment and recovery of VAT in the process of creation, maintenance and harvesting of a hectare of wheat, based on technologies from ICEADR Bucharest, is shown in table no. 3.

Table 3

MONTH	Previous year				Current year								
	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	Total
Costs /ha –lei	1167	1139	-	-	-	502	-	133	1078	-	1472	80	5560
VAT/ha-lei	128	125	-	-	-	55	-	15	116	-	162	9	610
<b>Total lei/ha</b>	<b>1295</b>	<b>1264</b>				<b>557</b>		<b>148</b>	<b>1194</b>		<b>1644</b>	<b>89</b>	<b>6170</b>
Subsidies lei/ha	-	386				385							771
Repart. on month %	21	21,5				9		2,4	19,2		26,4	1,5	100

Note: data source, calculation of technologies from ICEADR and own calculations

The expenditures required to obtain the wheat production differs between different periods of the year as follows: 41.5% at the establishing of crop in September-October, 30.6% for maintenance in February, April and May and 27.9% for harvesting the wheat crop majority in July. In addition of these costs is a financial effort of about 610 lei / ha for VAT with the possibility of being recovered after 10-12 months, at the production delivery. The level of expenses with inputs and VAT is influenced by the quantity, quality and price level, mechanical works, realized directed and / or service, etc. Although in practice there are agreements with suppliers of inputs regarding the date of payment of invoices, these rebounds on the price per tone of product. The subsidy received of 771 lei / ha is promised in two installments (October and February) but EU rules grant the first installment in December (?!), so after the crop was already established and money spent. In addition, the subsidy is eroded with 19.355%, the equivalent of VAT rate of 24%, respectively with 149.2 lei / ha. Compensation and / or recovery of VAT from the budget, possible for farmers with a turnover of over 220,000 lei (65,000 euros) creates the immobilization of the own financial resources, borrowed or raised and subsidies from one month to 3 month, the period limit established for the reimbursement from the budget and which often is exceeded with direct effects on the financial resources, especially through the failure to comply technology, overcoming the optimal time etc. and loss of production.

The reverse charge, although does not affect the net income of the state budget, keeps the fiscal inequity and discrimination both between unorganized and organized farmers and between them and the milling and baking industry. The first cannot regulate and recover VAT and those legal organized in agricultural holdings grow their immobilizations of financial resources and costs for manage VAT. It also increases the costs with refunds from the budget, multiplies bureaucracy, promotes abuse and corruption of public officials.

**1.c) The reduced tax of 9%** was introduced by GEO no. 16/2013 from 1 September 2013 to reduce evasion on the bread chain for trade in wheat, flour, bread and bakery products. The quota of 9% applies only for VAT collected on chain, except farmer covered by the reverse charge. Thus, this practice introduces two VAT quota, of 24% for the purchase of goods and services required for the chain operators, including farmers, and 9% for the purchase of wheat, flour and bread, as appropriate.

#### a) The impact of reducing VAT on the bread chain

Government, through MFP, has presented "Ex-post evaluation of the macroeconomic effects of reducing VAT on flour (CAEN code-1061), bread and bakery specialties (CAEN code-1071) in September 2014, after a year, as a success, summarized in: framing in the negative effect on the income of general consolidated budget of 281.4 mil. lei, compared to 281.7 mil. lei, reducing tax evasion with 300 million lei (without supporting calculations), and a high degree of VAT collection, of 73.6%. The figures show an increase in production of bread with 888,070 tons and 15.8% at flour. The price of bread has decreased by 11.43%, settling at 3.49 lei / kg flour with 10.09% in July 2014 compared to July 2013. The consumption of bread and bakery products

declined in the first quarter of 2014 at 8.25 kg / person, of which 0.9 kg self-consumption and from peasant market and at flour at 0.8 kg / person, of which 0.25 kg from outside trade.

The most significant results were recorded in the milling and baking industry, by increasing the number of companies (80), the average number of employees (233 people) compared to the period before the outbreak of the crisis, profit growth at 67.5 mil. lei in the milling industry and 181.8 mil. lei in the baking industry. Although the positive effects highlighted, the problem is far from solved. Therefore, we present the estimated effects for the state budget for 2015 that will continue to have effects, based on the results assumed by the Government. (Table no. 4)

specification	a) Standard VAT quota of 24 %						b) VAT quota – collected reduced at 9 %					
	Prod	millin	baker	trad	chai	Cons	Prod	millin	baker	trad	chai	Cons
<b>1 Selling price/chain</b>	800	1600	2500	3200	3200	3968	800	1600	2500	3200	3200	3488
2. Cost. cumulated	695*	1390	2175	2780	2780	3968	695	1390	2175	2780	2780	3488
Costs/ chain	695	590	575	280	2240		695	590	575	280	2240	
Cost of raw materials/good	-	800	1600	2500	540		-	800	1600	2500	540	
<b>3.VAT collected</b>	-	384	600	768	<b>768</b>		-	144	225	288	<b>288</b>	
<b>4.VAT deductible</b>	(122)	72,2	454,3	634,3	<b>189,1</b>		(122)	72,2	214,3	259,3	<b>189,1</b>	
a)raw materials/good	-	(192)	384	600			-	(72)	144	225		
b)cost/chain	122	72,2	70,3	34,3	176,8		122	72,2	70,3	34,3	176,8	
<b>5. VAT comp./rest</b>	<b>122</b>	-			<b>122</b>		<b>122</b>	-			<b>122</b>	
<b>6.VAT chargeable</b>	-	<b>311,8</b>	<b>145,7</b>	<b>133,7</b>	<b>591,2</b>		-	<b>71,8</b>	<b>10,7</b>	<b>28,7</b>	<b>111,2</b>	
<b>6.1 Net VAT (row6-5)</b>	-				<b>469,2</b>						<b>-10,8</b>	
<b>7 collect degree(row6.1:3)</b>	0	<b>81,2</b>	<b>24,3</b>	<b>17,4</b>	<b>61</b>		0	<b>41,3</b>	<b>4,2</b>	<b>9,97</b>	<b>-103,7</b>	

Note \*) without 154,2 lei/to subsidies. Calculations bases on the report of 1 / 2 / 4 for price of wheat / flour / bread and 1 kg wheat =1 kg bread.

**The price of 3.49 lei / kg (about 1.05 lei / 300 g loaf) corresponds to a price of 3968 lei / kg (1.19 euro / pcs.) practiced before applying the reduced rate of 9%,** Government confirmed the release dates. For consumption taxed of 36 kg / head (800 million tones / year), **the budget incomes decrease**, per balance, with 480 lei / ton of bread, respectively 375.3 mil. lei / year. Compared to a theoretical net **income** of budget of 365.5 million Lei (800,000 to x 469.2 lei/ tone bread), where the quota is of 24%, although it enchases 98.6 million lei (888.07 million to x 111, 2 lei / t), by the compensation / refunds established by farmers through the VAT return, the income earned theoretically are reduced by 108.3 mil. lei (888,070 to x 122 lei/ t). Thus, **the VAT contribution at the state budget becomes negative** in the amount of 20.5 million lei. The deficit will increase with the increase of bread consumption taxed. If doubling consumption, the estimated deficit reaches 772 million Lei / year and compensations / refunds from the state budget, if necessary, increase from 97 mil. lei (800 million to x 122 lei/ t) to 195.2 million lei (1600000 thousand tones x 122 lei / t) in current prices in 2014.

The deficit is multiplied by the household consumption of flour for about 61,360 tons / year (85200 tones wheat) with approximately 10.4 mil. lei / year by compensations and / or refunds and about 18.4 mil. lei from reducing VAT quota. Reducing the VAT rate to 9% keeps the effects of procedures introduced through the reverse charge (compensations and budget refunds of negative VAT, reducing the immobilizations of the own and borrowed financial resources of the milling and

baking industry and trade, maintains the immobilizations of financial resources of farmers). **Although the price** of bread and flour is reduced by 11.73% in theory, the revenues are reduced and the compensations and / or refunds from the state budget increase, bureaucracy multiplies, the abuse and corruption among public officials promote.

**b) Restitutions / compensations can be eliminated by increasing** the VAT rate on chain, from 9% to 15%, in equivalent rate of 13% deducted from the price paid to farmer with VAT included, as we proposed. Thus, is recognized VAT on inputs paid by the farmer. The substantiation of measure is shown in table no. 6. Even if the measure is unfavorable to the consumer, this is for moment, as the necessary budgetary resources will require the introduction and / or increase taxes, fees or contributions, as has happened with some luxury goods, fuel excise "pillar tax "etc.

**Substantiation and the effects of recognition VAT deduction to users for products purchased from individual farmers (Case Study at wheat lei / t)**

**Table 6**

( lei/ to)	Actual situation		Proposals
	Com. Soc.	Individ. Produc./	
<b>1. Inputs with VAT (materials, services etc.)</b>	<b>355*</b>	<b>355*</b>	<b>355*</b>
2. VAT deductible of inputs	(122,)	122,	122,
3. Other inputs (salaries, contributions, depreciation etc.)	340	340	340
4. Total costs	695	817	817
5. Price of selling	800	800	920
6. Profit /loss	105	-17	103
7. VAT collected	-	-	-
8. Amount invoiced/ received	800	800	920
10. Deductible amount		-	
a) – VAT deducted at the users of agric. prod. as raw material (row8 x 13%)	(72)	-	( 119,6)
b) – income ceded of prod. (row 8 x 0,3 %)	-	-	2,4**
11. VAT refund from budget (row 7-10a)	122	-	-
12. VAT for payment/ chargeable (row2-7)	-	-	-
13. Cost of raw material at buyer /user	800	800	800

Note: own calculations \*) without subsidy of 154 lei/to;\*\*) Only individual producers

Calculations show that the revenue per tone of wheat for farmer grow with 120 lei and compared to a loss of 17 lei / to is obtained a profit of 120 lei, respectively an additional income of 600 lei / ha at a yield of 5000 kg / ha . It is eliminated the compensation and / or payment to/from budget in the amount of 122 euro / tone, which at a taxed consumption of 888,070 tons / year totaling 108.3 million lei.

**c) The correlation between reducing VAT, the price of bread and wheat price**

Evolution of the price of bread related to the wheat price, that the decision makers have not taken into calculation of the effects of reducing the VAT rate from 24 to 9% on the chain producer-processor-merchant-consumer-budget is presented in table no. 5.

INDICATORS	31.VIII.2013	1.IX.- 31.XII.2013	1.1- 30.IX.2014	Budget 2015	proposals
Average price of wheat lei/to	1000	900	800	800	800
Euro/to	222	209,3	186	186	186

Price of bread lei/kg	4,960	3,924	3,488	3,488	3,680
Of which VAT lei/kg	0,960	0,724	0,288	0,288	0,480
Price of bread 300 g lei/loaf	1,49	1,18	1,0	1,0	1,1

Note: own calculations ;\*) limit price UE 1 Euro=4,3 lei

### 3. 1. 2) Exemption from VAT payment of individual producers and agricultural production efficiency

**Individual producers, exempted from VAT, are obliged to bear on expenditures the VAT on inputs purchased for agricultural production** with seeds, fertilizers and pesticides, fuels and lubricants, spare parts, feed, services, utilities (water - sewage, heating and electricity, etc., as appropriate) and to include on the cost of the finished product for fresh consumption or as raw material.

**For blurring the influences on production efficiency, the individual farmer has the option of variants from table 1, as follows:**

**V1** Apply the same technology. By valorization of production to the economic operators legal organized (processing industry or wholesalers and / or retailers) they do not recognize the VAT rate, it creates unfair competition and individual farmer, although it may receive the same price, does not achieve the same profit to the same financial effort and is added the income tax, if applicable. For cereals and industrial crops by applying the reverse charge, although obtained the same price, there is no possibility to recover the negative VAT from the state budget.

To avoid losses, the individual producer has the possibility of the variants V2, V3, V4, as follows:

**V2** - reduce costs with VAT inputs (seeds, fertilizer, pesticides, mechanical works, fuels, lubricants, spare parts, other materials, etc.). It is not guaranteed to obtain the same yields and gross profit / ha even has the same cost and obtain the same price. Those who pay income tax, although not calculate depreciation or some taxes, fees and contributions cannot recover VAT on their inputs consumed and may incur losses.

**V3** - reduce other input costs (wages, taxes and fees, interest, etc.). No guarantees to achieve the same gross profit / ha and those who pay income tax, although not calculate depreciation and / or some taxes and contributions, they cannot recover VAT on inputs and may incur losses;

**V4** - Sells on the open market at the costs level, with profit or loss.

To recover VAT related to inputs, the individual farmer is obliged to establish PFA or associate in legal forms (associations, cooperatives). This increases bureaucracy and the individual producer's expenses with records and financial reporting and increases the tax authorities' workload.

Value added tax has eroded and erodes the funds obtained, in any form of organization of farmers and program accessed from the EU budget and / or national level, where appropriate, due to his ineligible character.

The exemption from VAT distorts the agricultural production contribution to GDP and VAT loses its neutrality. It creates unfair competition between individual farmers and the legal organized. It grows the selling prices on the open market and reduces consumer's purchasing power.

## IV. RECOMMENDATIONS FOR IMPROVING THE ECONOMIC ENVIRONMENT

According to the ownership and conditions for the economic processes in agriculture, to promote the transformation of the private property legal unorganized in holdings and / or in viable companies, we propose the following measures:

**1. Determination of VAT**, by deducting from the price paid with VAT included, a kind of reverse charge for agricultural products purchased and paid by the users of agricultural production to individual producers:

a) **granting the right to deduct VAT rate** of 19.3548% respectively 8.257% (equivalent share of 24%, and 9% for wheat) **from the price paid to individual producers** by the users of agricultural products organized legal based on the purchasing slip and self-billing as follows:

> **to the processing industry** of agro-zootechnical products for human consumption (except for the obtaining of alcohol from grains), represented by the milling and baking industry, meat and meat products, milk and milk products, oil and sugar etc.

> **livestock farms** (dairy cows, fattening cattle, pigs, sheep) and birds, for the forages cultivated (barley, corn, alfalfa, etc. and remaining products from the processing of agricultural products);

> **wholesale markets, acquisition and storage centers** of agricultural production (vegetables and fruits, grains and technical crops etc.).

b) **Strengthening the economic role of contracts in negotiating and circulation of agricultural products purchased from individual producers at prices with VAT included.** The right to deduct VAT and / or application of the current reverse charging until elimination, conditioned by the payment of products purchased to farmers. **Generalization of the "procurement slip"** as document with special regime for self-invoicing, VAT regulation and monitoring of farmers' income.

c) **introducing VAT rate of 15%**, deducted from the price paid in the quota of 13.04%, instead of the current rate of 9% added on the chain of bread production.

By the proposed measure is **recognized VAT** on inputs (fertilizers, seeds, fuels and lubricants, services, heat and electricity, etc.) acquired by the legal unorganized individual producers, **increase their income** by 15% **without affecting the cost of raw materials** at the users of agricultural production, is eliminated discrimination between them and those legal organized in agricultural companies (associations).

It is reduced bureaucracy for regulating the amount of VAT of 122 lei / tone, which at the consumption of bread taxed of only 888,070 tons / year totaling 108.3 million lei with that the state budget revenues increase.

d) **The establishment of a temporary fund to support producer groups** by ceding a quota of 0.3% of the selling price of the individual producers as 'assigned revenue' (as is the practice of the EU in some cases - eg. the restructuring of the sugar industry);

**3) The introduction and generalization of VAT rates differentiated on chain: 9% or 5% for purchases of goods and services by operators and 19% for consumers in accordance with the proposal made at the symposium of ICEADR from 11 to 13 November. 2013 and sent to decision makers (MADR, MFP, some patronages, including ROMPAN, unions and agricultural companies).**

**4) The penalties calculation for non-payment of VAT to be made in relation to the production cycle of obtaining agricultural production** (eg. production of autumn cereals - wheat, barley - after 9 months from the establishing crop, etc.)

**5) Supporting the development of domestic industry for the production of machinery and equipment necessary for agricultural production and food industry** by importing competitive technologies, where we still experience and skilled labor available.

**6) Introduction of VAT payable in two installments** in the form of an advance of 60% of the amount due in the previous month, to be paid until the 10 of the current month and the regularization, based on the VAT return, until the 25th of the month, as currently, in conjunction with the granting a bonus to the economic operators that fully pay the VAT chargeable until 10 of the current month for the previous month. Thus, it is reduced the effort of economic operators and streamlines the receipts and payments from the state budget.

7) **Including banking financial services (commissions and fees) in the VAT circuit**, excluding the interest rate, by canceling the exemption provided by art. 141 of the Tax Code. The revenue to the state budget grows by increasing tax base.

8) **The adoption**, in regime of emergency, **of legislation by Parliament**, to amend and complete the Fiscal Code with recommendations, adoption of the law of economic contracts specific to agricultural production and completion of accounting regulations approved by Order no. 3055/2009 under the law no.82 / 1991.

## V. CONCLUSIONS

*"Whatever the budgetary needs of the moment and whatever tax reforms designed to satisfy, we must not forget that public money should be used to its benefit and only in its benefit, and any expenditure should be made righteous."* 1925- prof. M. Manoilescu (**9 December. 1891-1830 December 1950**).

An orderly adjustment of the fiscal and contributory system can lead to the adoption of those measures to stimulate domestic consumption, increase domestic production and velocity of capital, reducing the budget deficit, uncontrolled growth of prices, inflation and unemployment, in a word imbalances of economic life.

Therefore, the gaps appeared in the evolution of society, due to the current crisis, must be managed with greater accountability and transparency, and economic policies adopted cannot be left to chance, to market forces as a regulator.

*Fees, taxes and contributions are not only simple budgetary resources, but also effective tools in guiding farmers through the level and mechanisms of taxation which the state institutions can promote in stabilization of agricultural products and agro industrial markets, as part of a functional market economy.*

The reforms in the Romanian economy must combine and "burn" but also to avoid some mistakes in the steps already done by the developed countries. These goals cannot be achieved without analysis scientifically substantiated, approved by clear and non-discriminatory laws and procedures adapted to the realities of Romanian agriculture, through the political will by the Romanian Parliament and implemented by the Government.

## BIBLIOGRAFIE

1. Toma, M., Agricultura-sincopel tranziției, riscuri asumate, Editura SC Tipografia Slobozia SA 2007;
2. Toma, M., Cercetarea-sincopel tranziției, riscuri asumate, Editura SC Tipografia Slobozia SA 2007;
3. Toma, M., Contracurarea efectelor crizei. Reforma radicală a sistemului fiscal și contributiv. Agricultura, prima șansă. Cine, cum, cât, cu ce efecte? Editura Terra Nostra” Iasi, 2009;
4. Toma, M., Impactul TVA pe filiera, producător agricol-procesator-comerciant-consumator-bugetul de stat; Revista “Agricultorul român”. Nr. 11 (167) noiembrie 2012, București;
5. Toma, M., Estimarea efectelor reducerii taxei pe valoarea adăugată pe filiera la pâine; revista “Lumea satului nr. 16 (189) , 2013 și nr. 5 (202), 2014, București;
6. Toma, M., Revenirea la cota de 19% este posibilă. Cine, cum, cu ce efecte? Revista Profitul agricol nr. 14/2014, București;
7. Toma, M., Impactul TVA pe filiera, producător agricol-procesator-comerciant-consumator-bugetul de stat; Simpozion ICEADR Bucuresti 11-13 noiembrie 2013, ASAS, București;
8. Zahiu, Letitia, Politici și piete agricole-reforma și integrare europeană, Editura Ceres, București, 2005;
9. \*\*\* Directiva 112, **Directiva 2006/112 a Consiliului Uniunii Europene din 28 noiembrie 2006 privind sistemul comun al TVA**, publicată în Jurnalul Oficial al Comunităților Europene (JOCE), Legea 347/11 decembrie 2006, cu modificările și completările ulterioare;
10. \*\*\***Codul fiscal – Legea nr. 571/2003** (publicată în M.Of. Nr. 927/28 decembrie 2003), cu modificările și completările ulterioare – TITLUL VI;
11. \*\*\* **Codul de procedură fiscală – OG. Nr. 92/2003** (republicat în M.Of. Nr. 513/31 iulie 2007), cu modificările și completările ulterioare;
12. \*\*\* **Hotărârea Guvernului nr. 44/2004 pentru aprobarea normelor metodologice de aplicare a Legii nr. 57/2003 privind Codul fiscal**, publicată în M.Of. Nr. 112/6 februarie 2004, cu modificările și completările ulterioare (25 de rectificări).

## AMICABLE SETTLEMENT OF CONFLICTS BETWEEN AGRI-FOOD PRODUCERS AND CONSUMERS

ALECU IOAN NICULAE\*, CIOCAN FELIX-DIMITRIE\*\*, MIHUȚ GABRIELA  
GYONGY\*\*\*

**Summary:** *Similarly to how not knowing the laws and obligations resting upon a person will not exempt that person from liability, consumers not knowing their rights and not using them might place them into a position of inferiority when it comes to the relationships with the producers or distributors of agri-food products. Although, theoretically, such relationships mean that the parties are equal from a legal point of view, having correlative rights and obligations, in fact, given the nature of the products making up the object of the relationship between the producer and consumer, the consumer is place a priori in a position where he has to award maximum diligence, since we are talking about actions that might have consequences upon his health and even life. Returning to the previous state, fixing contingent damages and regaining the mutual respect and trust inherent to a healthy commercial demeanor, in case of conflict, determines the studying of alternative settlement procedures for conflicts, a stand out being the procedure of mediation, a procedure that is an alternative to the court of law. The institution of mediation can be understood through an exhaustive presentation of the framework law in the field, of the related laws, these being different from the European law in the field, the latter being included ope legis into the national framework law, through the ratification process or through undertaking the community acquis.*

**Keywords:** *mediation, consumer, agri-food, producer, conflict*

### INTRODUCTION

In Europe there are presently 500 million product and service consumers, with the highest, most needed and most generalized consumption being that of the agri-food products. This state of fact has caused the emergence of multiple forms of protection for the European consumers, one of them being the possibility to resort to a procedure to mediate conflicts occurring between the producer and the consumer, in view of fixing the prejudices caused to the latter. According to the provisions of Law 192/2006, mediation represents a method of settling conflict amicably, with the help of a third person specialized as a mediator, under conditions of neutrality, impartiality, confidentiality and having the free consent of the parties. Mediation is based on the trust that the parties confer to the mediator, as a person that is able to facilitate the negotiations between them and to support them towards the settlement of the conflict, through reaching solutions that are mutually convenient, efficient and long lasting<sup>1</sup> [17]. According to the provisions of the lawmaker, mediation pursues the settlement of conflicts by way of negotiations. Thus, the parties are not trying to settle the conflict from a contradictory standpoint, as it is in the case of legal actions, but rather from a reconciling standpoint. Natural persons and legal persons might request mediation even after a lawsuit was started at the competent courts of law. By way of mediation, any conflict can be settled for any civil, commercial, family, criminal, consumer protection and other matters.

### MATERIALS AND WORK METHODS

In order to accomplish this study, the existing regulatory documents were used: regulations, directives, recommendations, Romania and Bulgaria's Treaty of Accession to the

---

\*Acad. Prof. univ. Dr. - The University of Agronomic Sciences and Veterinary Medicine Bucharest

\*\* Ph. D. candidate - The University of Agronomic Sciences and Veterinary Medicine Bucharest

\*\*\* Ph. D. candidate - The Timișoara Vest University

<sup>1</sup> Law no. 192 concerning mediation and the regulation of the mediator profession from May 16, 2006. Off. Gaz. no. 441 of May 22, 2006, as amended and completed by Law no. 370/2009, G.O. no. 13/2010 for the amendment and completion of certain regulatory documents within the legal field in order to transpose Directive 2006/123/CE of the European Parliament and Council of December 12, 2006 concerning services on the internal market, Off. Gaz. no. 70 of January 30, 2010.

European Union, as well as other constitutive and changing treaties, other regulatory documents at European Union level; national regulatory documents: laws, ordinances, decisions, codes; jurisprudence and legal doctrine. The interpretation of law concerning mediation and consumer protection is accomplished through logical-rational operations that seek to clarify and explain the contents and meaning of norms, for the purpose of their just application, through the accurate classifying of various situations from the practical life of the agri-food producer-consumer relationships. Among these there are methods such as literary or declarative, extensive, restrictive interpretation, logical, grammatical, systematic interpretation, by correlation to other legal provisions or the historical-teleological interpretation, by determining the practical purpose and utility considered by the lawmaker at the time of issuing the legal norm concerning the mediation and consumer protection.

## RESULTS AND DISCUSSIONS

Consumers from the European Union have a series of tools and networks available, meant to provide them useful information and to help them to remedy the challenges that they might face on the internal market. One of the highlights among these tools and networks is **The European Consumer Centres Network (ECC)**<sup>2</sup>. Each member state of the European Union has a *national contact point*, member of the ECC network. Counseling concerning cross-border litigations is provided by the European Consumer Centres Network (*ECC-Net*)<sup>3</sup> [12]. Pursuant to a resolution of the Council from May 25, 2000, the EEJ-Net Network was established, which seeks to allow the settlement of complaints in an amicable way. Starting with January 1, 2008, Romania's European Consumer Centre has joined the EEC-Net network set up at European Union level in order to increase consumer trust in the unique internal market, by providing a wide range of services to the consumers, from informing them about their rights and to supporting them in the settlement of the issues they are facing in cases where they have made purchases in another European state (cross-border)<sup>4</sup> [10]. As early as its establishment, ECC Romania has awarded a great importance to informing consumers concerning the alternative means of settling cross-border litigations, with mediation playing an important role. As opposed to Poland, where 90% of the agri-food products being traded come from internal sources, in our country the rate of imports (especially imports from other EU states) is still very high, meaning that the cross-border mediation procedure - for disparities that target these types of goods - has to be a timely and appealing procedure. Upon the European Commission's initiative, at the beginning of the 90's, the first Euro-offices were established, with the purpose of providing information concerning the possibilities on the internal market and consumer rights.

By the necessity of aligning the Romanian internal law to the *community acquis*, as to what concerns consumer protection, the Consumption code<sup>5</sup> [18] targets the regulation of the legal relationships created between economic operators and consumers regarding the purchasing of products, goods and services, including financial services. The law in this matter ensures the required framework for the complete and accurate information of the consumers about the essential characteristics and the standards imposed to certain categories of products, for the defense and protection of the legitimate rights and interests of the consumers against certain abusive practices. Art.27<sup>6</sup> of law no. 296/2004 exhaustively lists the rights of the consumers protected by the

<sup>2</sup> Co-financed by the European Commission;

<sup>3</sup> [cec.europa.eu/consumers/redress/ecc\\_network/index\\_en.](http://cec.europa.eu/consumers/redress/ecc_network/index_en;);

<sup>4</sup> Address no.2055/04.12.2013 of Romania's European Consumer Centre to the Romanian Mediation Council;

<sup>5</sup> Law concerning the consumption code, law no. 296/2004, republished in the Off. Gaz. no. 224 of March 24, 2008;

<sup>6</sup> Consumers benefit from the following rights:

- to be protected against the risk of purchasing a product or have a service rendered to them which might bring prejudice to their life, health or safety, or to bring harm to their legitimate rights and interests;
- to be completely, accurately and precisely informed about the essential characteristics of products and services, so that the decision they are taking in relation to them will offer a better answer to their needs, as well as to be educated in their quality of consumers;

consumption code, rights that, contrary to the good commercial practices, are being breached, sometimes in bad faith or abusively, by the product and service providers. Misunderstandings arising between the parties entering into a conflict (seller/professional-buyer/consumer) can be settled by way of mediation.

Mediation, as a form of settling conflicts, has started to be promoted at European level since 1996, while in 1997, at the European Conference on conflict prevention, the Amsterdam Appeal was launched for creating an European platform for the prevention of conflicts and the development of peace<sup>7</sup>. In 2000, the European Commission has adopted the Conclusions concerning the alternative methods for settling litigations in civil and commercial matters, in view of simplifying and improving the access to justice. In 2002, the European Commission has published the *Green card concerning the alternative methods for dispute resolution in civil and commercial matters*, while, in October 2004, the European Union has forwarded a proposal concerning certain aspects for mediating disputes in civil and commercial relationships. Therefore, a series of community acts were adopted which help to support the reform in justice and to promote mediation as an alternative means for amicable dispute resolution<sup>8</sup> [19].

The emergence in Romania of a legal framework concerning the activity of mediation is the result of an ample process of legislative efforts which materialized in the issuance of a perfectible law, Law no. 192/2006<sup>9</sup>. The law concerning mediation and the regulation of the profession of mediator observes the recommendations of the European Union and targets the expansion of the existing regulatory framework, so that mediation can become a practical and functional institution.

An important step was taken by the adoption of Directive SAL<sup>10</sup> [15] and of the SOL Regulation<sup>11</sup>, both occurring as a consequence of a proposal submitted by the European Commission in 2011, with the purpose of improving the "functioning of the internal retail market and, particularly, consolidating the measures for compensating consumers"<sup>12</sup> [5]. They mainly target the agri-food market of the European Union, but other markets of goods, products and services are targeted as well. The Directive and Regulation were adopted on March 12, 2013 by the European Parliament, with a large majority of the votes (617 votes for, 51 against and 5 abstentions) and were entered into force within 20 days from being published in the Official Journal of the European Union<sup>13</sup>. Member states will have 24 months from the date the directive enters into force, meaning mid-2015, to transpose them into their national legislation. The SOL platform will become operational six months after the transposition deadline has expired.

These regulatory acts seeks to increase the number of SAL entities at the level of the European Union member states and to improve the quality of the services provided by these

- to have access to markets ensuring a wide range of quality products and services;
- to be compensated in a real and appropriate manner for the damages caused by an unsatisfactory quality of products and services, using the means provided by the law for this purpose;
- to be organized into consumer associations, to the end of protecting their rights and interests;
- to refuse the conclusion of agreements with abusive clauses, according to the applicable legal provisions;
- to not be denied by an economic operator to obtain a benefit that is expressly provided by the law.

<sup>7</sup> In 1998, the first Recommendation of the Committee of Ministers of the Europe Council was adopted for the use of mediation in legal causes relating to family matters (mostly for the settlement of disputes concerning the custody of children). The declared purpose, at European level, for promoting mediation is that of increasing the quality of the legal act by relieving the courts from causes that would fully or mostly involve agreements between the parties.

<sup>8</sup> Recommendation REC (98)1, targeting mediation in family related matters, Recommendation REC (2002) 10 targeting mediation in civil matters. Recommendation REC (99) 19 concerning mediation in criminal matters, Recommendation REC (2001) on the alternatives to trials for disputes between administrative authorities and private parties. Directive 2006/123/EC, Directive 2008/52/EC

<sup>9</sup> amended and completed, as expected, by Law no. 370/2009, Law no. 115/2012, EGO 90/2013, EGO 4/2013, Law no. 214/2013;

<sup>10</sup> Directive 2013/11/EU concerning the Alternative Resolution of Disputes

<sup>11</sup> Online Resolution of Disputes

<sup>12</sup> Gorghiu Alina, Mediatornet

<sup>13</sup> Published in the Official Journal of the European Union on June 21, 2013.

entities, with the purpose of encouraging the settlement of disputes between consumers and professionals outside of the law. The SAL entity is an extrajudicial entity involving a neutral party (mediator, peace-maker, ombudsman etc.) that proposes or imposes a resource that helps the parties to reach a mutual solution themselves.

It was found, at the level of the European Union, that financial losses suffered by the consumers due to purchasing goods and services were of 0.4% of the EU GDP.

The SAL Directive guarantees European consumers the chance to solve their differences in as short time as possible, with lower costs, thus offering an alternative to the classic legal methods. Cross-borders disputes represent a large part of the existing disputes between consumers and retailers and, therefore, there was an existing need for a unitary, coherent regulation at European level. Using alternative means of dispute resolution is beneficial for professionals as well, who avoid the bad publicity associated with litigation in a court of law and the costs of the entire trial, in the event that the consumer wins the dispute. The European food market, in essence, is one of the most diffuse, with numerous examples in which certain products are originated from one of the European Union member states, but is traded in a completely different part of the Union, due to the weather and pedogeographic cultural conditions, which are extremely diverse within the old continent.

The alternative resolution of disputes (SAL) helps the consumers of agri-food products to settle disputes with the producers/professionals<sup>14</sup> when they are faced with an issue connected to certain retail or wholesale products purchased, such as, in the event that a professional refuses to replace a product or to operate a reimbursement to which the consumer is entitled.

As far as SOL entities go, these are entities offering services online integrally and are named online dispute resolution entities. This method can assist with the settlement of disputes concerning online purchases, in the event that the consumer and the producer/farmer/professional are far apart from each other.

The SAL and SOL procedures are usually cheap, simple and fast procedures and, as such, they are beneficial not only for the consumers, but for the producers as well; therefore, besides eliminating costs and procedures relating to the classic, legal way of resolution, the expediency of such procedures can be highlighted in cases where the dispute is carried over perishable goods, where the hastiness of settling the dispute between producer and consumer is equated to avoiding that the goods disappear and that the damage is undertaken.

It is estimated that at the time of the SOL platform being implemented by the member states, the effective SOL procedures will stimulate online purchases, specifically those from producers residing in other EU countries. The development of online and cross-border retail in the EU will offer the consumers further possibilities to choose and will help them to obtain the best quality-price ratio. Although, mostly, this type of retail is and will be perfected for non-food material goods, it can be used on canned goods, but mostly on agricultural goods, equipment and combiners.

Usually, the alternative means for dispute resolution are easier to use than the legal procedure, while also faster and cheaper. These bring a series of practical advantages, of which we list those provided in the directive:

- The majority of issues submitted to SAL are settled within a timeframe of no more than 90 days;
- The large majority of the SAL procedures are free for the consumers or, in the event that they carry costs, their price in relation to the cost of a traditional trial is at least 80% cheaper. This is due to the short time in which an agreement can be reached, the lack of accessory expenses (transport, accommodation, witnesses, allowances etc), the lack of trial expenses (no legal fees), while, through an amicable settlement, the commercial relationships and practices (offers, refusals etc.) agreed by the parties can be maintained. The European Commission is of the opinion that such costs should not exceed the amount of 50 Euros.

<sup>14</sup> Traders, called as such in the old Commercial Code. According to the New Civil Code, they are called *professionals*. In the specific laws concerning consumer protection, as well as in other member states, the used term is that of *retailer*.

At the present time, there is a public debate over a legislative project which intends to establish - under the coordination of the National Authority for Consumer Protection<sup>15</sup> [11] (ANPC) - a single SAL entity, a thesis that is objectionable in a justified manner, since it would mean a genuine practice of a monopoly in the field. At the level of 2013, in the European Union, approximately 750 SAL entities were established, with the directive in the field making reference to setting up of entities at the level of the member states, which leads us to conclude that the establishment of a single entity in Romania would represent a profound inconsistency and would raise doubts of monopolistic practices over the settlement of approx. 45,000 annual complaints in the field of consumer protection by ANPC exclusively.

## CONCLUSIONS

We consider that the amicable resolution of disputes arising between the producers, retailers and consumers of agri-food products concerns the entire European community, particularly the emerging states, states from the former socialist bloc, which are required, considering their status of European Union member states, to adapt, on the go, to the demands of the Union, the free and common market, the competitive relationships and also the different social and economic conditions between the West and the East.

Alternative dispute resolution procedures, done amicably, are a genuine depository of social peace, with mediation presently being their main exponent, a fact which is due to an extended interest and a national legislation which is unitarily aligned to the community priorities, to the politics of the Justice and Internal Affairs field and to the common perspective.

Approaching this theme is a desirable necessity, being considered a bridge between the field of Common Agricultural Policy and the field of Justice and Internal Affairs.

Agricultural producers and consumers becoming aware of the imperative of protecting the surrounding environment, leads to the accomplishment of a *regulating system*<sup>16</sup> [9], which can determine a high quality production, while seriously reducing the risk of discontent among consumers in relation to agri-food products.

## REFERENCES

1. Blohorn-Brenneur Beatrice, *Medierea pentru toți. Teoria și practica medierii*, București, România, Editura Universitară, 2014;
2. Ciobanu Viorel Mihai, Marian Nicolae, *Noul Cod de procedură civilă comentat și adnotat Vol.I – art.1-526*, București, România, Editura Universul Juridic, 2013;
3. Fuerea Augustin, *Manualul Uniunii Europene*, Ediția a V-a revăzută și adăugită după Tratatul de la Lisabona, București, România, Editura Universul Juridic, 2011;
4. Gheorghe Anca Nicoleta, Spasici Camelia, Dana Simona Arjoca, *Dreptul consumației*, București, România, Editura Hamangiu, 2012;
5. Gorghiu Alina, *Mediatornet*;
6. Luminoso Angelo, Antonio Cicu, Francesco Messineo, Luigi Mengoni, *Trattato Di Diritto Civile e Commerciale. La mediazione*, seconda edizione, Milano, Italia, Dott.A. Giuffre Editore, 2006;
7. Martin A. Frey, *Alternative Methods of Dispute Resolution*, Canada, Ed. Thomson Delmar Learning, 2003;
8. Nougéin Henri-Jacques, Yves Reinhard, Pascal Ancel, Marie-Claire Rivier, Andre Boyer, Philippe Gernin, *Guide pratique de l'arbitrage et de la médiation commerciale*, Paris, France, Ed. LexisNexis Litec, 2004;
9. Tudor Valentina, Alecu Ioan Niculae, *Managementul producției*, București, România, Editura Ceres, 2013;
10. \*\*\* Address no. 2055/04.12.2013 of Romania's European Consumer Centre towards the Romanian Mediation Council;
11. \*\*\* The Romanian authority in the field of consumer protection;
12. \*\*\* [cec.europa.eu/consumers/redress/ecc\\_network/index\\_en](http://cec.europa.eu/consumers/redress/ecc_network/index_en);

<sup>15</sup> The Romanian authority in the field of consumer protection

<sup>16</sup> Tudor Valentina, Ioan Niculae Alecu, *Managementul producției*, Editura Ceres, 2013, p.126

13. \*\*\* Codul consumului și legi uzuale Ad litteram. Actualizat la 23 noiembrie 2012, Colecția Pro lege, Editura Universul Juridic, București, România, 2012;
14. \*\*\* Directive 2006/123/CE, Directive 2008/52/CE;
15. \*\*\* Directive 2013/11/UE concerning Alternative Dispute Resolution;
16. \*\*\* Grupul European Al Magistraților Care Susțin Medierea, Medierea în Uniunea Europeană Stadiu și Perspective, București, România, Editura Universitară, 2010;
17. \*\*\* Law 192/2006 concerning mediation and the regulation of the mediator profession, amended and republished;
18. Law concerning the consumption code, law no. 296/2004, republished in the Off. Gaz. no. 224 of March 24, 2008;
19. Recommendation REC (98) 1, targeting mediation in family related matters, Recommendation REC (2002) 10 targeting mediation in civil matters. Recommendation REC (99) 19 concerning mediation in criminal matters, Recommendation REC (2001) on the alternatives to trials for disputes between administrative authorities and private parties. Directive 2006/123/EC, Directive 2008/52/EC.

# MODERNIZATION OF THE AGRI-FOOD SECTOR OF THE REPUBLIC OF MOLDOVA IN THE CONTEXT OF INTERNATIONAL TRADE DEVELOPMENT

ALEXANDRU STRATAN<sup>1</sup>, VICTOR MOROZ<sup>2</sup>, ANATOL IGNAT<sup>3</sup>

**Abstract:** *The purpose of this paper is to identify opportunities for modernization of the agri-food sector of the Republic of Moldova in the context of the recent developments in the international and regional trade. Participation of the Republic of Moldova in various foreign trade agreements was analyzed. The assessment of the agri-food export was performed in order to show the impact of the trade barriers introduced by Russian authorities over the most important groups of agri-food products. The impact of the recent trade barriers over the economic stability and country's food security was analyzed. The possible directions of the agro-food sector modernization in order to overcome external trade shocks were discussed.*

**Keywords:** *agriculture, agri-food export, trade barriers, commercial risks, modernization*

## INTRODUCTION

Agri-food sector represents one of the pillars of the national economic development of the Republic of Moldova. Agriculture contributed with almost 11% of the country GDP in the year 2012. About 26% of the active population of the country was engaged in agriculture in the year 2012. Agri-food exports amounts to about 45% of the total country's export.

The Republic of Moldova is part of a range of foreign trade agreements that creates opportunities for commercial relations with 93 countries. The main trade partners for export of major groups of agri-food products are Russia, Ukraine, Belarus, Romania, Italy, France and Spain. The evolution of agri-food exports during the last years has a stable increasing trend. However, the recent sanctions imposed by the Russian authorities could affect negatively country's agri-food export, economic stability and food security.

The purpose of this article is to assess the impact of restriction measures and identify possible solutions for strengthening the resilience of the agri-food sector against external trade shocks.

## MATERIAL AND METHODS

Given the challenges of the recent development in foreign agri-food trade the following research methods were used: analysis of the trade agreements signed by the Republic of Moldova which regulates country's foreign trade, analysis of the export development trends, comparative analysis of export for main groups of agri-food products, analysis of the impact over export development, country's economic stability and food security.

The main sources of primary information for this study were data from the publications of the National Bureau of Statistics of the Republic of Moldova, the data bases of the National Bureau of Statistics of the Republic of Moldova and World Integrated Trade Solutions data base. As a secondary source of information served a range of articles and studies elaborated by local and foreign experts.

---

<sup>1</sup> Dr. hab., Stratan A., Institutul Național de Cercetări Economice. Chișinău, Republica Moldova. Email: alex\_stratan@yahoo.com

<sup>2</sup> Dr. Moroz V., Institutul Național de Cercetări Economice. Chișinău, Republica Moldova. Email: vmoroz27@gmail.com

<sup>3</sup> Dr. Ignat A., Institutul Național de Cercetări Economice. Chișinău, Republica Moldova. Email: anatolie.ignat@gmail.com

## RESULTS AND DISCUSSION

The trade policies promoted by the Republic of Moldova are mostly geared towards attracting investments in the national economy which are capable of innovation, transfer of know-how and competitive goods for domestic and foreign markets, high added value and creating efficient technical and economic infrastructures in order to maximize the existing economic potential.

Due to its favorable geographical position, Republic of Moldova is an attractive location for international organizations and transnational corporations, and becoming increasingly important as a place to conduct business between western and eastern markets.

Moldova's relations with other countries in the field of foreign trade are based on compliance with the generally recognized principles and norms of international law and obligations arising from international agreements concluded by the Republic of Moldova (Comitetul executiv al CSI, 2013).

Since March 2008, the Republic of Moldova has benefited from the new scheme of trade preferences granted unilaterally by the European Union, known as the Autonomous Trade Preferences (ATP) scheme. Trade preferences have been granted as a result of Moldova's implementation of sustainable development, good governance policies and efficient customs administration.

Under ATP the Republic of Moldova received free access to the EU market without quantitative restrictions and customs fees, the only exception being a small number of goods which are sensitive for the EU and subject to annual duty free tariff quotas. The main condition for entitlement to preferential arrangements is compliance with the EU rules of origin of products. ATP have offered a basis for increasing the competitiveness of Moldovan products exported to the EU and have also stimulated the efforts of Moldovan exporters to penetrate alternative markets to those in the CIS.

In March 2012 the European Union started negotiations to create a Deep and Comprehensive Free Trade Area (DCFTA) with Moldova. This DCFTA agreement assumes the abolition of duties and quotas in mutual trade in goods and services, as well as the elimination of non-tariff barriers (by the adoption of EU rules on public procurement, health and safety standards, and intellectual property rights, among other means). This agreement allows the integration of Moldova with the common EU market. The idea behind was to stimulate free trade between the EU and Moldova, and to improve the investment climate. Consequently, this should translate into economic growth and also open up business in EU countries to new opportunities for working with Moldova.

Moldova is also a part of the CIS Free Trade Area (FTA). The FTA Agreement entered into force on 20 September 2012 and repealed the previous bilateral free trade agreements within the CIS. The CIS FTA is currently applicable for six CIS countries.

The aim of this Agreement is to establish conditions for a free transfer of goods and services, to provide mutual trade balance, to stabilize domestic economic conditions and to promote growth of the economic potential of the member states on the basis of mutual cooperation. Although the FTA provides for a free tax trade regime, there are still certain exceptions, usually asymmetric in nature.

In 2002, Georgia, Ukraine, Azerbaijan and Moldova signed the GUAM agreement regarding the creation of a free trade zone. Its scope is to eliminate customs fees and other taxes with equivalent effect and quantitative limitations on trade, as well as to eliminate the barriers for free movement of goods and services.

In 2006 Moldova signed the Central European Free Trade Agreement (CEFTA), which came into force on 1 May 2007. CEFTA allows duty free access to the market of countries from the South-Eastern part of Europe. The CEFTA agreement has radically evolved since Romania and Bulgaria left and joined the EU. At this stage, the present signing parties are Moldova, Albania, Bosnia and Herzegovina, Croatia, Macedonia, Serbia, Montenegro and Kosovo. Although the

exports from Moldova to CEFTA countries are fairly low, they have an important role in supporting Moldova's efforts to be included in the Western Balkans perspective of joining the EU, thus reinforcing the relevance of the CEFTA agreement in achieving the objective of Moldova's accession to the EU.

The commercial relations of Moldova with CEFTA countries are governed by the preferential trade arrangements provided by CEFTA, which require almost total liberalization of imports of industrial and agricultural products from CEFTA countries, except for imports of wine from the Republic of Macedonia, which carry a 1,000 hl. duty free tariff quota. CEFTA also provides an individual mechanism for trade disputes settlement or usage of the instrument provided by the WTO.

Moldova has signed comprehensive double taxation agreements with 48 countries, of which 45 are in force. The Double Tax Treaties may provide for more favorable tax regimes than those provided by the local legislation. As guidance on the interpretation of Double Tax Treaties and, correspondingly, for tax administration purposes, the Commentaries to the OECD Model Tax Convention on Income and on Capital are used by the tax authorities and taxpayers. Additional guarantees and support to investors are offered by 40 bilateral treaties signed between Moldova and various countries for the mutual guarantee of investments.

The state policy in the sphere of foreign trade is carried out through the customs tariff (the application of import tariffs) and non-tariff regulation (in particular, through quotas and licensing), also through the introduction of special duties (special, antidumping and countervailing) for foreign trade activity in accordance with the legal framework and international treaties, signed by the Republic of Moldova.

The state is ensuring that installed protective measures, restrictions and prohibitions in the field of foreign trade activities correspond to the reasons behind the need for their introduction. The preference is given to those protective measures, restrictions and prohibitions that cause minimal damage to the implementation of this action and do not contravene to international standards.

Currently, the Republic of Moldova supports external economic relations with 93 countries. These relations are developing in many areas, particularly in the export-import operations.

The current situation in the international trade with agri-food products placed the Republic of Moldova in a difficult position. Exchange of sanctions between a number of Western countries and the Russian Federation provides multiple restrictions on the conduct of economic activities, including international trade, in fact, makes it necessary to review existing economic policies in most countries with economies in transition. Prohibitions and restrictions on the part of the Russian Federation on the import of agricultural products from the Republic of Moldova are forcing the government to urgently diversify export markets and to take measures to strengthen the economic security of the country.

In 2013, more than one quarter of Moldovan export revenues originated from Russia. Currently, Russia uses this economic leverage to exercise pressure on Moldova through a number of trade restrictions.

The most important export groups of products for Moldova agricultural sector are "Edible fruits and nuts", "Alcoholic and non-alcoholic beverages", "Oil seeds" and "Vegetable oil" (see figure 1).

The main export destination countries for these groups of products are Russia, Ukraine, Belarus, Romania, Italy, France and Spain. Out of these four major groups of products only two, namely "Oil seeds" and "Vegetable oil" were not included in the restriction list imposed by Russian authorities. While external trade with other two groups of products was seriously affected by these restrictions.

This leads to the question to what extent these restrictions threaten the stability of the Moldovan economy. Despite a drop in exports to Russia by almost one quarter during the first half of the year 2014 (compared to the same period of the year 2013), total Moldovan exports grew by 3% over the same period.

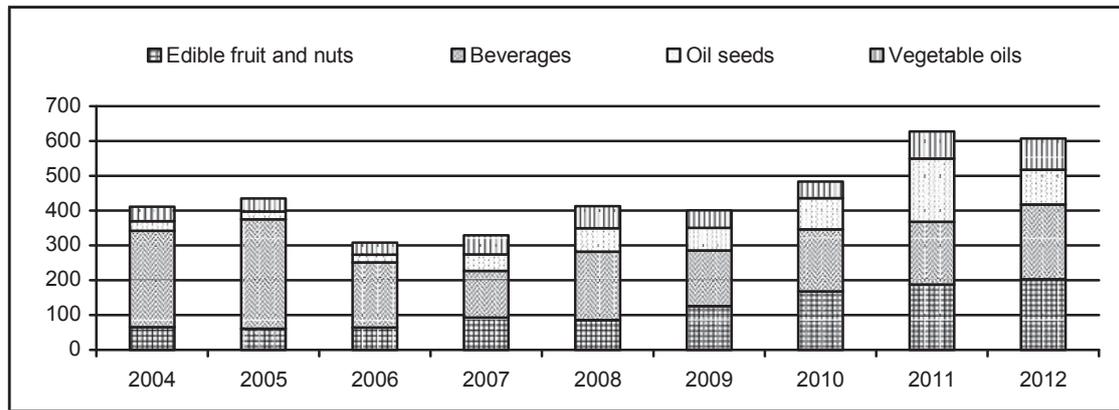


Figure 1. Most important exported groups of products in the Republic of Moldova 2004-2012, Mil. USD  
Source: National Bureau of Statistics, 2014

Moreover, comparing the level of exports for the four major groups of products in the first half of the year 2014 with the average level of these exports for the five previous years one can see a strong increase for three groups, namely “Edible fruits and nuts”, “Oil seeds” and “Vegetable oil” and a small decrease for the “Alcoholic and non-alcoholic beverages” (see figure 2).

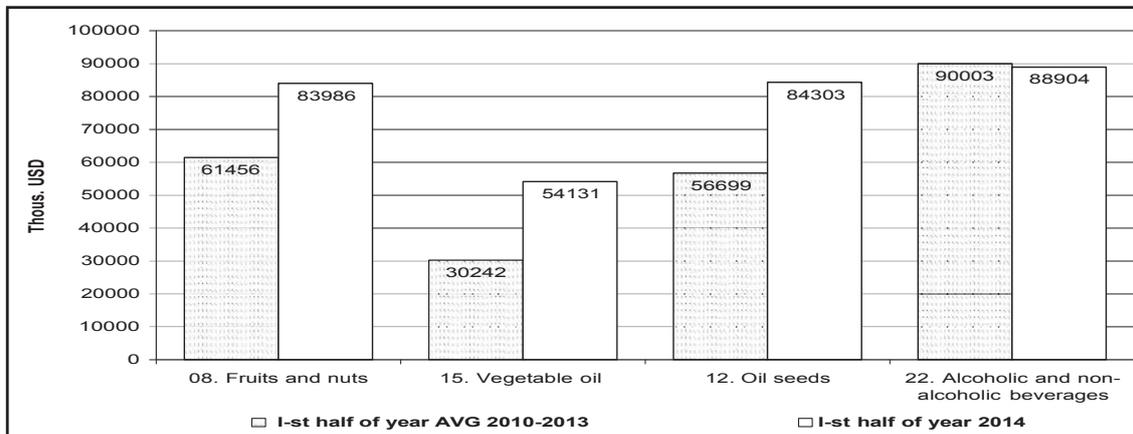


Figure 2. Comparative analysis of export for main groups of agri-food products, 1<sup>st</sup> half year average 2009-2013 and 1<sup>st</sup> half of year 2014, thousand USD  
Source: National Bureau of Statistics, 2014

However, the costs are likely to rise due to new restrictions which came into force in the mid of 2014. Estimations made by a team of independent experts show that the new and existing measures together could reduce export revenues by USD 145 mil. per year. This is equivalent to 25% of exports to Russia and to about 2% of Moldovan GDP (Giucci and Radeke, 2014). These measures have the potential to reduce economic output. However, the economic stability of the country should not be affected in the mid term period, if an adequate policy response will be provided.

So far, the impact of restriction measures affected the total Moldovan exports only moderately. However one can expect these restrictions will remain in place for a longer period that could have a more serious impact on the agri-food exports and on the level of economic growth.

While all previous measures are de-facto import bans, Russia has also increased the import tariff rates for some Moldovan products. Based on the 2011 CIS Free trade agreement, Moldova currently could export almost all goods duty-free so far. In July 2014, however, Russian representatives announced a raise in the import tariffs for in total 19 product groups.

The tariff rate for the affected goods (mostly agricultural products and food) is to be increased to the higher „Most Favored Nation (MFN) Tariff Rate“ which applies to countries without preferential trade agreements. This would suggest a decline in demand for Moldovan

products. However, most products affected by the tariff increase have already been banned before. Therefore the impact of this measure will be significantly lower than existing one.

The imposed import restrictions could affect also the country's food security. However they generate a dual impact over the access to food products and livelihood of the Moldovan population. Thus, from one side it facilitates the access of the country's residents to local food products, while from other side it decrease the purchasing power of the population due to the negative impact over the economic situation.

At the national level Republic of Moldova is food secure. It produces its main food products, exports its surplus food, and imports what it needs to meet its food requirements. Food security indicators prove that in the Republic of Moldova the level of per capita food consumption have stabilized during the last years. The level of food self-sufficiency of the country is rather high, however in several years it decreases to a critical level (see table 1).

Table 1. Self-sufficiency rate for most important agri-food products in the Republic of Moldova, %, 2006-2012

	2006	2007	2008	2009	2010	2011	2012
Cereals	99,2	70,6	143,4	105,0	117,8	115,6	60,8
Sunflower	145,0	65,5	178,0	121,4	156,6	195,9	143,8
Potatoes	91,7	67,0	93,4	89,4	100,4	116,2	66,6
Cereals	103,5	84,8	110,1	98,6	104,2	100,5	93,3
Sunflower	195,8	227,0	222,2	213,9	207,7	237,7	245,2
Grapes	102,4	106,8	102,6	104,3	104,6	102,8	103,9
Meat	67,8	84,5	67,8	86,7	86,0	86,1	81,5
Eggs	112,7	101,6	100,0	100,3	98,8	95,4	102,2
Whole milk and milk products, milk weight equivalent	97,5	95,0	97,1	95,0	94,1	92,0	84,7

Sources: National Bureau of Statistics of the Republic of Moldova, 2014

Analysis of the monthly time series for the year 2014 shows that there are not significant deviations from the typical seasonal trade fluctuation in previous years. However in order to ensure the higher resilience of the agricultural sector of Moldova to external trade shocks it is necessary to modernize the whole agri-food production chain.

Nowadays, modernization for sustainable development of the agri-food sector should foreseen three principal dimensions: economic growth, social equity and protection of the environment. Underlying the economic dimension is the principle that society's well being would have to be maximized and poverty eradicated through the optimal and efficient use of the limited natural resources. The social aspect refers to the relationship between nature and human beings, uplifting the welfare of people, improving access to basic health and education services, fulfilling food security needs and respect for human rights. The environmental dimension, on the other hand, is concerned with the conservation and enhancement of the physical and biological resource base and ecosystems.

Due to the great diversity of rural areas and the presence of the historic and contextual factors in the realization of changes and developments in agriculture, there exists a diversity of future pathways for the agri-food production chains that can prove to be useful for the assurance of the medium and long term stability of this sector. The modernization of the agricultural sector should be based on the following principles:

- An integrated, long-term approach, which corresponds to the objectives set forth in the National Strategy for Agricultural and Rural Development of the Republic of Moldova for 2014-2020;
- A comprehensive and complete framework of incorporating risk evaluation and management approach into uncertainty situations;
- Joint, partnership responsibility at all governing, economy and community levels
- Flexibility of planning mechanisms for the adaptation to possible impacts of economic, commercial and natural risks

The Republic of Moldova has made a significant effort for harmonization of technical regulations with the international standards for food that would ensure the consumer's and human health protection, the conditions for loyal competition, avoiding commercial falsifications and technical barriers.

The strategic goal of the Government is to reform the system of quality control of food. For achieving these goals it is necessary to accomplish the following strategic objectives:

- The improvement of legislation that will ensure a greater harmonization with the international legal norms and standards that reflect all aspects of food productions from the farm to the table of the consumer, including the production of animal feed;
- Fortification of the National Agency of Food Safety, which is charged with the responsibility of the implementation of several key objectives for managing all aspects of the food quality from the farm to the table of the consumer, including those of the rapid alert systems, dialogue and communication with consumers, as well as with the national agencies and scientific organizations;
- Control of food quality, which will provide a uniform procedure for the activities of the national system and inspection through the appropriate distribution of authority and responsibility among all government agencies involved in the food safety issue.

All marked problems should be solved on the basis of the need to improve the quality of management system of food, ensuring compliance with technical requirements, both for export and for domestic market.

## CONCLUSIONS

- There are positive trends in the development of the agri-food sector of the Republic of Moldova during the last years. However the vulnerability of this sector to natural, economic and commercial risks remains to be very high
- The level of country's food security for major agri-food products has stabilized during the last years. Nevertheless in several years it decreases to a critical level due to negative impact of natural hazards. Trade restrictions exacerbated by natural calamities could increase the risk of food insecurity
- The government's efforts to reform the management system of food quality had a positive impact on the development of foreign trade with agricultural and food products
- Successful implementation of the government policies in the field of agri-food development requires a support of the civil society, business community and local public authorities
- The growth of agricultural productivity, supported by investment in rural infrastructure, and technology in the presence of adequate financial mechanisms may contribute significantly to economic growth and resilience of the agri-food sector against external trade shocks.

## BIBLIOGRAPHY

1. Comitetul executiv al CSI (2013). Politicile comerciale ale Republicii Moldova. Comunitatea Statelor Independente, Moscova (în limba rusă)
2. Giucci R., Radeke J. (2014). The Economic impact of Russian Trade Sanctions. Newsletter. Issue No.24 German Economic Team Moldova, Chişinău, October, 2014
3. National Bureau of Statistics of the Republic of Moldova (2014). Statistical Yearbook
4. StatBank (2014). The data base of the National Bureau of Statistics of the Republic of Moldova, <http://statbank.statistica.md/pxweb/Database/RO/databasetree.asp>
5. World Integrated Trade Solutions data base (2014). <https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx>

## ECONOMY OF MOLDAVIAN WINE COMPLEX IN CONTEXT OF EUROPEAN UNION INTEGRATION

GAINA BORIS<sup>1</sup>  
COBIRMAN GALINA<sup>2</sup>  
PASCARI XENIA<sup>3</sup>

**The summary:** *To realize the Moldavian political vector of European Union integration, a paramount importance has the increase of effectiveness of wine complex and the national economy in a whole. During the accession process, current and future development of vine culture and winemaking is assessed, which will allow European experts to make decisions towards futures vineyard areas, the volume and biological category of grafted plant products, the overall volume of the grape harvest and wine production on the domestic market and the EU markets. Increasing the efficiency of this branch of the economy is closely related to the current policy of the state related to subsidize various activities in the nursery wine, using of plantations, integral protection of the grape harvest, creating plantations - parent of clone of a high quality EU countries such as France, Italy and Germany.*

**Keywords:** *national economy, wine complex, competition, quality, export.*

To realize the Moldavian political vector of European Union integration a deep study of the current situation of the wine complex is necessary, determining priorities for development of this important branch of the national economy during the of training and membership. Last years, the practice show that the pre-accession countries was accepted and confirmed to the European wine market by appropriate decisions only on the basis of deep technical and economic studies and examinations.

Currently, the areas occupied by vineyards in Moldova are 142 000 ha and in the period 2004-2014 had decreased by over 10 000 ha. Because of the economic disagreements with the producers of grapes and wines from Moldova and importers of Independent States (CIS) countries such as Russia, Ukraine, Belarus, Kazakhstan and others, this branch has suffered attesting currently a strong decline. From 95 000 ha of plantations, in good condition, productive is about 40 000 ha (their age is 1-7 years), and 38 000 ha of agricultural technique not meet current culture of the vine. From all areas occupied by this culture, it remains to be cleared about 60 hectares of vineyards, vines lack it exceeds 25%, and their age is more than 25 years since their planting. This is proving a disastrous phytosanitary situation, the hubs being attacked by phytoplasma Flovescence d'ore (yellow strings), which causes significant loss in the number of healthy hubs and a considerable decrease in their productivity. The fight with this disease is not so effective because of the high transmissibility on the health plantations. Another problem is the apparition of bacterial cancer of vines in the vine nursery and some plantations; that is why a decrease of vine plantations area and productivity is noted because of the need to disforest the affected hubs and to burn them.

Regarding to the global volume of produced grapes, it varies between 500 and 600 thousand tons per year with a maximum of 685 000 tons in 2009, of which 424 000 tons commodity production. And in 2013, it was registered a rich harvest of 620 000 tons of which the commodity production - 410 thousand tons. It is normal when young fruit plantations harvest reaches 15-18 tons per hectare, while in the old - from 2.6 to 3.4 tons per hectare, that's why the overall average in the country to be only 4.75 tons ha.

Further development of this branch of the national economy depends on several factors: the current state of the wines and vine complex, the grapes, wines and distillates, state subsidies, landing rate and other.

---

<sup>1</sup> GAINA Boris, Academy of Science of Moldova, [bgaina@asm.md](mailto:bgaina@asm.md)

<sup>2</sup> COBIRMAN Galina, Trade Co-operative University of Moldova, [galinacobirman@mail.ru](mailto:galinacobirman@mail.ru)

<sup>3</sup> PASCARI Xenia, Technical University of Moldova, [x.pascari@yahoo.com](mailto:x.pascari@yahoo.com)

Thanks to grants from the state, expressed through compensation of planting vines totaling 25 - 30 thousand / ha in 2005, 4500 ha were planted in 2006-5250 ha, 2007-5 , 3000 ha in 2008-4600 ha, but the embargo established by the Russian authorities to Moldavian wines in 2006, 2008, 2010 and 2013 caused huge losses valued over 150 million dollars, inflicting economic deep crisis or even fail of enterprises. In this conditions, a new vine areas planted in November 2013 made up 3.0 thousand ha (varieties for wine-1, 5000 ha); in 2014, it is expected only 3500 ha planted vines (for fresh consumption and for industrial processing).

According to the deforesting of vine plantations, it is noticeable the 2012 year with 4.6 thousand ha and 2013 – with 3.5 thousand ha (during 2007-2011 years it was deforested around 2.3 thousand ha per year). For 2014 it is planned to deforest around 4.5 thousand ha of vine. The deforestation of old and infected vines plantation is encouraged require subsidies from state, about 2-3 thousand lei per ha should be increased at least 10 times. Only under these conditions, we can bring in agricultural circuit the desired area of 60 thousand ha of vine plantations.

Regarding the global harvest in the country: with 4 tons of grapes per ha it is impossible to realize a need profitability. To get a benefit of the wine business is required to be a minimum yield 8-10 tons per hectare, conditions which cover the costs of cultivation, harvest, transport and ensures a modest net income. And these factors must be correlated with the quality of the grapes, wines and distillates feedstock quality (mass concentration of sugars to top g/dm<sup>3</sup> 180-200) with the high protection of these grapes (no gray mold and other diseases and pests).

There are about 60 nurseries of which 10 have an special activity. Leader in this field is LLC " Elita - Vitis Com. " 3-5 million plants produced annually with an average 50 % of first class wine production.

The vine nurseries are the basis of the wine complex development, and because of the political vector of Moldavian integration in the European Union, the pass to the production of a high quality seedling such as “certified” and “basic” is indisputable and extremely important. In order to stimulate the production of wine seedlings of these high biological categories the stimulation by state subsidies in 2014 is set in the amount of 50 000 lei / ha thing that mobilize domestic producers in addressing the transition from seed "regular" at the free viruses and bacteria seed. Of course these goals require the creation of parent-plants of slips and rootstock from clonal selection of EU countries (France, Italy and Germany). In 2013 it was produced and performed only 2.3 million grafted vine plants, of which 3.0 million pieces has formed as table varieties and 0.5 million pieces - the technical ones. It was exaggerated with mass production of material for the "Moldova" variety in volume of over 1 million pieces, while strong demand varieties were produced in small quantities: Arcadia ( 160 000 ), Alb de Suruceni (130 mii), but Presentabil, Codreanca, Victoria, Carmen and others only by 40-60 thousand pieces. During last years the demand of technical varieties for wine, which was produced in 2013 in volume: Rcatiteli (260 000. Pcs) Aigote (150 000. Pcs. Ritont (135 000 Pcs.), The Rhine Riesling (105 000 pcs.) and Viorica varieties Bianca, Sauvignon, Muscat poloschei - only 70-80 thousand.

A difficult situation is noticeable to create a new plantation areas for seedlings production and rootstock for the “basic” category, even if for 2014 year the state subsidies are about 50 thousand lei/ha. It is important to note that the production and marketing of planting material of "normal" category is authorized only until 2015. The deficit of high quality vine plants will be covered by importation from France, Italy and Germany.

The maximal production of grafted wine in Moldova, keep about 10 million workers ( 2007), however, the financial crisis, the difficulties of economic gender embargo imposed by Russia, etc., have reduced activities; As a result, in 2013 there were only 3.5 million pieces, of which 3 million of table varieties and 0.5 million - for wines and spirits production. This fluctuation destabilizes wine products market with considerable damage, with the deepening economic crisis in the country.

State policy is to strengthen the areas planted with vine; for this purpose in the regulations in force in 2014, are set allocations amounting to 10 000 lei / ha for groups of farmers - producers of grapes.

Regarding the range of vine varieties, despite that the state registers includes about 70 varieties, The Minister of Agriculture and Food Industry subsidizes 25 thousand / ha ( 2014) planting vines and additionally about 2, 5000 lei / ha if you plant the recommended varieties (required for export and domestic market) Codreanca, Moldova precoce (Kubani FR), Victoria, prima, Mecita, Kişmiş lucitor, Aperen roz, Negru de toamnă, Guzun, Negruli.

In this context, subsidization of 2014 will be allocated only for farmers who have become members of association of grapes producers, respectively wines with geographical name indicated ( IG ) or controlled designation of origin (DOC ). And here comes the state policy to regulate the accepted assortment: Feteasca regală, Feteasca neagră, Rară neagră, Muscat ottonel, Pinot gris, Riesling de Rhin, Riton, Traminer roz, Cabernet franc.

Production of grapes (for table consumption and wine production) will be certified as "organic", will be supplementary subsidized with 5 thousand lei/ha. In this way, the work of this important area will facilitate to increase the exportations with non-polluted products, clears biological (grapes, juice, concentrate, wine and other).

A special attention is paid currently for plant health of vine plantations, given that, in the last 5-7 years, were found infected areas Flovecence d'ore (drying arms golden strings) via *Scaphoideus titanus*, coming from the forest strips, abandoned plantations and other locations. An increased concern manifests the problem of avoiding contamination of seedlings and young plantations by bacterial cancer of berries and grapes, caused by the bacterium *Agrobacterium tumefaciens*.

Making persistent and successfully addressed problems will ensure further development of complex Moldovan wine, will increase the efficiency of activities in this sector and will create prerequisites for product quality requirements in this area to meet the requirements of EU legislation. In this way complex wine of the Moldovan economy will perform, along with the entire economy of the country, the tasks outlined in the plan to achieve our state policy vector integration into the European states.

## BIBLIOGRAPHY

1. Belostecinic Gh.L. (1999) Concurența. Marketing. Competitivitate. Chișinău, Republica Moldova, Ed. ASEM
2. Gaina B.S., Puech J.- L, & Savin Gh.A., (2006) Uvologie și enologie. Chișinău, Republica Moldova, Ed. AȘM
3. Gaina B.S., Aricova Z.N., & Rotaru A.M. (2013) Menegment cacestva vinodelicescoi producții (rus). Chișinău, Republica Moldova, Ed. KGU
4. Sturza R.A., Gaina B.S. (2012) Inofensivitatea produselor uvologice . Chișinău, Republica Moldova, Ed. UTM

# RESPONSE POLICIES AND STRATEGIES FOR INTENSIFICATION PROCESSES OF LAND DEGRADATION AND DESERTIFICATION IN THE REPUBLIC OF MOLDOVA

TAMARA LEAH<sup>1</sup>

**Abstract.** *Soil, the main means of production in agriculture of Moldova suffered a progressive deterioration in the last 20-30 years due to a intensive operations without adequate investment to preserve and improve its natural properties. Intensive exploitation led to changes in chemical composition (dehumification, alkalization, salinization) and structure (compaction) and degradation through erosion, pollution, landslides etc. It was estimated a loss of agricultural potential of the soil to 40% due to these direct negative effects of soil degradation. Policy analysis and response strategies showed that the state support of agriculture is very limited. There is no single source of information, containing reports on the amounts (internal and external) have been allocated, the distribution thereof and the name of the projects implemented or under implementation. Evaluation and monitoring of donor funded projects is made in several stages. In this process not involved beneficiaries and the results are made public only in some cases, depending on the scope of the project. To overcome the problems caused by land degradation is required structural agricultural policy, to ensure better use of land.*

**Keywords:** *agriculture, degradation, policies, soil, strategies*

## INTRODUCTION

Over half century the agrifood sector of the Republic of Moldova was developed in foreign terms of market economy. During the transition period there have been efforts to reform the property, creating a competitive production and diversification of external economic relations. But the crisis in the agricultural sector has not been exceeded, it carries a structural character and is caused by contributions that occurred during integration into the market economy structures inherited from the centralized economic system. In recent years there has been a visible decrease of agricultural crops productivity: from 3/1 of cereals and sugar beet, to 50% and more of fruits, vegetables, grapes and tobacco. Reduction of productivity in agriculture is caused by natural and anthropogenic factors leading to soil and land degradation, intensification of desertification and drought. As a result of increased of land degradation processes, the excessive fragmentation has a negative impact on agricultural output because in these conditions is possible only low labor productivity. Another factor of the domestic agriculture land crisis is Soil Law, and how poor it was applied thereby causing the worst agrarian structure of the last century. Moldova became the country with the most fragmentation of agricultural land in the Europe bringing to a situation similar to that in the interwar period, which means that more than 70% of properties measured the 3 ha (of which more than half have less than 1 ha area) and properties greater than 10 ha represent only 0.5%, divided in 3-5 plots (Gheciu *et al.*, 2012).

## MATERIAL AND METHOD

As materials were used agricultural policy documents referring to national programs, development strategies, action plans intended to diminish soil degradation and increase their fertility; traditional agricultural practices developed on this subject, which is being made. The method used - evaluation of policies and response strategies on the intensification of land degradation and desertification, comparative analysis, which were identified main causes problems stopped achievement in agriculture.

---

<sup>1</sup> Assoc.prof. PhD., Institute de Soil Science, Agrochemistry and Soil Protection "N. Dimo", tamaraleah09@gmail.com

## RESULTS AND DISCUSSION

The dominant character of agriculture in Moldova's economy is due to its moderate climate and fertile soils. Chernozems occupy 80% of the country territory. Share of agriculture with manufacturing of agricultural raw materials account for around 33% of GDP and 65% of total exports. Having production capacity of fertilizers, pesticides, mineral feed additives, veterinary medicines and fuel, Moldova depends on imports. According to official statistics, agricultural production fell by about 35% in the first half of the 90 yrs. and 20% - in the second half, now being less than 50% of the years 1989-1991 (*Reforma, 2011*).

The privatization process of agricultural land occurred within two stages: the first - "*small privatization*", which led to a substantial increase in assigned areas of rural families (up to 300 thousand ha in 1990-1992), and the second - "*large privatization*" which expanded on land cultivated by former collective farms. During the second stage, the rural population by offering titles and were sent privately owned agricultural land shares (*Muravschi, 2002*). The process has resulted in a highly fragmented structure of land ownership, which led to the intensification of soil and land degradation. Agricultural soil degradation results are presented by destructuring processes, compaction, humus, destruction by erosion and landslides, etc. These negative consequences are well known and multilateral research. To mitigate and avoid their various concrete measures have been developed, specific technologies and procedures that form complex systems or processes regional mitigation and protection of soil degradation (*Erosion, 2004*).

***Complex National Program for Soil Fertility Increase (2001-2020)***. Goal - promoting and developing by the central and local public administration a unique policy of the state in planning, organizing exploitation and protection of soils and agricultural land, development of a complex and scientifically based measures to increase soil fertility, improve the institutional and legal framework for the regulation of land relations. In the Program, Chapter II "System of measures to combat soil fertility degradation and increase" are given basic principles and objectives of the strategy to combat degradation, protection and sustainable use of soils. Action Plan (program annex) reflects the complex of measures to combat soil degradation forms (organizational, general, sustainable agriculture, the erosion control works, to combat landslides, grassland ecological reconstruction, fertilization, irrigation, combat drought).

***Recovery Complex Program of degraded lands and increase soil fertility (2001-2015)***. *Part I. Improvement of degraded land*. It was developed in accordance with art.12 and 14 of the Law on normative price and the sale of land 1308-XIII of 25 July 1997 and Government decision no.1027-402 of 04.05.1998. The program sets overall strategy and tactical guidelines of state policy for the protection, improvement and sustainable use of land resources, long-term maintenance of quality and production capacity of soils for food security and ecological security of the country. Are presented scientific methods and procedures to improve degraded soils, the complex of measures on improvement of soil based scientific elaborations.

***Recovery Complex Program of degraded lands and increase soil fertility (2001-2015)***. *Part II. Increasing soil fertility*. Goal - preserving and enhancing soil fertility of degraded low production level, and those with less manifestation of natural and anthropogenic risk factors justified applying of fertilizers, crop rotation implementation, expansion of irrigated land and other measures that contribute to regenerate fertility soils and food security of the country. Some resources to improve soil fertility are presented and characterized livestock waste. In the last 10 years the amount of organic fertilizer applied in agriculture declined from 9700 thousand tons in 1990 to 75,4 thousand tons in 2001 to minor amounts (10 kg/ha) in the present.

Actions planned in the programs mentioned above were partially implemented (10 percent). Unrealized measures can be translated into reality within the activity of landscaping at the household, district, country level. The measures of protection, improvement and sustainable use of soils can be achieved through researches and projects that are long-term action, but require massive investment from the state, businesses and organizations dealing with environmental and sustainable development issues.

***Program of conservation and improvement of soil fertility (2011-2020).*** Goal - implementation of measures to stop the degradation and increase soil fertility by upgrading and extension of land improvement, implementation of modern technologies and environmentally friendly agricultural practices. Provisions: providing scientific effort; create Automated Information System of soil quality status based on soil and agrochemical research; stop the degradation of the active forms of soil cover (erosion, landslides, gullies) by extending of land improvement works; increase the soil fertility by implementing environmentally friendly agricultural practices, harmless system of fertilization, irrigation and extension compliance agricultural technologies.

***Program of conservative agriculture (2014-2020).*** Goal - to promote the conservative agriculture system in versions to adapted at the soil condition and the requirements of the main crops to ensure competitive quantity and quality production, with lower costs and higher profit in terms of improving soil characteristics and functions in agroecosystems, enlarged reproduction of pedogenesis and environmental process. Preventive restoring of soil degraded characteristics of arable and underlying layer on the land planned for phased implementation of Mini-Till and No-Till annually on the surface of 10000 ha.

***National Program "Moldovan Village" (2005-2015).*** The purpose of the implementation will serve as a basis for achieving its priority in rural areas. In this program states that will be developed and implemented risk mitigation mechanisms and repair the damage caused by climate deviations promoting extension services that would allow the transfer of knowledge on how to implement the erosion and crop rotation systems for the processing soil and combating drought. It will encourage the planting of forests on lands vulnerable, degraded and damaged. Will be improved weather forecasts and hail system will be developed. It will invest in irrigation systems, including the development of small-scale systems. It will develop and promote of agricultural crops insurance schemes.

***Strategy for Agriculture and Rural Development of Moldova (2014-2020).*** The purpose - to enhance completeness food sector through an extensive restructuring and modernization and to improve quality of life and work in rural areas by creating a strategy between food activities and the natural environment. For the entire purposes three priorities and nine measures were identified. The expected impact is to achieve this goal sector, including the structure and use of land resources, improving soil quality.

***Strategy of agrifood sector development (2006-2015).*** In this strategy shows that state efforts to revitalize the livestock sector are geared towards creating the next 10 years a system of small and medium business units based most on private property. The strategy envisages obtaining and developing new breeds of animals and birds high productivity, competitive both in the domestic and foreign markets. Main link to the sphere of production of livestock is due to a homestead (farmer), based on private property with a farm commodity production of milk and meat, provided 18-20 acres of agricultural land and technical processing the earth and animals. The strategy proposes improving the subsidizing local farmers in the livestock sector in the state, in order to facilitate their work. Strategy forecast annual growth of global agricultural production by 7.5 percent, increasing the share of processed agricultural output by 20 percent and organic production to 10 percent by 2015 to increase the real incomes of agricultural workers to 85 percent from the average on the economy.

***National Development Strategy "Moldova 2020": seven solutions for growth and poverty reduction.*** Objective - providing quality economic development and therefore poverty reduction. In 2010, the poverty rate was 21.9%. If use the 2010 level in the baseline scenario the poverty rate in 2020 will decrease to about 16%. However, with the implementation of the priorities, it will significantly reduce up to 12.7%, or 3.3% more than in the baseline scenario, which is potentially 149 thousand people out of poverty. The strategic vision of the Government's medium and long-term reconciliation between the need for accelerated economic development and environmental protection in accordance with European standards.

***Environmental Strategy for the years 2014-2023.*** Application of Environmental Strategy for the years 2014-2023 will cost about 9 billion. lei. Costs were estimated in the negotiation of the Association Agreement and the Free Trade Agreement with the EU. Expenses to be covered by internal resources (State budget, National environmental fund, Regional development fund, Fund energy efficiency) as well as foreign investment. New Environmental Strategy aims to ensure the population of Moldova right to a sustainable environment unpolluted and healthy in the context of economic development. The document establishes that the next 10 years to develop a modern organic through the development and adoption of an environmental legal framework at European standards. Stipulated provisions that will reduce the negative impact of economic activity on the environment, but will also increase the level of environmental protection by at least 50%. Also included are measures of protection and biodiversity conservation, recovery of ecosystems, reduce greenhouse gas emissions by at least 20 percent until 2020, reducing the amount of waste by 30% and increase the recycling rate to 20% until 2023. According to experts, a result of the strategy, over 80% of the population will have access to quality water and over 65 percent - to sewerage systems.

***Strategy of Food safety (2011-2015).*** The aim - to achieve the highest level of protection of public health and consumer interests in terms of food safety. The strategy is a prerequisite for the adoption of EU food safety principles and achieve integrated approach "from fork to hayfork" to ensure public health and to allow increased exports.

***Strategy of Land Consolidation (2012-2027).*** Objective - consolidation of agricultural land in order to stop the land degradation. Main activity: implementation of land consolidation projects. External funding for the implementation of building projects: World Bank, United States Agency for International Development, Swedish International Development Agency, European Union programs, including the Rural Development Program.

***European Strategy of the Republic of Moldova.*** One of the major regression in agriculture reached is that agriculture has lost its industrial character altogether. Create a system of "allowances" in Moldovan agriculture significantly reduced the potential development of an intensive agricultural industries based on modern scientific methods. Priorities: creating the conditions for the purchase of seeds, fertilizers and pesticides; reducing transportation costs through supply sufficient fuel producers; purchase by association modern agricultural equipment; processing of agricultural production to marketing within single centers respective associations; linking agricultural production supply producer associations with actual demand of the market; improving agricultural property structure by promoting economic incentives to increase farm; rural infrastructure development; development of systems for the collection, storage and distribution of agricultural products; create a national land administration and control; establishment of necessary institutional structures near the Common Agricultural Policy coordination.

## CONCLUSIONS

To overcome the problems caused by land fragmentation is required structural agricultural policy, to ensure best use of degraded lands. Concentration of agricultural production is one of the essential conditions for the development of productive capacities and competitiveness to achieve a sufficient level of integration in the European Union. Here it is important to identify potential sources of progress in the agricultural sector and the conditions necessary to attract them. If Moldovan agriculture, the main source of agricultural progress are implementing new technologies, practicing consistent economic policies and institutional development appropriate strategies.

Systematic action plans on measures reducing soil degradation processes in different national and planned development strategy is just a first step, the next step is implementation. At the stage of implementation of recommendations and actions occur the difficulties, such as incompetence, irresponsibility, lack of agricultural and laboratory shortage of material and financial resources, etc. Result: develop strategic action plans are not implemented. Making action plans

would contribute, on the one hand to obtain higher production volumes and highest quality indices, on the other hand, to effectively preserve and enhance soil fertility and biodiversity.

Soil protection should become one of the objectives of the National System for Monitoring Land, where it is necessary to develop environmental standards and norms, primarily to determine optimal and critical levels of various indices according to their soils genesis, climate, cultures and technologies of cultivation, to make predictions of long-term soil quality and present concrete recommendations unfavorable regulatory processes. In the case of Moldovan agriculture, the main source of agricultural progress are implementing the new technologies, practicing consistent economic policies and appropriate institutional development, implementation of action plans and long term strategies.

## BIBLIOGRAPHY

1. *Eroziunea solului. Esența, consecințele, minimalizarea și stabilirea procesului* (2004). MAIA, ARFC, IPAPS N. Dimo. Red.resp. D.Nour. Ch.: Pontos, (F.E.-P "Tipogr. Centrală"). 476 p.
2. Gherciu, V., Palade, I., Jambor, A., Sass, R. & Popov, V. (2012). *Politici agricole și rurale: standarde de dezvoltare. Experiențe europene pentru Republica Moldova*, <http://soros.md/files/publications/documents>.
3. Muravschi, A. (2002). *Dezvoltarea rurală în Moldova (studiu de caz)*. Ch.. IPP, p.6-12.
4. *Programul agriculturii conservative pe anii 2014-2020*. <http://www.maia.gov.md/doc.php?l=ro&idc=49&id=15564>
5. *Programul Complex de Valorificare a terenurilor degradate și sporirea fertilității solurilor (2001-2015)*. Partea I. Ameliorarea terenurilor degradate. Ch.: Pontos, 2004. 212 p.
6. *Programul Complex de Valorificare a terenurilor degradate și sporirea fertilității solurilor (2001-2015)*. Partea II. Sporirea fertilității solurilor. Ch.: Pontos, 2004. 128 p.
7. *Programul de conservare și sporire a fertilității solurilor pentru anii 2011-2020*. <http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=339882>
8. *Programul Național „Satul Moldovenesc” (2005-2015)*. <http://www.gov.md/doc.php?l=ro&id=2764&idc=447>
9. *Programul Național Complex de Sporire a Fertilității Solului în anii 2001-2020*. Ch.: Pontos, 132 p. HG RM nr.591 din 20.06.2000, ordinul MAIA al RM nr. 16 din 04.07.2000.
10. *Reforma Agriculturii*. (2011). Prevederi din Strategia de Creștere Economică și Reducere a Sărăciei (SCERS: p. 263-313), <http://2011.europa.md/subpagina/arata/36>.
11. *Strategia de Dezvoltare a Agriculturii și Mediului Rural din Moldova, 2014-2020*. <http://www.maia.gov.md/public/files/Proiecte/ProiectStrategiaAgriculturaDezvRur.pdf>
12. *Strategia de dezvoltare a sectorului agroalimentar pentru 2006-2015*. <http://www.agravista.md/article/11477/>
13. *Strategia de mediu pentru anii 2014-2023*. [http://www.realitatea.md/tag/strategia-de-mediu-pentru-anii-2014-2023\\_10317](http://www.realitatea.md/tag/strategia-de-mediu-pentru-anii-2014-2023_10317)
14. *Strategia Europeană a Republicii Moldova.2005*. <http://www.ipp.md/libview.php?l=ro&id=517&idc=167>
15. *Strategia în domeniul siguranței alimentare pentru anii 2011-2015*. <http://www.maia.gov.md/doc.php?l=ro&idc=48&id=14670>
16. *Strategia națională de Dezvoltare "Moldova 2020": Șapte soluții pentru creșterea economică și reducerea sărăciei*. <http://particip.gov.md/pageview.php?l=ro&idc=475>
17. *Strategiei de consolidare a terenurilor agricole pentru anii 2012-2027*. <http://www.ipot.md/ro/Consolidarea-terenurilor-agricole.html>.

# FIGHTING AGAINST DROUGHT IN DOBROGEA BY PROTECTIVE FOREST BELTS

LUP AUREL<sup>1</sup>, MIRON LILIANA<sup>2</sup>

**Abstract:** Dobrogea province is composed by Constanta and Tulcea counties, situated in the South-eastern part of Romania, and it is known as one of the driest parts of Romania. The yearly amount of precipitations is no more than 400-450 mm. The yearly average temperature is around 10.5°C; the soils are of good quality but the main factor limiting the crops is, in this case, the lack of the water. During 1949 and 1955, studies were carried out concerning the damages produced by drought and the influence of the forest plantations for protective purposes on crops. Consequently, there have been planted protective forests on a few thousand hectares in the southern part of Constanta county but which were insufficient in order to protect all the agricultural lands. Because of the uncertainty surrounding the rehabilitation of the irrigation systems in the near future in Dobrogea, several projects were made in order to set up protective forest plantations. These projects include 70 localities and there have already been planted protective forests in some of them. The width of these forests is 10 m, the planting scheme is 2 x 1 m, and the distance between them is variable, by the case. The locust tree is the used species.

**Key words:** drought, damage, forest belt

## INTRODUCTION

For a long time, deforestation was the only way to increase the cultivatable area needed in order to produce food for a more and more numerous population. Then, deforestation was conducted for the construction of ships, and, later for the railway beds for the coal industry; nowadays, despite the ecologists' signals and governments' regulations, deforestation continues. Every day, thousands of hectares of forest disappear; due to the aggravation of this phenomenon, the agriculture, i.e. the only food source, is in danger.

Erosion, flooding, desertification, soil washing are phenomena threatening the planet's ability to ensure mankind's food security. The disastrous effects of drought on crops completes this grim picture, and the forest plantations for protective purposes are considered as one of the main means of fighting against them.

## MATERIALS AND METHODS

There were analyzed experimental data regarding the influence of the forest protective belts on agricultural yield for any crops the such as wheat, mays, barley and other cereals species, as well the influence on the climate: air temperature wind speed soil moisture keeping of the water in the soil. Finally we are proposed any schemes and methods for setting up some forest protective belts against the drought in Constantza county.

## RESULTS AND DISCUSSIONS

Deforestation had important consequences, just as serious as the shortage of food areas. Huge areas, once fertile, have undergone an intense process of desertification because the lack of forest vegetation generated one of the most damaging phenomena to agriculture, namely drought. The acknowledgement of this situation was late - in the early twentieth century – but the measures taken against deforestation remained fragile in comparison to the evolution of the phenomenon. In Romania, until the mid-nineteenth century, a large part of the Romanian Plain, Baragan and Dobrogea were covered with forests, which, later, had been cleared in order to make way for the grain, which was well sold at the export.

---

<sup>1</sup> Professor Dr. Eng., Ovidius University of Constanta. email: luparel@yahoo.com

<sup>2</sup> Dr. Eng. Ovidius University of Constanta

The effect was quick to appear; thus, one of the greatest landowners began planting forests of locust trees in order to “*shelter the crops*”<sup>3</sup>, said Ctin. Garoflid, one of the ministers of agriculture of the time.

***Dobrogea case.*** In the past - before 1850, as M. Drăcea, the great silviculturist, said - Northern Dobrogea, with the exception of a narrow strip in the north and east of Tulcea county, as well as the southwest corner of Constanta county, was covered by ancient forests - forests that have not been found by the Romanian agronomist-scholar Ion Ionescu de la Brad, who, in 1850, scientist discovered Dobrogea with a dry climate and burning soils, where plants suffered more from water shortages, from rain shortages, rather than from nutrients. Ionescu de la Brad also stated that the very word Dobrogea would be translated from Turkish as *the land without trees*<sup>4</sup>.

In its turn, the Romanian Administration of Dobrogea has not spared the forests. In 1902, a local newspaper was announcing: *Tulcea forests are in a real mess... Trees have been cut down and cut down, without ration, without control; the plunder was practiced in every way; the public fortune has been operated without*

*care about anyone or anything.* According to the statistics from the second half of the '20, professor Drăcea quotes for the two Dobrogea counties the following data: in Constanta county: 19 500 ha, of which 25.1% gaps; in Tulcea county: 80 400 ha, of which 10.0% gaps. A forest fund development in Dobrogea, during the planned economy period, compared to the previous period is presented in Table 1.

In 2000, the forest fund occupied, in Constanta county, 3.5% thousand hectares (representing 5.0% of the county area) and 92,900 ha in Tulcea county (representing 10.9% of the county area). Numerous observations and climatological studies have highlighted the arid nature of the area. As an agro-meteorological phenomenon, the drought is defined as *the period when the total amount of rainfall is below average and when the distribution per seasons is unfavorable to plants' needs* (Gh.Ionescu Șișești, 1958-1961). Under this aspect, in Dobrogea, we meet the strongest and the most frequent water shortage caused both by the lowest amount of precipitation as well by their uneven distribution throughout the year, in relation to crop needs.

***The aridisation phenomenon in Dobrogea.*** According to relatively recent studies, in Dobrogea, the quality of the agricultural land is affected by what is called, in the language of FAO, *the danger of desertification*, mainly determined by two factors, i.e. the vulnerability of the land in connection to the mentioned phenomenon and the human activity (including grazing). In relation to the continental climate, there are considered vulnerable those areas where the ratio between precipitation and the potential evapotranspiration (Penmann) is less than 0.75. In Northern Dobrogea, this phenomenon was highlighted on the lower and middle levels of the relief in Jurilovca, Cerna, Babadag, Tulcea, Macin, Topolog (moderately-strong steppe vulnerability and weak-moderate pre-steppe (Munteanu, 1988). In southern Dobrogea, the aridity phenomenon has also been identified in the lower and middle levels of relief at distances greater than 70 km from the coastline (Mihailescu 1993). As a remedy, the reforestation and irrigation have been proposed, the latter, however, if practiced defectively, may entail unintended consequences, such as salinization or erosion.

***The influence of protective forest belts on the environment.*** The influence of protective forest plantations on the microclimate is complex and it results from the influence of: the wind, the air temperature and the sunlight, the hydrological regime, the soil formation process and the macroclimate. The creation of the protective forest plantations was imposed in order to fight against drought. Droughts are usually accompanied by dry winds.

Table 1

The evolution of the forest fund in Dobrogea, 1927-1989

Years	Constanta county		Tulcea county	
	Area thousands ha	Share in the county%	Area thousands ha	Share in the county%
1927	25,6	3,7	106,7	12,7
1935	13,6	2,0	72,0	8,6
1968	24,5	3,5	89,7	10,6
1989	39,0	5,5	95,5	11,2

<sup>3</sup> Ctin.Garoflid: *Agricultura veche*. Tiparul ...

<sup>4</sup> A.Lup: *Dobrogea agricolă, de la legendă la ... globalizare*. Ed Ex Ponto, Constanța, 2003, p.788 și 757.

The influence of protective forest belts on the wind. We should consider as harmful to the crops in our steppes all the winds that do not bring rain, because they evaporate the water from the soil and make the plants transpire more. The influence of protective forest plantations on the speed of these winds largely determines their other influences on the microclimate.

The influence of protective forest belts on the hydrological regime. The tree crowns cover the soil and their leaves intercept the sunrays so that a small number of these rays touch the ground.

The retention of rain and snow by tree crowns, trees and shrubs. The trees and shrubs retain in their crowns 10-40% of the total rainfall. The water thus retained is rapidly evaporated, the rest of the precipitation thus contributing to wetting the soil.

The influence of protective forest belts on soil water evaporation. The research reveals that both during the daytime and the night, the soil water evaporation is lower in the area protected by forest plantations, the greatest percentage reduction occurring during dry winds.

The influence of protective forest belts on crop transpiration. The protective forests belts contribute to the increase of the air humidity in the crop layer and, due to wind speed reduction, they retain for a longer time this layer unrefreshed and reduce the intensity of plant transpiration.

The influence of protective forest belts on the snow deposit in the protected area. In the open field, a good part of the snow is blown by the wind and piled into gullies, ravines and depressions, generally. In the protected area, the snow layer is deposited uniformly in a layer descending up to 18-40 over a length of about 200 m (fig. 1).

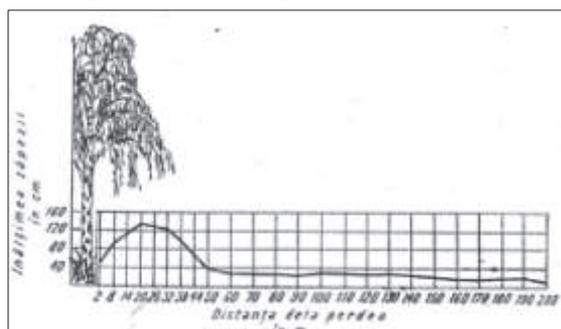


Figure 1

The influence of forest belts on crops. Based on the research conducted in order to increase the agricultural crops due to protective forests belts it was found that: protective forests increase, in the protected area – on all soil types –, all the crops: cereals, pulses and oil crops, industrial crops, vegetables and herbs. From the experiments conducted in Dobrogea, by dr. eng. I.

Lupe, it results that the average crops from the lands protected by forest belts, as a percentage compared to the unprotected lands (100%), are:

- autumn wheat ..... 123-176%
- oats ..... 123-246%
- corn ..... 123%
- dry hay ..... 395%

Table 5  
The distribution of protective belts by regions and emergencies in Romania

Regions	Region area - thousands ha			
	Emergen cy 1	Emergen cy 2	Emergen cy 3	Emergen cy 4
Dobrogea	580	247	-	827
Baragan	940	751	143	1834
Olt-Argeş Plain	175	530	428	1133
Oltenia Plain	405	298	266	969
Tisa Plain	372	233	216	821
Transylvania Plain	487	-	272	759
North-East of Moldavia	435	715	-	1150
<b>Total</b>	<b>3394</b>	<b>2774</b>	<b>1325</b>	<b>7493</b>

Lupe, it results that the average crops from the lands protected by forest belts, as a percentage compared to the unprotected lands (100%), are:

The establishment of protective forest belts. Altogether, for the dry regions of the country, there are required 654 800 ha of protective forests belts for the agricultural land and 12,400 ha of

protective belts along rivers - therefore a total of 667 200 ha of protective forests to which we need to add the forest plantations for greening the roads and the populated urban and rural centers, the anti-erosion forest plantations and those for agricultural amelioration works etc.

Only in Dobrogea there are required forest belts on an area of 545000 ha on lands with a slope below 3°. For example, we present the map of the country with the panoramic territorial distribution of the protective forest belts, made of dr. eng. Lupe and V.Jianu (Fig. 2).



Figure 2

**Types of protective forest belts.** The type of protective forest belts is determined by their stand composition. According to the number of the species in a forest plantation, we distinguish between: the pure type, which consists of a single species, and the mixed type, which includes several species of trees and shrubs.

The forest belts of mixed type are more resistant than the pure ones. They are classified in the following main subtypes: forestry-shady; forestry-shrub and combined.

The forestry-shady mixed type includes protective forest belts where the tree crowns are placed on two floors. The first floor is higher and consists of the basic species of the forest plantation; the second floor, situated lower, consists of the accompanying species.

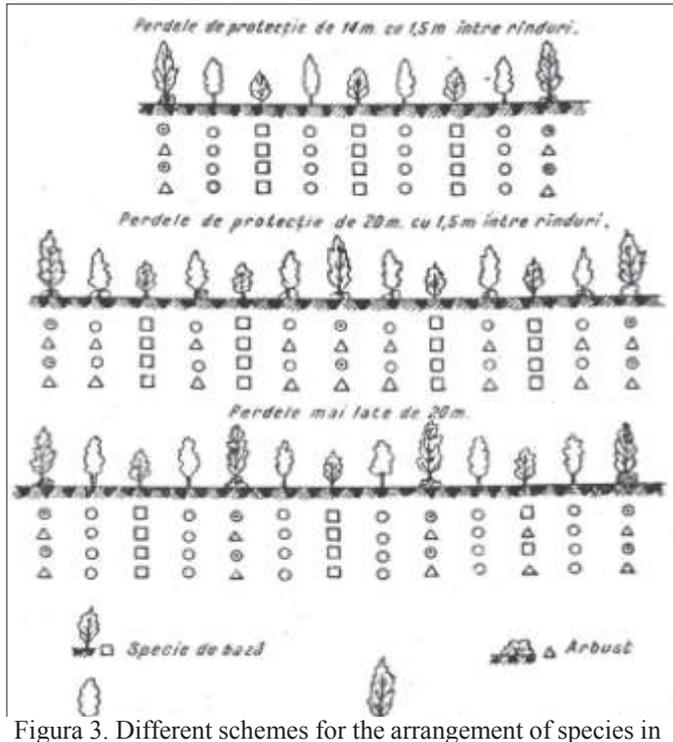


Figura 3. Different schemes for the arrangement of species in protective forest belts

The forestry-shrub mixed type. The tree species are mixed in the row or rows with shrubs, in an amount of at least 50%.

The combined type is used on the proper chernozem to the degraded chernozem.

**The distance between the protective forest belts** is calculated according to the height reached by the base species from the forest plantation at the age of 25-30 years. The protective forest belts, which also include species that grow quickly, reach, in the area of degraded and proper chernozem and in the area of reddish-brown forest soil, at this age, 17 to 18 m; in the area of chocolate chernozem - 14 m; on the brown chernozem and on the light-brown steppe soil - 8-12 m. The favorable influence of the protective forest belts on the agricultural field is felt at 25 ha in the defended area plus 5 ha in the area situated before the forest plantation, resulting thus in 30 ha. Therefore, there are

recommend the following distances between the main forest belts:

- Reddish brown forest soil: 500-600 m
- Proper and degraded chernozem: 400-500 m
- Chocolate chernozem: 350-400 m
- Brown chernozem: 300-350 m
- Dry light-brown steppe soil: 250-300 m

The recommended width of protective forest belts is 8-20 m. The forest plantations with a width of less than 8 m should be avoided, because, in such forest belts, there lacks the required forest environment. Also, widths greater than 20 m should be avoided. Generally, in the steppe, there are recommended: 14-20 m for the main forest belts and 8-11 m for secondary forest belts.

In recent years, in Constanta county, there has been conducted a study whose objective was to substantiate the need to establish a network of forest belts for the protection of fields, and to determine their location. The forest belts for the protection of fields were placed at the following distances from: sheepfold roads (in close proximity); irrigation channels (in close proximity of the roads serving them); grids - at 30 m

If national and county roads are sheepfold limits, the plantation of field protection forests should be avoided because the NRA (National Road Administration) regulations on road belts provide for a minimum plantation distance of 30 m from the road, which would lead to the undue fragmentation of the property (the strip of land remaining between the road and the forest belts cannot not be properly used for crops). It is noted that, where the power lines cross, the forest belts

shall consist only of shrubs underneath them, at a distance of 20 m from the edge of the projection of power lines.

Given that the optimal distance for forest belts, set in the technical standards, could not be met due to local topography and cadastral features, the network was created from one type of forest plantations (main - 10 m width), aiming at compensating the decrease in the protective effect due to the increase in the distances between the forest plantations, by increasing the area occupied by forest vegetation. In order to allow the mechanized execution of planting works, there was adopted the planting scheme of 2 x 1 m (5000 seedlings / ha).

The total estimated value of the investment: 282 506 651,42 RON.

Until now, there have been planted protective forests belts especially in the south of Constanta county, in the area of Ostrov, Lipnita, Viișoara, Cobadin, Ciocarlia. In Amzacea, there have been planted protective forests belts over an area of 14 hectares, representing a share of 3.7% of the area of 382 ha, which they protect. For each ha of protected area there are 0,037 ha or 370 m<sup>2</sup> of protective forests belts. Another feature of the current protective forests belts is the fact that they are composed only of locus trees - the only species currently available.

## CONCLUSIONS

1. Along with irrigations, the plantation of forests belts for the protection of fields is the main method to combat drought.

2. Compared to irrigation, which depends on a water source, protective forests belts can be placed especially in steppe areas, where water is scarce or where the cost of irrigation is high, such as Dobrogea, for example.

3. The current orientation for the re-establishment of protective forest belts is based on both scientific considerations and practical reasons.

4. Unlike irrigations, which, in addition to the beneficial effect on crops, also have negative effects on soil erosion, salinization and even marsh, forest belts instead protect the soil, help maintain its sustainability and even improve its quality.

5. The effects of forest belts on the environment, in general, are well known: wind mitigation, improving soil water regime, mitigation or even surcease of the soil erosion on slopes.

6. Among these practical reasons, we are also faced with the uncertainty of the costly rehabilitation of the irrigation systems; this rehabilitation depends on the bodies and institutions at the central-national level; on the other hand, the belts of protective forests is available to any user of agricultural land.

7. We consider that the land cadaster action and the creation of nursery seedlings will contribute, in the near future, to the restoration of the system of protective forest belts at the regional or even at the national level.

## BIBLIOGRAPHY

1. Chirilă Ctin., Miron Liliana (2010): *Managementul economic al resurselor agriculturii și dezvoltarea rural-agrară în România*. Ed. Universitară, București.
2. Ionescu Șișești Gh., Staicu Ir. (1968): *Agrotehnica, vol.I*. Ed. Agrosilvică de stat, București.
3. Ionescu Ion de la Brad (1968): *Opere agricole, vol. I*. Ed. Academiei RPR, București.
4. Lup A. (1997): *Irigațiile în agricultura României*. Ed. Agris, București.
5. Teaci D. (1980): *Bonitatea terenurilor agricole*. Ed. Ceres, București.
6. x x x (1956): Colectiv de autori: *Manualul inginerului agronom, vol. V*. Ed. Tehnică, București.
7. x x x (2008): *Studiu de fundamentare a necesității instalării perdelelor forestiere de protecție a câmpului din județul Constanța*.

## EDUCATION AND SPECIALIZED TRAINING - WAYS TO INCREASE PERFORMANCE IN AGRICULTURE

ANCUȚA MARIN<sup>1</sup>

**Summary:** *This paper makes a brief analysis of education in general and of agricultural profile in particular, and highlights existing problems, and the ways to improve them, in order to increase performances in agriculture. The economic development of a country requires transformations qualitative, quantitative and structural, both in economy and how people think. Therefore, there can be no economic development without fulfilling social conditions without changing the institutional framework, without research and education, without technical progress. On Measure the economic development, educational institutions suffer changes of functions, adapting to specific needs of the moment. In traditional societies, education refers to the transmission and reception of knowledge, to the formation of a public opinion, to maintain a broad social consensus. In modern society, the educational institution acquires a special importance, which can be regarded as recruitment agent and the distribution of individuals or group of individuals to different economic roles or positions within the social structure. Because of this, both in developed countries as well as in emerging the education became a variable of profound influence on progress of human society by facilitating economic development.*

**Keywords:** *education, performance, economic development, professional training*

### INTRODUCTION

Education, as a social phenomenon has historical character. She appeared with the first forms of social organization of people and evolved according to the transformations undergone by human society. Education aims to form a personality consistent with the objective requirements of society and the individual. The great Dutch humanist Erasmus said in the seventeenth century that "The future of a nation is determined by how it prepares its youth" perfectly true statement nowadays.

Initially education was predominating individual. Moving from the individual to the collective education was made due to the need for schools to keep up with technical progress, to deliver a increasing volume of scientific knowledge in a relatively short time and a increasing number of students required for production development.

The economic development of a country requires transformations qualitative, quantitative and structural, both in economy and in how people think. Therefore, there can be no economic development without fulfilling social conditions without changing the institutional framework, without research and education, without technical advance. Because of this, both in developed and in developing countries the education became a variable with profound influence on progress of human society by facilitating economic development.

This paper is an analysis of Romanian education compared to that of countries in the European Union, highlighting the problems related on the one hand the lack of specific studies and the disparity between the number of graduates of secondary and higher education and the other hand requirements of the labor market, the performance to be achieved in order to have an efficient economy, made by skilled people.

### MATERIAL AND METHOD

The education system represents the coherent ensemble of schools at all levels, profiles and shapes, from a certain country, which is designed, organized and operated on the basis of educational principles, general organizational character and some with legal character.

---

<sup>1</sup> PhD. Ec. Ancuța Marin – Economist at The Research Institute for Agriculture Economy and Rural Development, [marin.ancuta@iceadr.ro](mailto:marin.ancuta@iceadr.ro)

Biggest part of education at all levels, profiles and shapes in Romania is organized by state, ensuring that the organization and operation of schools at all levels, profiles and organizational forms in all their sides, content, teaching and assessment.

In Romania the first agricultural high schools appeared about 50 years ago, by transforming agricultural vocational schools in agricultural colleges, equipped with agricultural farm schools teaching in which students were required to practice and begins work the best trained high school graduates or faculty experts . In 1990, in Romania there were 160 schools and agricultural colleges. According to statistics, today there are only 40 of them with more than poor equipment.

Dilemmas facing high school graduates when they have to choose an institution of higher education are even higher as there are no studies on the demand on the labor market within 3-5 years. In other European countries such reports are ordered by authorities. According to specialists in human resources, the structure of higher education in our country is not aligned with the latest trends in the real market. Most of the times, companies are put in the position of hiring inexperienced staff, case where the company assumes the role of "teacher" for several months after recruitment.

Young people today do not really care about college because society no longer values the Romanian education and there are increasingly fewer people working in the field who were trained. Reason for this is the fact that the system is outdated and learning methods are old and the same books as 20-30 years ago are used for learning. Paradoxically, the faculties with little chance of employment after graduation attract more candidates.

The most popular specializations on the labor market in 2013 were technical, engineering, automation, cybernetics, all specializations in IT, medicine, pharmaceuticals, foreign languages, because they are well-paid jobs and are popular also in other countries of the Europe, Canada and USA.

Top faculty directly sending a large number of unemployed graduates is led by humanities majors - Letters, Philosophy, Sociology, Political Science - followed Journalism, Public Administration and even Economics.

The work is based on the study of a vast bibliography on the field, the analysis of the Romanian educational system in general and of the agriculture educational system in particular using statistical data during the period 2006-2013.

## RESULTS AND DISCUSSION

By analyzing and processing the data published by the National Statistics Institute (INS), I made a situation for university graduates in Romania in the period 2006-2013. As shown in Table 1, in Romania, in 2008, there is a doubling of the number of graduates, followed by a slight decrease in the following years.

Table 1

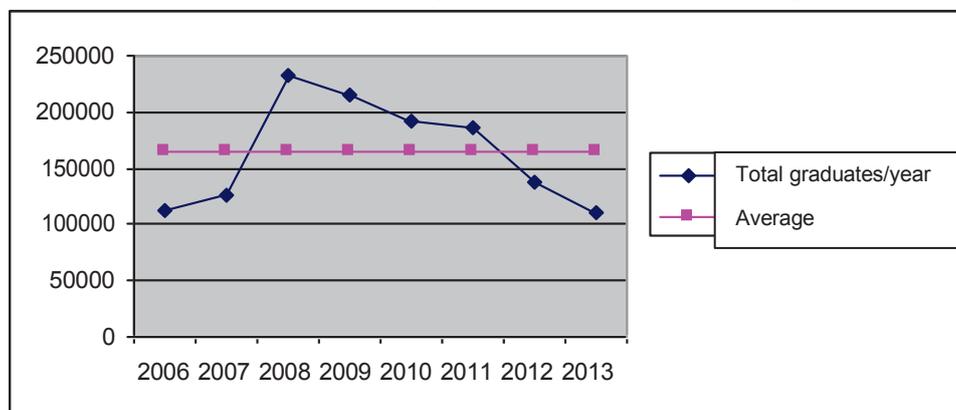
<b>HIGHER EDUCATION GRADUATES SITUATION IN ROMANIA FOR STATE + PRIVATE</b>									
<b>DOMAIN</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>TOTAL GRADUATES BY DOMAIN</b>
Technical	24.605	24.758	23.949	49.342	30.287	25.493	27.190	25.317	230.941
Agricultural	3.200	3.750	2.087	3.336	2.228	2.453	2.499	2.396	21.949
Medico-pharmaceutical	6.292	6.633	6.596	8.122	7.763	9.729	9.434	9.437	64.006
Economic sciences	32.098	37.211	94.884	67.420	72.641	62.685	34.415	25.724	424.078
Legal sciences	10.175	12.568	14.458	21.418	17.954	26.404	19.215	12.521	134.713
Pedagogical	36.502	42.093	92.118	66.140	60.198	57.507	41.514	33.430	429.502
Artistic and journalistic	2.572	2.236	3.880	2.384	2.448	2.629	2.404	2.203	20.756

<b>TOTAL GRADUATES PER YEAR</b>	<b>112.244</b>	<b>125.499</b>	<b>232.885</b>	<b>214.826</b>	<b>191.291</b>	<b>186.900</b>	<b>136.671</b>	<b>111.028</b>	<b>1.311.344</b>
---------------------------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	----------------	------------------

Source: INS data processing

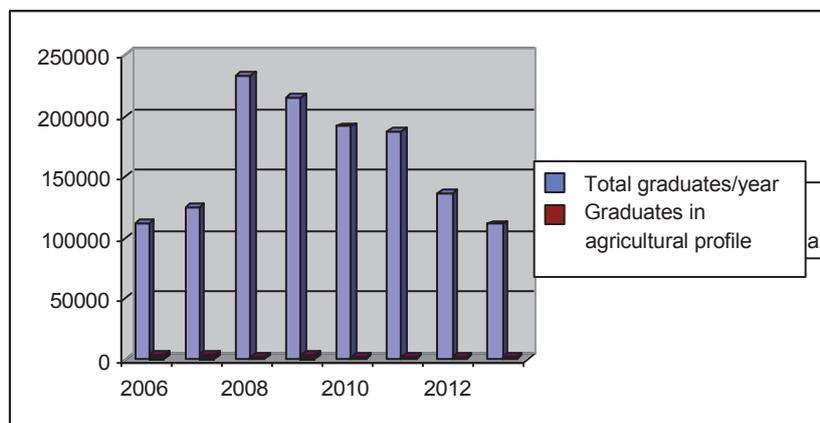
From the data presented follows that 43% of higher education graduates are economists or lawyers, while only 19% fall into the category of directly productive (engineers and farmers).

Chart 1 - The situation of graduates from multiannual average



Annually, the Romanian education system “produces” on average 163.918 of university graduates. The year 2008 marks the beginning of “explosion” of graduates, which lasts until 2011. From 2012 the number of graduates is comparable to the first part of the period considered, a possible explanation being that drastically reduced the number of those managed baccalaureate. As shown in Table 1 and Chart 2, from the total graduates, the share of those in the agricultural sector is below 3%, which for a modern agriculture is very little.

Chart 2 – The situation of graduates with agricultural profile



Net international migration rate is significant and is primarily related to younger age group constitutes the second cause of decline in the number of university graduates. External migration has become an issue of significant magnitude for Romania, especially in recent years. Statistics estimations indicate that more than 2 million Romanian - or about 10% of the population working abroad (Spain, Italy, Greece and Germany).

Young people are not necessarily aware of the deficit of people trained for specialized fields, but rather orientates towards universities considered to be good. That's because they think the higher the chances that you might have when you exit on labor market.

As shown in Table 2, in the last five years has increased the importance of training of persons active in all EU countries the weightings they occupy educated population in total population in a country, varying very little, but an upward trend.

Table 2

PROPORTION OF PEOPLE WITH HIGHER EDUCATION IN TOTAL POPULATION											
COUNTRY	TOTAL POPULATION	2009		2010		2011		2012		2013	
		*	**	*	**	*	**	*	**	*	**
Germany	81.802	11.940	14,60	12.060	14,74	12.610	15,42	12.961	15,84	13.154	16,08
France	65.822	10.359	15,74	10.501	15,95	10.730	16,30	11.118	16,89	11.499	17,47
U.K.	62.008	11.774	18,99	12.402	20,00	13.106	21,14	13.675	22,05	14.078	22,70
Italy	60.626	5.044	8,32	5.141	8,48	5.211	8,60	5.481	9,04	5.683	9,37
Spain	46.149	8.537	18,50	8.848	19,17	9.105	19,73	9.265	20,08	9.463	20,51
Poland	38.187	4.763	12,47	5.018	13,14	5.233	13,70	5.519	14,45	5.770	15,11
Romania	20.122	1.689	8,39	1.789	8,89	1.946	9,67	2.030	10,09	2.071	10,29
Holland	16.945	3.086	18,21	3.032	17,89	3.041	17,95	3.113	18,37	3.164	18,67
Hungary	10.014	1.145	11,43	1.166	11,64	1.227	12,25	1.277	12,75	1.304	13,02
Sweden	9.428	1.667	17,68	1.716	18,20	1.770	18,77	1.832	19,43	1.918	20,34
Austria	8.404	898	10,68	917	10,91	929	11,05	966	11,49	1.004	11,95
Denmark	5.561	950	17,09	969	17,43	977	17,56	998	17,94	1.012	18,19
Finland	5.461	1.090	19,96	1.117	20,46	1.144	20,96	1.149	21,05	1.171	21,44
Slovakia	5.435	526	9,68	591	10,87	636	11,70	660	12,14	687	12,63

Source: EUROSTAT data processing

\* People with higher education  
 \*\* % from total population

During the last decade, lifelong learning has occupied a central position in the Community policy on the education and training. Adult education has been recognized as an important component of lifelong learning, adult learning opportunities is essential to the social and economic progress, and personal development.

Lifelong learning in Romania is not dealt in a coherent and comprehensive system and educational policies. This limits the consistency and flexibility of individual learning routes lifelong. Despite progress in regulating the validation of prior learning, insufficient use of the existing legal framework remains one of the weaknesses of the process of introducing the approach of "lifelong learning" in education and training.

Insufficient development of knowledge transfer mechanisms, limits the possibilities of the population, especially the adult population, to obtain formal accreditation of competences acquired in the labor market and to rejoin the formal education system.

Also in the policy making is a need for greater coherence between policies in education, vocational training and continuous professional training. The validation of knowledge acquired a better correlation between education and initial vocational training and continuing vocational training, improving the definition and transparency of qualifications are issues addressed in the development and implementation of the National Qualifications Framework.

The Sectoral Operational Programme Human Resources Development (POSDRU) establishes priority axes and areas of intervention of Romania in human resources to implement the financial assistance of the European Union. Investments in human capital will complete and will give long-term sustainable productivity growth.

A highly skilled manpower with a high level of education, having the ability to adapt to new technologies and the changing needs of the market is essential for a competitive and dynamic economy.

In the category of adult training also enters the acquisition of information and knowledge to enable sustainable management of agricultural and forestry land, improve management quality at farm level, restructuring and modernization of the processing and marketing sectors for agricultural and forestry products, contributing thus to improving living conditions and reducing unemployment in rural areas. These actions are set out in Measure 111 - "Training , information and diffusion of knowledge" from the National Rural Development Programme 2007-2013 respectively measure 1 - "Knowledge transfer and information actions" National Rural Development Programme 2014-2020.

In National Rural Development Programme 2014-2020, the amount allocated for knowledge transfer and information actions is 50 million. Such financial instruments, which will be available for Romania, will not be valued unless there is research reformed if there is a system of professional education adapted to the needs in practice, if there is a relationship between the young man who wants to take a farm or to work in an agricultural society, the basic training system, continuous training system.

## CONCLUSIONS

With the development of agriculture, "based on EU funds" there is a increasingly higher demand for employment in agriculture. Better cooperation between the Ministry of Agriculture and Rural Development, Ministry of Education, Ministry of Labour and Social Safety, Employment Agencies and agricultural colleges and universities in the field in order to establish relevant schooling figures for the "production" of specialists to be absorbed by the labor market should be a priority in the near future.

Another way to increase the economic performance of the country in general and agriculture in particular, is the initiation of technical working groups between the Ministry of Agriculture and Rural Development and Ministry of Education - the complete strategy on identifying new skills required labor market, development of new training standards, updating and revision of the Code of Occupations in Romania and Nomenclature of Qualifying. The link between education and training continues to be well understood and promoted.

Another priority should be the the reestablishment of didactic farms where students in agricultural colleges and universities in the field to be received and directed to acquire practical knowledge needed to successfully practice their future professions.

Ministries must identify forms of support for agricultural education graduates and to organize information and promotion campaigns regarding agriculture.

## BIBLIOGRAPHY

1. Bontaş, I. - Pedagogy, ALL Publishing House, Bucharest, 1994
2. Cicea Claudiu, Dobrin Cosmin - The contribution of education to economic development, ASE Publishing House Bucharest, 2005
3. <http://www.cnp.ro/inovatie/docs/seminar-studii-25-06-2012/Rezumat%20studiu%20Piata%20muncii.pdf>
4. <http://www.insse.ro/cms/files/pdf/ro/cap23.pdf>
5. Palicica Maria, Gavrilă Codruța, Ion Laurenția - Pedagogy for agricultural education Mirton Publishing House, Timisoara, 2007
6. Ziarul Financiar, Recolta.eu – agribusiness daily newspaper

# IMPORTANCE OF EDUCATION AND TRAINING LOCAL POPULATION IN PROCESS OF DEVELOPMENT RURAL TOURISM IN SERBIA<sup>1</sup>

PREDRAG VUKOVIĆ, JONEL SUBIĆ, DRAGO CVIJANOVIĆ<sup>2</sup>

**Summary:** *Since the mid-nineties of the twentieth century begins a rapid expansion of rural tourism in Serbia. In the first initial phase, the development has taken place without a clear plan and program. The first achieved positive results, influenced that Serbian Government since 2008 started with appropriate funding with aim to improve rural tourism development. Also, until 2008 there was no system of education and training sessions of the local population. Farmers were not educated and trained to provide adequate quality system services. On this way was undermined the competitiveness of rural tourist destination and positive results that rural tourism could bring. Expectations are that the implementation of appropriate methods of education and training could create conditions for providing better quality services, which will bring bigger effects of rural tourism and benefits to rural areas.*

**Keywords:** *rural tourism, destination, education, training, farmers.*

## INTRODUCTION

Rural development in Serbia has been defined as an economic, social and environmental priority by Government of Serbia. The diversification of the rural economy in a socially, economically and environmentally sustainable way is need order to improve the quality of life, to reduce the poverty level, as well as to fight against social and environmental degradation. Tourism has been identified as key sector which can drive the diversification of the rural economy and can support Serbia.(1) Rural areas cover more than 80% of Serbian territory and in these area lives approximately 44 % of total population (2). From this data could be concluded how important are this area for Serbian economy and society in all.

Serbia doesn't have natural sources to develop mass tourism (sea coast and adequate mountain resorts to develop ski tourism). In tourist development emphasis is on several tourist products: tourism in cities, wellness and spa tourism, culture tourism, tourism on the Danube River, rural tourism, tourism events and transit tourism. (3)

Expansion of rural tourism in Serbia began spontaneously in the 1970s. Starting process were in villages with longest tradition in central Serbia, but an increasing number of villages that developed rural tourism nowadays is located in the regions of eastern and western Serbia (the municipalities of Kosjerić, Knić, Valjevo, Brus, Gornji Milanovac, Ivanjica, Kraljevo, Lučani, Mionica, Požega, Prijepolje, Rača Kragujevačka, Sokobanja, Užice, Zlatibor, Čačak, Šabac as well as the traditional farming estates in Vojvodina). (4)

From the years 1990 – 2000 Serbia was passing through the dramatic period of tourism history. The number of tourist arrivals felt for ten times, as well as tourism income. The consequences of the international isolation and war strongly reflected on the level of tourism services, infrastructure and global supply, and political and economic problems hurt tourism image. The years after 2000 was starting by recovery of tourism industry and the comeback Serbia on the international market. (4)

Main tourist offer of rural tourism in Serbia are (5):

- The life in traditional and healthy way,
- Ethno villages (such as Sirogojno or Kostunici),

<sup>1</sup> This paper work is result of the project No. 46006 – III „Sustainable agriculture and rural development in function realizing strategic goals of the Republic of Serbia in framework of Danube region“, financing by the Ministry of Education and Science of the Republic of Serbia in period 2011 – 2014.

<sup>2</sup> Predrag Vuković, M.A. Research Assistant, Institute of Agricultural Economics, Belgrade, Volgina 15, 11060 Belgrade, Serbia, e-mail: [predrag\\_v@iep.bg.ac.rs](mailto:predrag_v@iep.bg.ac.rs); phone: +381 11 6972-852, Jonel Subić, Ph.D., Assistant Professor, Senior Research Associate, Institute of Agricultural Economics, Belgrade, Volgina 15, 11060 Belgrade, Serbia, e-mail: [jonel\\_s@iep.bg.ac.rs](mailto:jonel_s@iep.bg.ac.rs); phone: +381 11 6972-858; Prof. Drago Cvijanović Ph.D., Principle research fellow, Institute of Agricultural Economics, Belgrade, Volgina 15, 11060 Belgrade, Serbia, e-mail: [drago\\_c@iep.bg.ac.rs](mailto:drago_c@iep.bg.ac.rs); phone: +381 11 6972-858

- Nature, culture and hospitality at one single place,
- Villages tourism (agritourism),
- Ecoorganic tourism,
- Food tourism,
- Events (e.g. Guča),
- Hunting and fishing etc.

One of the main problem is how to achieve service quality standards prescribed by Serbian Law and some important tourist international organization (such as for example, WTO, EUROGITES etc.). On that way it is important to educate and training local population about importance of rural tourism as additional source of farm income and how to deliver adequate service quality to tourists.

## MATERIALS AND METHODS

The Institute of Agricultural Economics, Belgrade in period 2007-2008 realized project „*Tourism as chance to develop rural areas*“. Project was realized at the territory of City of Pančevo in framework of special project by the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia. Aim of the Project was to educate inhabitants about all comparative advantages that rural tourism can bring them. Some of topic which has been presented to farmers:

- Tourism creating additional sources of income for farmers;
- Strengthening agriculture through sales of agricultural products to tourists;
- Preventing the depopulation process;
- Tourism as factor of development trade in rural areas;
- Tourism as factor of development traffic;
- Strengthening of the entire infrastructure through tourism development;
- Tourism as factor of development service sector;
- Revival of cultural, ethnic manifestational and all content in these areas etc.

Experience shows that tourism provide economic growth, financial and social security, etc. On the other hand, the specific of the project required consideration of certain topics, such as, for example:

- educate the population about the concept of tourism;
- pointing to the social, economic, the social importance of tourism development in rural areas;
- illustrate the complementarity of tourism and agriculture;
- creating conditions and showing how the organization of tourism in rural areas;
- education on marketing concept and its application in tourism;
- educate people about sustainable development of the Tourism;
- presentation of all forms of tourism that can be implemented in a given environment, etc.

This paper present results of the Project and through a concrete example make base for conclusions which would helpful to implement rural tourism in other regions in Serbia.

## RESULTS AND DISCUSIONS

Bearing in mind the trends in the tourism market to move away from the concept of mass tourism, recently posted an increase of interest in rural tourism and special interest tourism. This is consistent with the fact that in the last decade of twenty century as an act of political affiliation promoted model of rural development „CAP“ (*Common Agricultural Policy*) by EU, which assumes the multifunctional nature of European agriculture and its development role in the economy and society as a whole. Agriculture as a primary industry has far-reaching interest in complementary cooperation with all sectors of the economy. Also, with tourism. (6)

As an integral part of tourism is increasingly being promoted locally, regionally and nationally. Serbia has favorable conditions for the development rural tourism, which in the future

must necessarily use it. Seen from this perspective, it is necessary to strengthen the role of rural households. (7)

The first step in the process of stopping negative trends that characterized rural areas (migration from village to town, depopulation, negative economic rise etc.) is to develop rural tourism. Raising awareness of the local population must be organized in cooperation between Tourist Organization of Serbia (National Tourist Organization), local authorities and regional chambers of commerce.

Organization of appropriate courses have aim to show the importance of tourism in community development, where the focus is primarily to explained a way how to successfully implement rural tourism.

The quality of staff is one of the crucial components in acquiring and maintaining the competitiveness of the tourism market. From their knowledge and skills (know-how) how to meet the needs of consumers/tourist depends largely on the attractiveness of a destination.

Basically we can make differentiation between formal and informal system of education. (8) Today trends are to emphasize concept of education and training managers in all levels. WTO (2002) WTO (2002) states that education and training is essential in the development of rural tourism, especially in the initial stage of development. Training and education are carried out at several management levels (9):

- 1) **Training the Trainers** – Training is necessary for individuals involved in leadership positions at local level (i.e. administration, product development, marketing). With the appropriate knowledge and skills, these individuals in turn are well positioned to train other individuals at an operational level.
- 2) **Training for Rural Tourism Providers** – Rural tourism product providers, or operators, require training and education in a range of subjects as follows:
  - Customer care
  - Language skills
  - Product standards
  - Understanding of partners needs
  - Product knowledge
  - Basic marketing
  - Internet
- 3) **Training for officials** – Many officials working at government or municipality level are unaware of the potential benefits of tourism. Training and educational programs are also necessary for this key group.

Baum, T., (1995) makes a distinction between competence (10):

- to manage with a problems of guests (tourists), with care and sensitivity;
- to communicate in written and oral form;
- to achieve a positive working atmosphere among the staff;
- to obtain professionalization in every aspect of tourist business;
- to achieve the positive attitude of consumers as well as positive relationships with them;
- the employee to submit to achieve the desired operation.

a) **Formal system of education** should be open to all management levels (top, operational and functional). All employees in management, doesn't matter, the private (companies, businesses, etc.) and public sector (government institutions, ministries, agencies, tourism organizations, chambers of commerce, etc.) must be led through formal system of education.

Depending on the needs and responsibilities depending on the needs ("required") level of education. In the private sector, for example, the owner of appropriate restaurants is desirable to have a university degree, although today in practice usually is not the case.

As a critique accomplished to the formal system of education is that a large percentage so far operated through the model of complete separation. An alternative model is a long-term cooperation between educational and institution of tourism. Also, the formal education system almost entirely a function of staff development for mass tourism, while other types of tourism were

marginalized. Given the fact that rural tourism in our country is still in the early stages of development cooperation (formal and non-formal education system) and their networking is, especially, is preferable. This would be made more positive results in practice.

Business in tourism today is characterized by constant innovation, and is therefore necessary that management at all levels, from "top" to the functional, has a formal education, but also to continue monitoring qualify for innovations that everyday occur in the tourism business.

**b) *Informal education system.*** In Republic of Serbia so far, in a very small percentage conducted training process of local population to provide appropriate quality services to tourists. This role should have implemented local tourism organizations, regional chambers of commerce and local government units, non-governmental organizations, etc.

Insistence on educating farmers, primarily holders developmentally oriented households, a condition in which must be based development in rural areas. A program to educate the population is a basis on which the future must be based tourism development.

It is expected that on this way of training will enable that acquired knowledge on the theoretical basis and practical exercises in mastering certain skills in the field of tourism, should enable farmers to planning, organizing and coordination tourist activities at their household, village, and local communities as small tourist resorts destinations.

In the later stages of the development of rural tourism in order to foster further development is necessary to implement appropriate extension services which will carry out education and the exchange of information with the owners of rural tourism households make a key contribution to the sustainable development of rural tourism in Serbia

**c) *Experiences that Institute of Agricultural Economics, Belgrade had in process of education and training farmers.*** Institute of Agricultural Economics, Belgrade (IAE, Belgrade) realized Project „*Tourism as a chance for rural development*“ at the territory of City of Pančevo. This project realized in three phases:

- preparatory phase,
- implementation phase, and
- the phase measurement of achieved results.

*The preparatory activities* have been carried out all necessary activities in order to start the process of education. Some of them were:

- field visits,
- discussion with farmers,
- establishment of working groups,
- drafting,
- printing of brochures and promotional material, both in writing and in electronic form.

*In second phases of direct education*, participants were informed in detail, with the program of lectures. Then, were chosen location for education, and finally teaching and training events were implemented.

Given the complexity and requirements of the program implementation, the educational activity was directed only to a certain number households. There were a competent holders or registered members developmentally oriented farms. Depending on the size of the settlement, the educational program included up to 20 participants.

Some of the activities were carried out in the first two phases are:

- meetings with a large number of farmers at the pilot area, and than were formed small working groups with the selected composition;
- IAE prepared and produced promotional material, in written and electronic form;
- organized and implemented a series of theoretical lectures with active participation of all attended;
- illustrated practical examples;
- during the teaching process, applied some form of testing to determined the content and the like;

- at the end, we summarized the results of the joint work, and eliminated possible ambiguities and insisted on further cooperation between all participants.

Practice showed that farmers on the basis of such education programs can:

- understand the place and role of available natural and human (anthropogenic) resource potential in tourism development;
- realize the impact of tourism and its application to social, economic, and rural development;
- evaluate the effectiveness and efficiency of tourism in achieving their goals and interests;
- get all the necessary information about the experiences of other communities that have opted for this type of rural development;
- evaluate the available natural and heritage resources and predict own chances for tourist development;
- insights into the role of sustainable development for the environment;
- escape the consequences of neglect of natural and social resources of their own development;
- understand the importance of tourism in the overall social development.
- reduce the risks in creating their own income and others.

After the project, as time has passed, in research which IAE conducted, many farmers started to think how to implement rural tourism activities in their own households and how to prepare their farms for possible tourist visits. The main reason for this is that farmers want to raise farm income.

## CONCLUSION

Since 2008 Government of the Republic of Serbia, basically the Ministry of Agriculture, Forestry and Water Works give support for rural tourism development. Also, with incentives Government support the expansion and improvement of economic activities in rural areas such as (11):

- Construction and renovation of buildings modeled on authentic farmhouse "salaši", "vajati" and other objects;
- Restoration of authentic buildings in the countryside - mills, wine cellars, cloth watermills, and the like.
- Procurement of equipment for the enrichment of content on offer rural tourism, promotion of rural tourism, events that foster women's associations in rural areas, as well as activities that are focused on women's employment in rural areas;
- Procurement of raw materials and equipment necessary for the maintenance of the old traditional crafts, arts, different farm skills and activities.

Different forms of tourism can develop complementary with rural tourism, such as, for example, tourism, events, hunting and fishing tourism, special interest tourism and they will together represent an opportunity to improve the overall economic and social state in rural areas. However, the development of tourism must not be left to chance, and to local ingenuity farmers. It must be the subject of serious analysis and planning at all levels.

All management levels from Government, relevant ministries, and officials at the regional and municipal levels up to the level of local communities, as well as a numerous tourism organizations and various business organizations, through the development of rural tourism can and must find their own economic interest in rural tourism development. For this reason, it is necessary a systematic approach, through process of education and training which representing certainly a starting point for future rural tourism development. It is essential that farmers build a special relationship with the tourism industry, to put its own resources into the function of its tourism development.

Expectations are that multiply positive effect that tourism can make, will have influence on the overall rural development and it can be quickly felt. It is necessary to educate and inform in

detail about the significance and consequences for use of natural and anthropogenic sources in the development of rural tourism all users. This process must take place continuously.

## BIBLIOGRAPHY

1. "7. Training and Education", p.9, World Tourst Organization seminar, "Rural Tourism in Europe: Experiences and perspectives", Belgrade, Yugoslavia, 24-25 June 2002, Conclusions, web link: <http://dtxtq4w60xqpw.cloudfront.net/sites/all/files/docpdf/ruralt-sem-2002-concl.pdf>
2. Analysis of budgetary support to the development of rural tourism in Serbia and diversification of economic activities in rural areas, the Ministry of Agriculture, Forestry and Water Management, RS - Department of Rural Development, 2009, p. 2.
3. Baum T., (1995): "*Managing Human Resources – in European Tourism and Hospitality Industry – Strategic Approach*," International Thompson Business Press, London, p.191.
4. Baum, T, Wahab, S. & Cooper, C. (2001): "*Education for Tourism in a Gloobal Economy*", p. 198-212, in "*Tourism in the Age of Globalisation*", edited by Wahab. S and Cooper, C. published by Rothelge, Taylor & Francis Groop, London and New York.
5. Erdelji, I., Gagić, S., Jovičić, A., Medić, S. (2013), *Development of Rural Tourism in Serbia*, Journal of Settlements and Spatial Planning, Special Issue, no.2. p.309-315.
6. *Master plan for sustainable rural tourism development in Serbia* (2011), UNDP, web link: <http://futurehospitalityleaders.files.wordpress.com/2012/11/master-plan-odrzivog-razvoja-ruralnog-turizma-u-srbiji.pdf>
7. Milosavljević, S. (2003), *The Importance of Tourism in Serbia*, p.21-25. World Tourism Organization proceeding „Rural Tourism in Europe: Experiences, Development and Perspectives“, Belgrade (Serbia and Montenegro, 24 and 25 June 2002), Kielce (Poland, 06 and 07 June 2003), Yaremcha (Ukraine, 25 and 26 September 2003), OMT, WTO, BTO. web link: <http://www.idestur.org.br/download/20120219145557.pdf>
8. Milovjević, Lj. (2003), *Social and Cultural Aspects of Rural Tourism*, p. 115-121. World Tourism Organization proceeding „Rural Tourism in Europe: Experiences, Development and Perspectives“, Belgrade (Serbia and Montenegro, 24 and 25 June 2002), Kielce (Poland, 06 and 07 June 2003), Yaremcha (Ukraine, 25 and 26 September 2003), OMT, WTO, BTO. web link: <http://www.idestur.org.br/download/20120219145557.pdf>
9. Results of the Census 2011, Statistical Office of the Republic of Serbia, web. link: [http://popis2011.stat.rs/?page\\_id=2134&lang=en](http://popis2011.stat.rs/?page_id=2134&lang=en)
10. Vuković, P., Arsić, S., Cvijanović, D. (2010), *Competitvnes of rural tourst destinations*, Ekonomika poljoprivrede/Economic of Agriculture 57, janury – march, 2010, Belgrade, Год./вол. LVII, бр./N<sup>0</sup> 1(1-153), p.. 47-60,
11. Vuković, P., Cecić, N., Cvijanović, D., (2007), *Sustainable tourist development or rual ares in Serbia*. *Ekonomika poljoprivrede/Economic of Agriculture*, Belgrade, God./Vol. LIV, br./N<sup>0</sup> 2 (261-392), p. 369-379.

## **SECTION 2**

### **ECONOMICS, MANAGEMENT AND MARKETING IN AGRICULTURE**

# AGRICULTURAL COMMODITIES AND PROCESSED PRODUCTS RATIO IN THE ROMANIAN INTERNATIONAL AGRIFOOD TRADE

GAVRILESCU CAMELIA<sup>1</sup>

## Abstract

*Romania's international agrifood trade increased significantly during the last decade, and mostly after the EU accession. Since 1990, the Romanian agrifood trade balance showed an almost continuous increasing deficit trend until 2008. In four years only, the trend reversed and in 2013, for the first time in the last two and a half decades, the agrifood trade balance turned positive. The present paper is analyzing the evolution of the trade evolution and its structure, separating the agrifood products in three categories: agricultural commodities, primarily processed products and secondary processed products. A higher ratio of processed products in exports is indicating an increased competitiveness, resulting from higher unit values incorporating more added value, and showing, at the same time, a higher development degree of the country's food industry. The results for total trade show that the processed products represented at most 46% of the Romanian exports, and at least 63% of imports, indicating a low-competitive structure of the agrifood trade. The analysis is detailed for intra and extra-EU trade and by main partners and groups of products.*

**Keywords:** *agrifood trade, competitiveness, processed products*

## INTRODUCTION

The agrifood sector is of major importance in the country's economy, due to its share in the GDP, production and contribution to the general trade. Despite having favorable soil and climatic conditions, since 1990, Romania needed continuously agri-food imports, in order to cover the domestic food demand. Imports have been far larger than exports, resulting in a continuous agrifood trade deficit.

Since accession, and even a few years earlier, the requirements of the Single Market imposed significant enhancements in the Romanian domestic agri-food production and processing. As a result, both exports and imports increased significantly, in value and quantity terms. The economic crisis introduced supplementary constraints in the sector, mostly in 2009. The increasing trend in imports was reversed, the exports intensified, and the result was the reversal of the agrifood trade balance trend. Consequently, the deficit diminished continuously since 2007, and in 2013, Romania achieved a positive agri-food trade balance, for the very first time in the last two and a half decades.

Several methods have been used to assess the Romanian agrifood trade competitiveness: trade balances (Gavrilescu, 2014); analysis of trade unit values (Gavrilescu & Voicilaş, 2014). An examination of the trade flows composition according to the degree of processing provides an interesting image of the country's capability to export products with a higher degree of processing, thus supplying high-value added products, more competitive and obtaining better prices.

## MATERIAL AND METHODS

The general features of the Romanian agrifood trade are analyzed, in value terms, for exports, imports and trade balance. The analysis is performed for the total trade flows with agricultural and food products, as well as for the intra-EU trade.

In the literature there are many debates regarding the classification of agricultural products according to the processing degree. For example, Regmi et al. (2005) are grouping together as "high-value products" all horticultural products, processed and semi-processed products, as opposed to "bulk commodities".

---

<sup>1</sup> Dr. Camelia Gavrilăscu, CS II, Institute of Agricultural Economics, Romanian Academy, e-mail: cami\_gavrilescu@yahoo.com

A more practical approach (Jankune and Wagner, 2014) is separating food products in three categories: agricultural commodities, primary processed products (or semi-processed products) and secondary processed products. The latter two categories combined give all processed products.

In the first category (agricultural commodities) are included (e.g.): live animals, live plants (trees, flowers), fresh fish, eggs, fresh vegetables, fresh fruits, cereals, oilseeds, tobacco leaves.

The primary processed products category includes: meat, liquid milk, cereal flour, edible oils, sugar, coffee, tea, dried fruits, frozen vegetables, animal feed (soybean cake). These products require minimal processing, and although they can be consumed as such, often they are used as raw material for other products with higher value added (secondary processed products).

Secondary processed products require more laborious industrial processing. Thus, in this category are included: yogurt, butter, cheese, chocolate, bakery and pastry, wine, food preparations (ex.: sausages, soups, sauces), pet food, cigarettes etc.

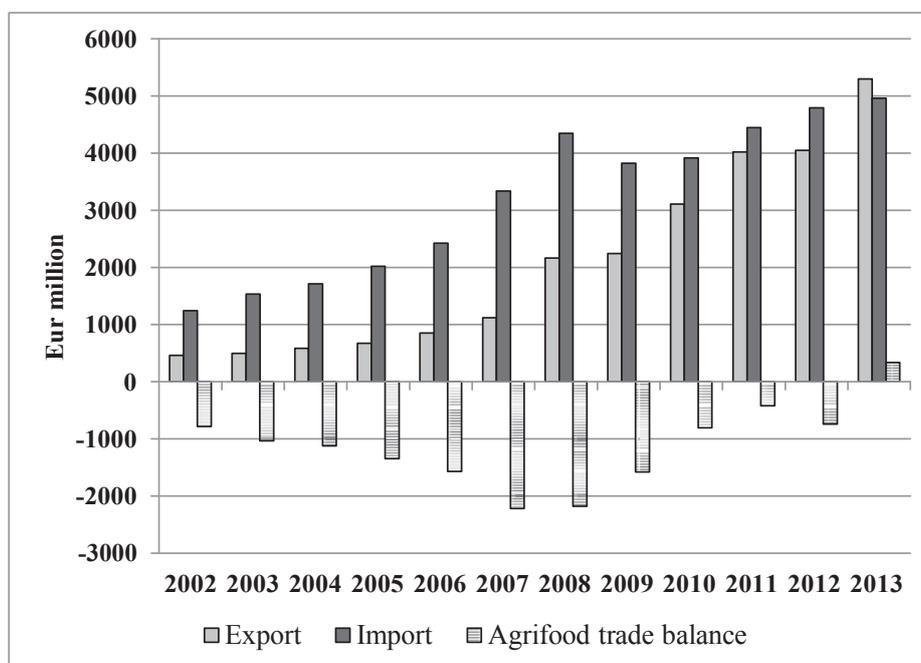
The separation of all agrifood products in the three above mentioned categories required detailed calculations at 4 digits level in the Combined Nomenclature Classification, for a total of 196 product subgroups.

## RESULTS AND DISCUSSIONS

After EU accession, the Romanian agrifood sector started improving its efficiency and product quality along the food chains, aiming at improving its competitiveness on the international (intra- and extra-community) markets.

Nevertheless, as in the case of other new member states that joined the EU in 2004, it took Romania a couple of years to adapt to the new rules of the game. As a result, during the first 2 years, the agrifood total international exchanges increased considerably; therefore in 2008, the total value had doubled as compared to the last pre-accession year (2006). Although the exports increased continuously since 2002, the imports showed a faster pace growth, and, as a result, the agrifood trade deficit increased massively, to a historical peak of 2.2 billion EUR in 2007 (figure 1).

**Figure 1 – Romanian total international agrifood trade (2002-2013)**



Source: author's calculations using Eurostat data

The economic crisis showed its effects upon the agrifood trade on short term only, as a contraction of the total trade exchanges during one year (2009); afterwards, the upward trend resumed.

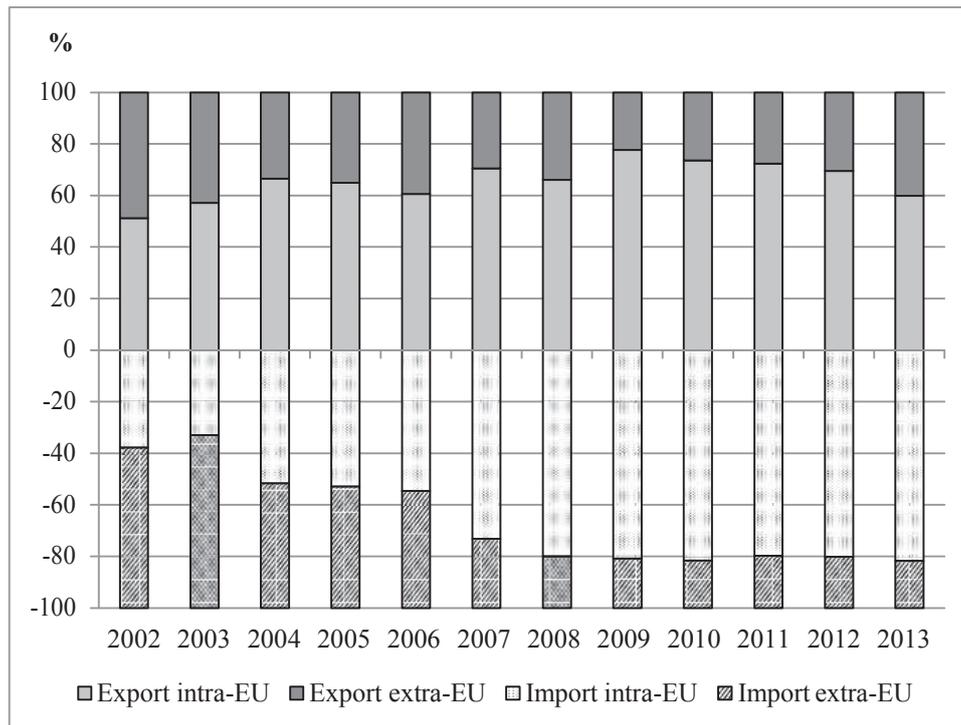
The free access on the Single market meant an important expansion of exports: after 2 years of membership, the export value was 2.5 times as compared to 2006. With the single exception of the crisis year (2009), the total exports increased continuously; in 2013 they reached EUR 5.3 billion, that is 6.2 times higher than in 2006.

Imports increased sharply immediately after accession, since the Romanian agrifood sector joined the EU with far lesser performances in terms of competitiveness; therefore the free access on the Single Market meant also a free penetration of cheaper products. In 2008, imports were almost double as compared to 2006, and more than double than the 2008 exports. The crisis year diminished the import value by 12%; and in the following year, the growth rate was rather modest: only 2.5% (2010/2009). In the subsequent years, imports increased, but at a much slower rate than the exports: in 2013 they were 2 times only larger than in 2006.

The result of these combined evolutions was a very dynamic trade balance: during the first two years after accession, it reached the highest deficit value ever recorded: EUR -2.2 billion. Starting with the crisis year, due to the higher pace of the export expansion, the trade deficit diminished almost continuously and quite rapidly: in three years only it diminished 5.2 times, from EUR -2.2 billion down to EUR -423 million. In 2013, the Romanian agrifood trade balance turned positive, for the first time in the last two and a half decades.

During the pre-accession period, the Romanian agrifood exports became more and more oriented to the EU (figure 2). The average ratio of intra-EU versus extra-EU exports has been (in percentage) 60/40 in the pre-accession period and 70/30 in the post-accession period, reaching the highest share in the total exports in 2009 (78%), to decrease subsequently down to 60% in 2013.

**Figure 2 – Extra / intra-community ratio in the Romanian agrifood exports and imports (%)**

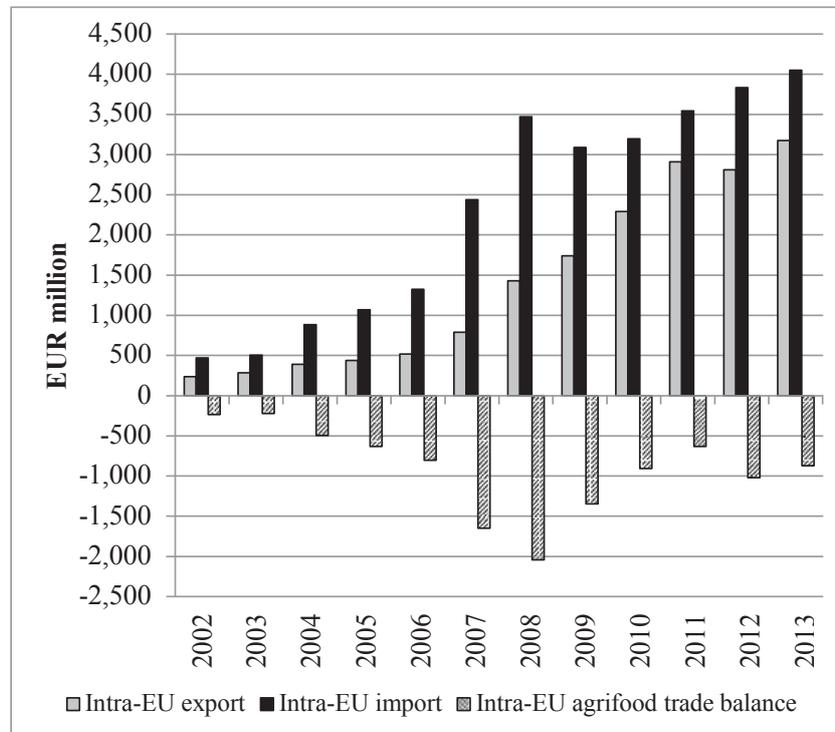


Source: author's calculations using Eurostat data

The imports came mainly from outside the EU during the pre-accession period (due mainly to existing (at that time) of some free trade agreements (such as with Republic of Moldova, Turkey, Israel etc.), that allowed imports at lower prices than from the EU. After accession, the import orientation shifted massively to the EU, due to the community preference rule. Thus, the average ratio of intra-EU versus extra-EU imports has changed from (in percentage) 46/54 in the pre-accession period, to 80/20 in the post-accession period, remaining quite unchanged for the last six years.

Yet, the evolutions are rather different in the intra-community and extra-community trade. The intra-community exports (figure 3) increased sharply immediately after accession: in 2007, they were 1.5 times higher than in 2006, and in 2008 they were already 2.8 times higher than in 2006. They increased continuously during the post-accession period, even in the crisis year, reaching the highest value in 2013 (EUR 3.2 billion).

**Figure 3 – Romanian intra-EU agrifood trade (2002-2013)**



Source: author's calculations on Eurostat data

Imports from the EU increased even more: 1.8 times in 2007/2006 and 2.6 times in 2008/2006. The crisis year resulted in an 11% decrease, but subsequently, the upward trend resumed, to reach the highest value in 2013 (EUR 4.1 billion).

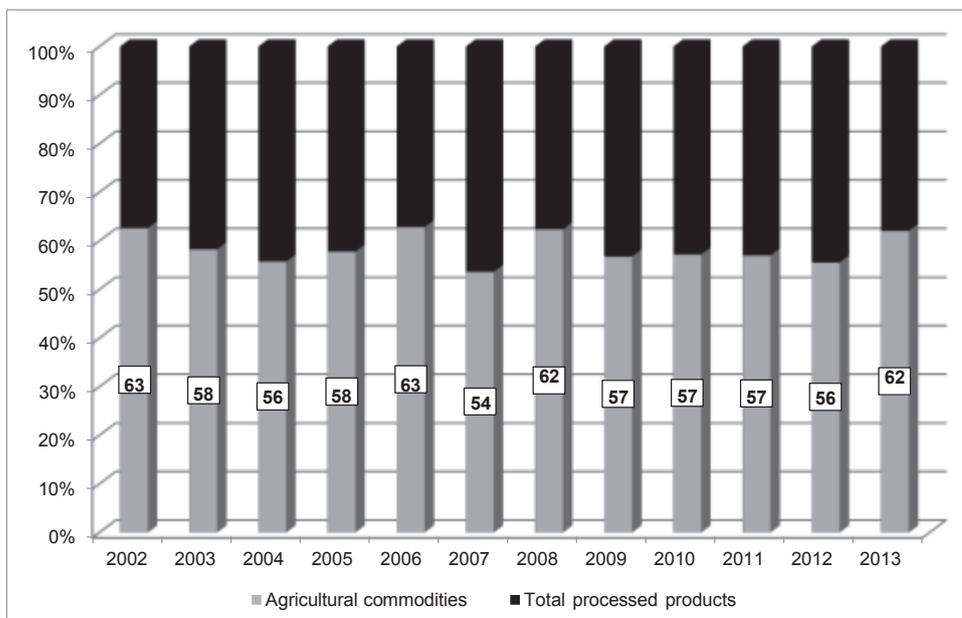
The trade balance in intra-EU exchanges has been continuously negative. The agrifood trade deficit doubled in the first year after accession, and reached the largest value in 2008 (EUR -2 billion, which represented 94% of the total agrifood trade deficit of the country). Since 2009, the intra-community agrifood trade deficit decreased significantly, to less than half in 2013/2008, due to the combined action of the export expansion and import contraction.

In the intra-EU trade, in 2013, Romania ranked 17 for export and 11 for import.

The top ten destinations of the Romanian agrifood products dispatches (exports) to other EU member states have been in 2011-2013 (average values): Italy, Hungary, Bulgaria, Netherlands, Spain, Germany, Greece, France, Belgium and Austria, accounting for 87 per cent of total dispatches to the EU member states.

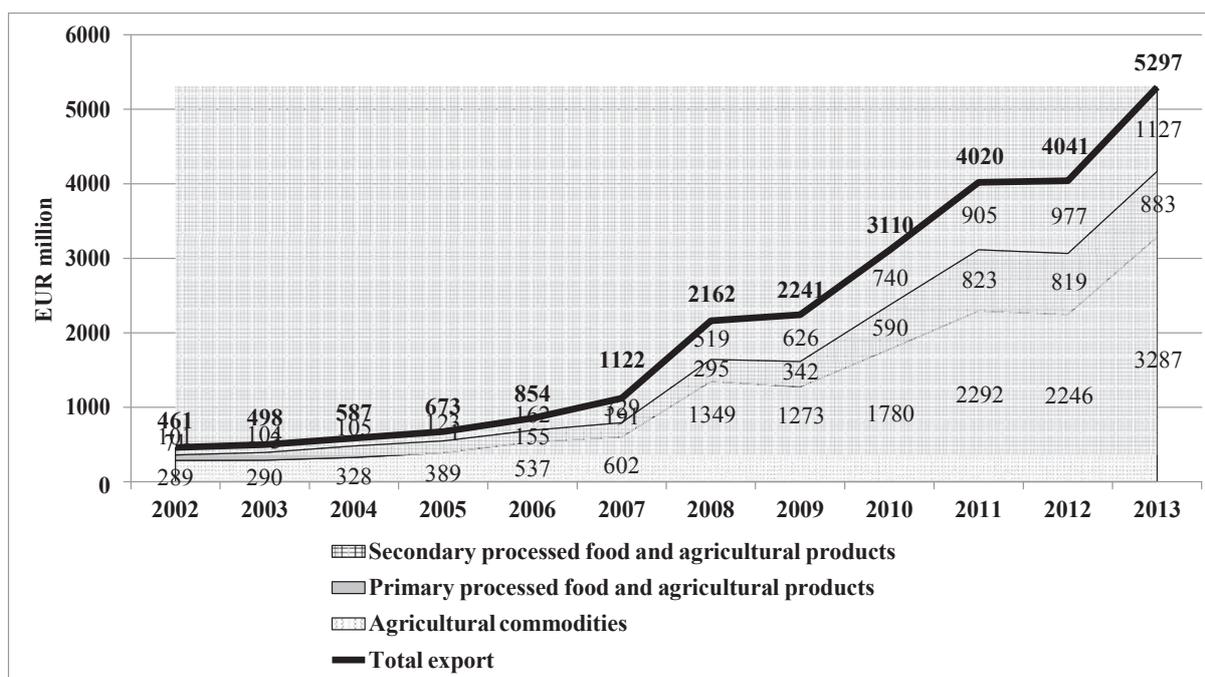
The analysis of the Romanian international agrifood trade by the degree of processing shows that during the whole analysed period (2003-2013), the agricultural commodities were prevalent in exports (54-63 per cent) (figure 4). The variation is given essentially by the yearly variations in the cereals and oilseeds exports. If we compare the average values for the pre-accession (2002-2006) and post-accession period (2007-2013), there is a significant increase in the export values: 5 times for the agricultural commodities, 4.4 times for the primary processed products and 6.3 times for the secondary processed products (figure 5).

**Figure 4 – Share of agricultural commodities in agrifood exports (%)**



Source: author's calculations using Eurostat data

Figure 5: The structure of the Romanian agrifood export according to the stage of processing (2003-2013)



Source: author's calculations using Eurostat data

When looking at the share between the three categories of products, a visible improvement is shown by the secondary processed products only, which increased from 20 to 25 %, at the expense of the primary processed products, while the share of the agricultural commodities remained almost unchanged (58%). In 2013, the share of the agricultural commodities increased to 62% due to exceptionally high cereals exports (table 1).

Table 1 – Structure of agrifood exports by the degree of processing (2002-2013) (%)

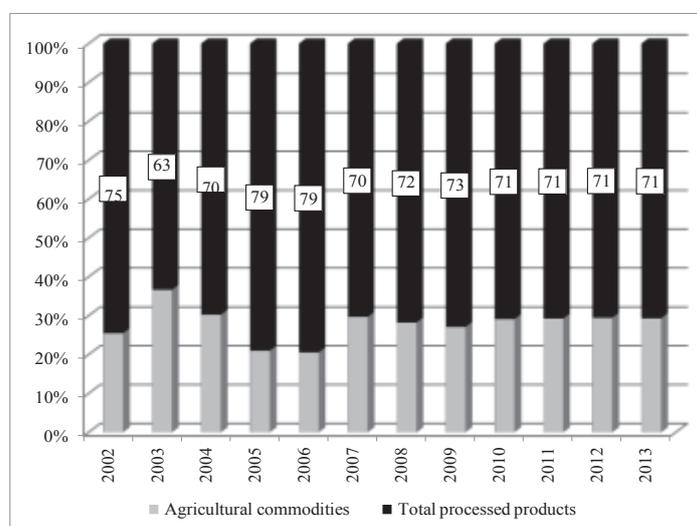
Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Agricultural commodities	63	58	56	58	63	54	62	57	57	57	56	62

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Primary processed food and agricultural products	15	21	26	24	18	17	14	15	19	20	20	17
Secondary processed food and agricultural products	22	21	18	18	19	29	24	28	24	23	24	21
<b>- total processed products</b>	<b>37</b>	<b>42</b>	<b>44</b>	<b>42</b>	<b>37</b>	<b>46</b>	<b>38</b>	<b>43</b>	<b>43</b>	<b>43</b>	<b>44</b>	<b>38</b>
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: author's calculations using Eurostat data

In the post-accession period, the share of processed food imports decreased by 8% over 2005-2006, then maintaining a relatively constant level of about 71% (Figure 6).

**Figure 6 – Share of processed products in agrifood imports (%)**



Source: author's calculations using Eurostat data

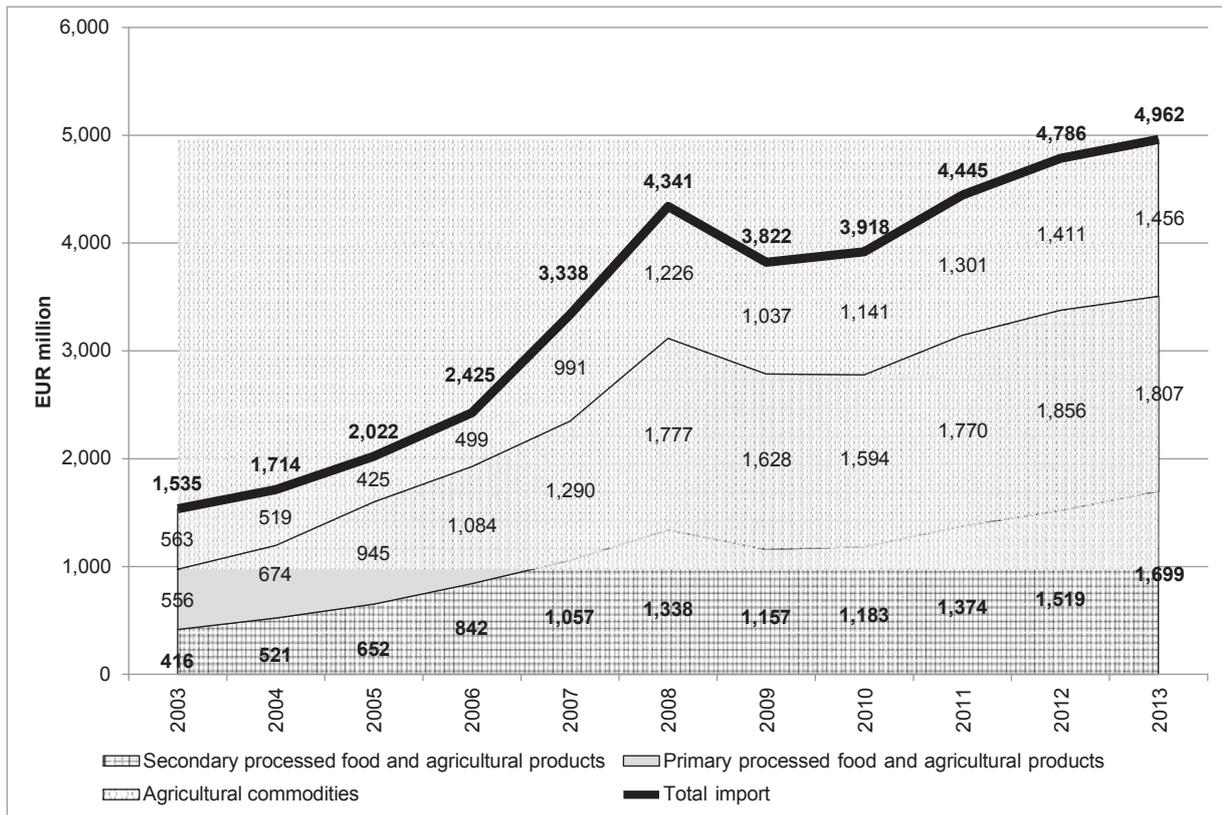
If we compare the average values of the pre-accession period (2002-2006) and post-accession (2007-2013), the increase in the value of imports was much slower, by half or even one third of the exports dynamics (Figure 7).

Thus, the share of primary processed products doubled, the secondary processed products increased 2.2 times, while that of agricultural commodities multiplied 2.5 times.

If in the structure of exports the agricultural commodities did not fall below 54% in the analyzed period, the imports did not exceed 30% (except in 2003, when drought has severely diminished production of wheat and barley and exceptional imports were needed to cover the domestic consumption) (Table 2).

After accession, only the trade balance for agricultural commodities has been continuously positive, thus diminishing the total deficit. The increase was sharp, by EUR 1.7 billion (that is 15 times in 2013 as compared to 2008).

**Figure 7: The structure of the Romanian agrifood import according to the stage of processing (2003-2013)**



Source: author's calculations using Eurostat data

Table 2 – Structure of agrifood imports by the degree of processing (2002-2013) (%)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Agricultural commodities	25	37	30	21	21	30	28	27	29	29	29	29
Primary processed food and agricultural products	46	36	39	47	45	39	41	43	41	40	39	36
Secondary processed food and agricultural products	29	27	30	32	35	32	31	30	30	31	32	34
<b>- total processed products</b>	<b>75</b>	<b>63</b>	<b>70</b>	<b>79</b>	<b>79</b>	<b>70</b>	<b>72</b>	<b>73</b>	<b>71</b>	<b>71</b>	<b>71</b>	<b>71</b>
Total	100	100	100	100	100	100	100	100	100	100	100	100

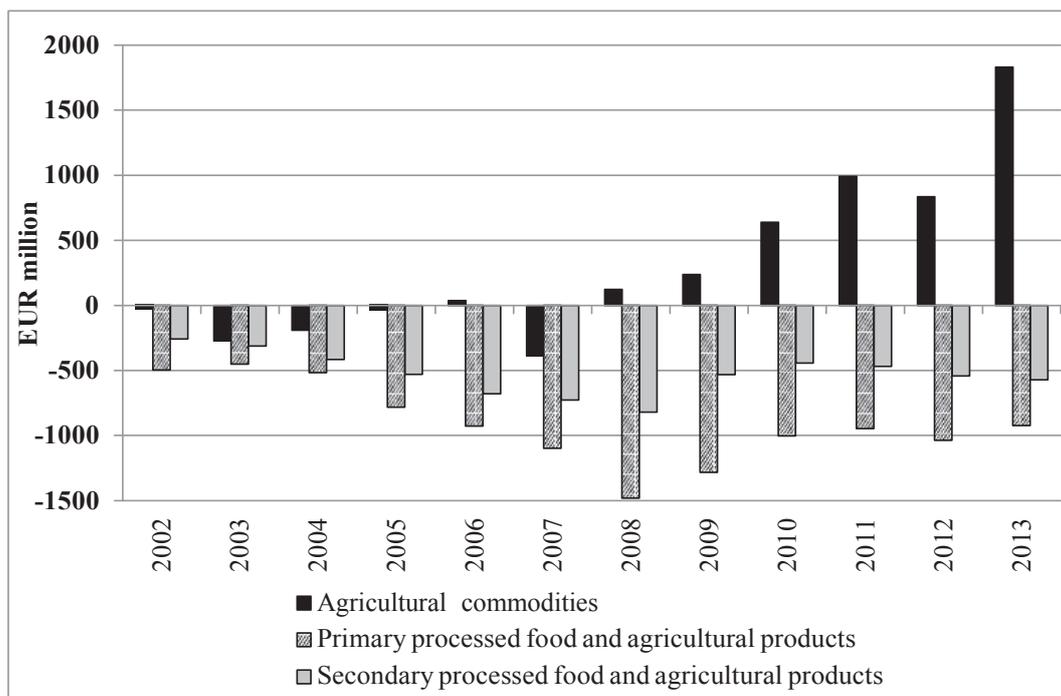
Source: author's calculations using Eurostat data

The trade deficit for processed (primary and secondary) products decreased significantly as well between 2008 and 2013, by 65 per cent (EUR 806 million).

When analysing the trade balance according to the processing degree, during the pre-accession period, all three products categories showed negative balances (figure 8).

After accession, only the agricultural commodities balance turned positive, thus contributing substantially to the reduction of the agrifood deficit. The increase was significant, by EUR 1.7 billion (in 2013 the value of agricultural commodities trade surplus was 15 times higher than in 2008). Cereals, oilseeds and live animals were the agricultural commodities that have sustained the upward trend of the agrifood trade balance.

Figure 8 – Structure of the agrifood trade balance by the processing degree



Source: author's calculations using Eurostat data

The trade deficit in primary processed products declined by 38% between 2008 and 2013 (that is EUR 806 million), while the deficit in secondary processed products decreased by 30% only, proving that for products with high added value, Romania continues to be at commercial disadvantage.

## CONCLUSIONS

In the post-accession period, Romania has made significant efforts to improve the efficiency and quality of its agrifood products and become a more significant player on the European and international markets. The result is that 7 years after accession only, Romania has become a net exporter of agricultural products, showing spectacular growth of export flows.

Also after accession, the ratio between agricultural commodities and processed products has improved. During the last three years, the average share of the processed products increased to more than half (56%), of which 25% semi-processed products and 30% products with high degree of processing. At the same time, the share of processed products in imports decreased by 10% in 2011-2013 as compared to the pre-accession period.

## BIBLIOGRAPHY

- Gavrilescu, C. (2014). *Evolution trends of the Romanian post-accession agrifood trade*. Ovidius University of Constanța Annals, Economic and Sciences Series, XIV (1), 119-124.
- Gavrilescu, C. & Voicilaș, 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), 823-834, <http://mts.asu.lt/mtsrbid/article/view/886>.
- Jankuné, K.G., Wagner H. (2014). *Competitiveness of Hungarian agri-food products in intra- and extra- EU trade*. Unpublished working paper, AKI Budapest.
- Regmi, A., Gehlhar, M., Wainio, J., Vollrath, T., Johnston, P., Kathuria, N. (2005). *Market Access for High-Value Foods*, USDA, Economic Research Service, Agricultural Economic Report AER-840, <http://www.ers.usda.gov/publications/aer-agricultural-economic-report/aer840.aspx>

## CEREAL MARKET IN ROMANIA-REGIONAL COMPETITIVENESS

DAN-MARIUS VOICILAS<sup>1</sup>

**Abstract:** *The article analyses the Romanian cereal sector in the last decades. The analysis gives a special attention to the sector development level and its evolution by regions. We analyze areas, productions, yields and the trade with cereals, at national and regional level. We try to identify how competitive the sector is and the main factors of influence, based on some quantitative indicators. Moreover, we identify the negative factors which influenced it. The statistical analysis is based on long data series and concentrates on the years before and after Romania's accession into EU. We use data provided by the National Institute of Statistics. The results presented show the evolution of the cereal sector after 1989, its decline for about ten years, but also the recovery, especially after the EU accession. The article opens new discussions about the role of the cereal sector in the Romanian economy and the ways of development in the context of a high level of competitiveness among European Union countries and other countries in the world. At the same time, by the present analysis we want to show how the regional performances can contribute to the development of the cereal market in Romania.*

**Key words:** *cereals, regions, competitiveness, Romania*

### INTRODUCTION

In the „90s, the first decade of major structural changes in Romania, the transition influenced the agricultural structures, as well. As a consequence, agriculture experienced important transformations, if we analyze the structure of the Romanian agriculture (crop or animal production), cultivated area, productions or yields. Structural changes are important for our analysis, because they influence the contractual relations between operators on the agri-food chain, policies and strategies at micro or national level, with direct impact on trade, competitiveness and efficiency. The cereal sector was also affected, and this is the reason why we chose to study it, both at national and regional level.

The national territory is split into eight economic regions (NUTS2). They are not territorial administrative structures but rather informal organizational structures made up of an average of 4-6 counties (NUTS III) each, except for the regions Sud-Muntenia and București-Ilfov. There are many other differences between them, especially from the agricultural point of view. Each region has its own characteristics, from specific relief and natural conditions to economic culture and traditions. The agriculture in general, and the crop production in special, has particularities determined by them. As a result, we meet specific features on the cereal market as well.

### MATERIALS AND METHODS

For the analysis we use data provided by the National Institute of Statistics (INS) and the Ministry of Agriculture and Rural Development (MADR).

The statistical analysis is based on long data series (1990-2012) and focuses on the years before and after Romania's accession to the European Union (EU), in 2007. For our calculations and comparisons, we selected only a few years during the mentioned period, years with historical significance. This is the reason why the results of the analysis take into account only the following years: 1990, 1991, 1992, 1996, 2000, 2002, 2005, 2007, 2010 and 2012. We have in view all these years either because they were years with agricultural census, structural surveys, or years related to some important political moments, like the years after the “Revolution”, electoral years, or others. The political life had a direct influence on the economic life, as regards the macroeconomic evolution of Romania, but also the regional or sectoral evolution on the way towards EU integration. For example, 2000 represents the year when Romania effectively started the negotiation

---

<sup>1</sup> Senior researcher Ph.D Romanian Academy-Institute of Agricultural Economics, Assoc.prof. Hyperion University, dmvoici@yahoo.com

process with the EU, in 2005 Romania signed the Accession Treaty and in 2007 Romania joined the EU.

## RESULTS AND DISCUSSIONS

### Cereal market

The structure of the Romanian crops or crop production is dominated by cereal production. The agricultural areas under these crops represent more than 50% of the cultivated area each year. Out of these, wheat and maize - traditional crops for Romanian agriculture, regardless of household size or farms - have significant percentages. For our calculations, among all varieties of cereals, we selected for deeper analysis only four cereals, considered the main cereals in Romania: wheat, maize, barley and oats.

The areas cultivated with cereals declined in the last two decades but, per total, not significantly. The greatest difference in our analysis was recorded in the year 1991 compared with 2010 (Figure 1). Generally, the evolution oscillated, due to the lack of a clear and stable governmental policy in the field.

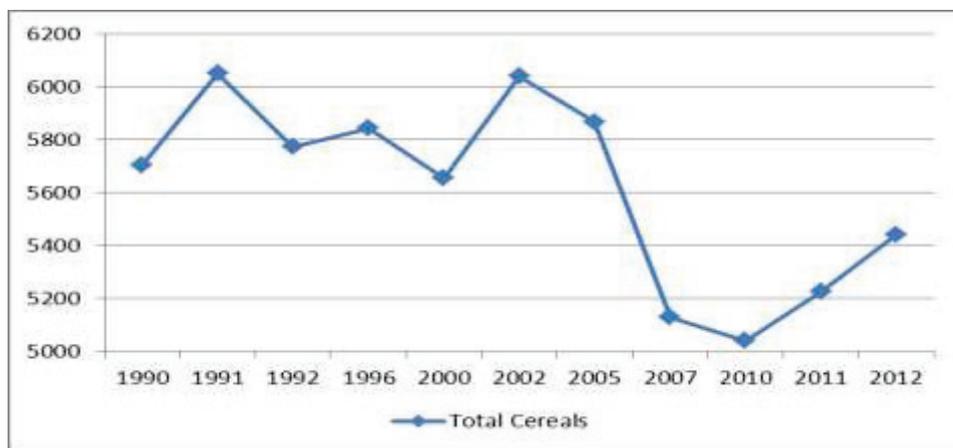


Figure 1. Total areas with selected cereals (thou.ha)

Source: Based on INS data (Tempo On-line)

The main cereals in Romania represent together over 95% of the Romanian cereal market. Besides wheat and maize, we will next analyze other two cereals like barley and oats. Thus, the cultivated area with the four mentioned cereals is represented in Figure 2.

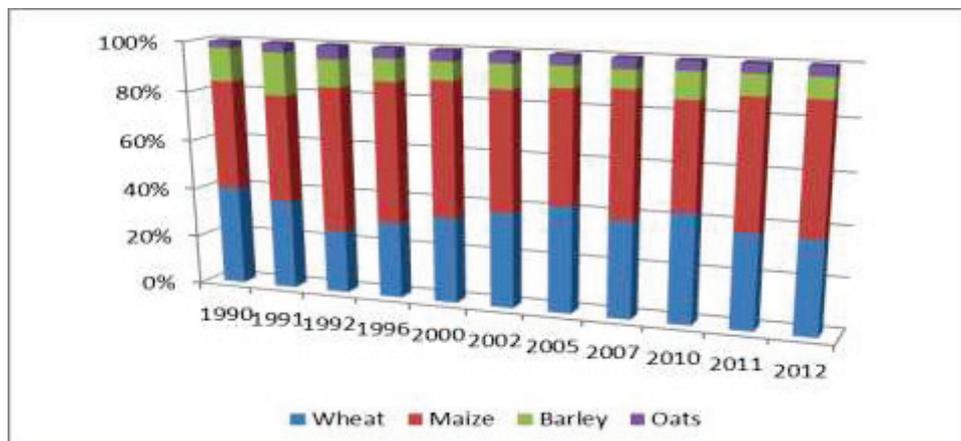


Figure 2. Areas with main cereals

Source: Based on INS data (Tempo On-line)

The area with maize together with wheat cumulates about 80-85% of the total area cultivated with these cereals, out of which maize has the largest share, i.e. 50-60%. The biggest changes can be noticed in the case of maize, with a descending trend after 2000, compared to the „90s. The other two cereals have a minor role on the cereal market (less than 20%). The area with barley was down in the last years compared to the „90s. Traditionally, Romania is a maize and wheat producer.

As regards productions, the analysis shows a few particularities. The total production has had a variable evolution (Figure 3), very close connected to weather conditions. Unfortunately, the production of cereals still depends on temperature, sun exposure and precipitations. There were years with good productions (of course, not compared with the main producers in the world), but also years with weak productions. The oscillation was quite big, if we have in view the comparisons of the year with the best production and that with the weakest production (in 2011 the production was 2.6 times bigger than in 2007). Presently (2012), the production is situated at an average level of the last two decades.

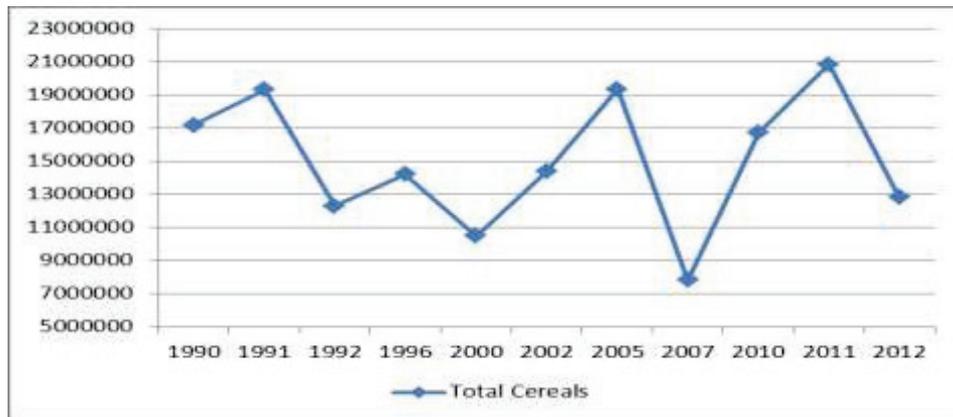


Figure 3. Total production of selected cereals (tons)  
Source: Based on INS data (Tempo On-line)

The analysis by types of cereals (Figure 4) shows that maize production is the most important. It is followed by wheat. Generally, 40-50% of the total production of the group of investigated cereals is represented by maize. In the present analysis, the biggest volume was recorded in 1996. At the same time, the barley production decreased in the last years, compared to that in the „90s.

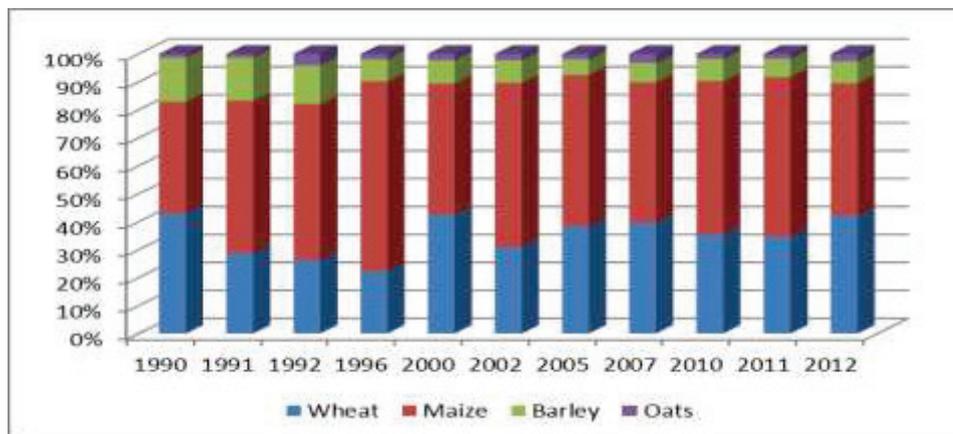


Figure 4. Production of main cereals  
Source: Based on INS data (Tempo On-line)

At the same time, the yields in the selected years show the weather dependency and the lack of irrigations (Figure 5). The weather dependency mainly includes precipitations (floods or drought) and temperatures (high or extremely low from year to year). Besides all these natural

factors of influence, we must have in view the human factors which can affect the level of the economic results as well (irrigations, chemicals, pollution, technologies etc).

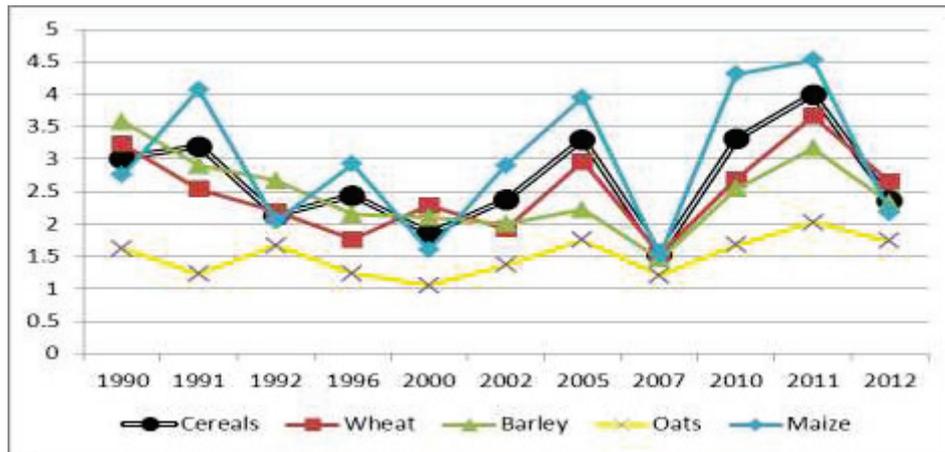


Figure 5. Yields of main cereals (tons/ha)  
Source: Based on INS data (Tempo On-line)

The best years in the investigated period were those with good weather conditions, balanced as regards precipitations and temperature. On the average, the cereal yields were 2.5-3 tons/ha, with a minimum of 1.5 tons/ha and a maximum of 4 tons/ha. The biggest oscillation was noticed in maize, which is very dependent on precipitations and irrigations (between 1.5-4.5 tons/ha). Only oats was less affected by climate and it had almost a linear evolution. Before 2000, the yields in all cases diminished, and then they slowly increased, except for the year 2007, which was the worst year due to different negative factors, including the weather influence. We can conclude that Romania does not have an intensive agriculture based on modern technologies.

### Regional competitiveness

In order to analyze the regional competitiveness of the cereal sector, we will have in view the statistical comparisons of the Romanian regions, as regards areas, productions and yields. All these indicators, together with different trade indicators, give us information on the level of competitiveness. In the present study we focus on areas, productions and yields. For the beginning, in Figure 6, we analyze the areas cultivated with cereals by regions.

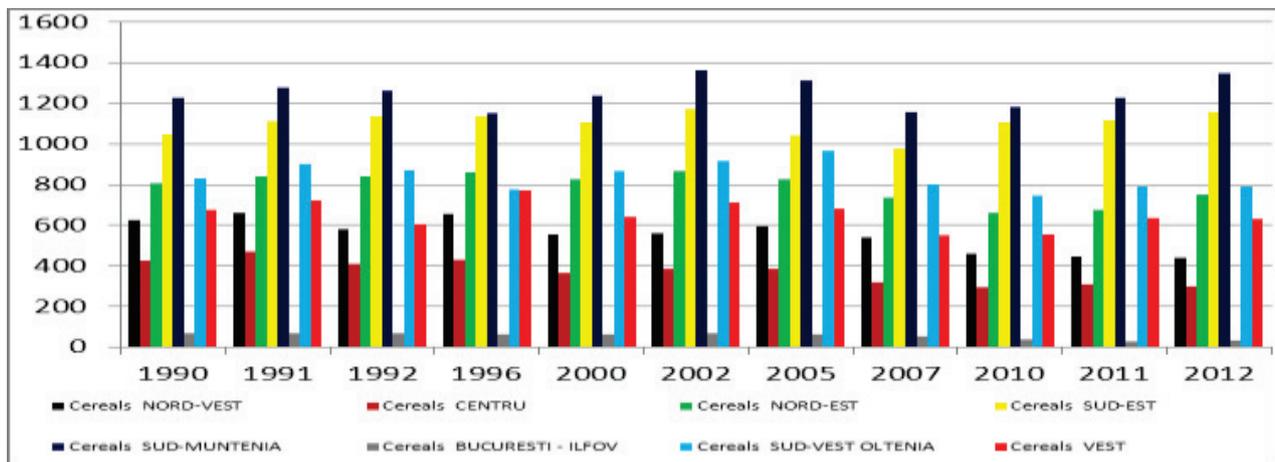


Figure 6. Areas with cereals per regions (thou. ha)  
Source: Based on INS data (Tempo On-line)

Among the Romanian regions, Sud-Muntenia is the most important in terms of area cultivated with cereals. It is followed by Sud-Est and Sud-Vest Oltenia regions. All together

accumulate over 55% of the Romanian area for cereals and among them Sud-Muntenia has at least 20%. In conclusion, the principal cereal regions for Romania are those situated in the South.

In the next two figures, we will analyze the areas with the main cereals (wheat and maize), by regions.

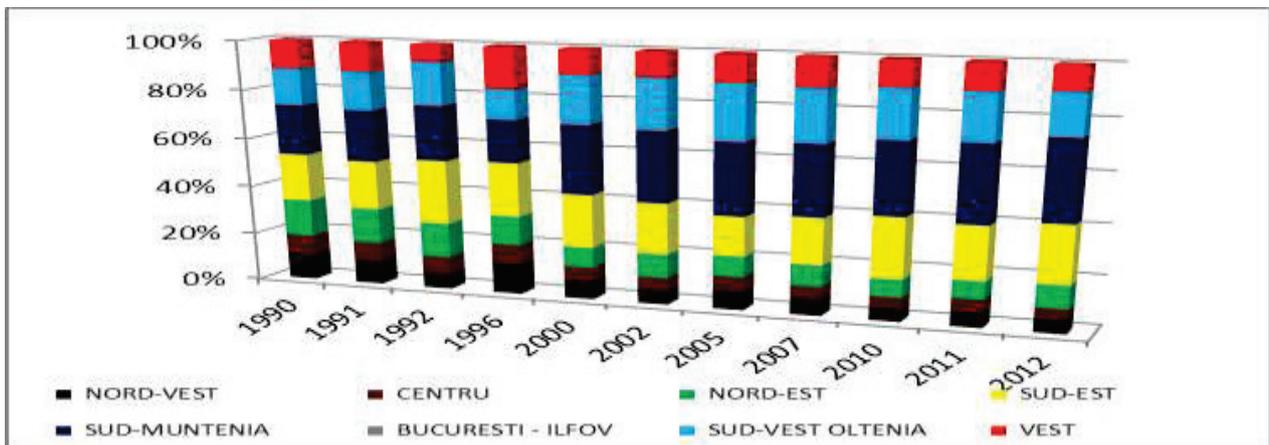


Figure 7. Wheat areas by regions  
Source: Based on INS data (Tempo On-line)

In Figure 7 we show the areas under wheat, by regions and their evolution in the last decades. Like in the case of total cereals, the main regions for wheat are: Sud-Muntenia, Sud-Est and Sud-Vest Oltenia. They represent more than 50% of the area cultivated with wheat at national level. The area under this crop increased after 2000 compared to the „90s. Thus, from about 53% in 1990, the areas were extended to about 70% in 2012. Sud-Est Region had about 20%, Sud-Vest Oltenia about 15% but, on the first place is the Region Sud-Muntenia. It contributes with about 32% (2012) compared to 20% in 1990. The most important areas under wheat are found in the southern part of Romania, like in the case of total cereals.

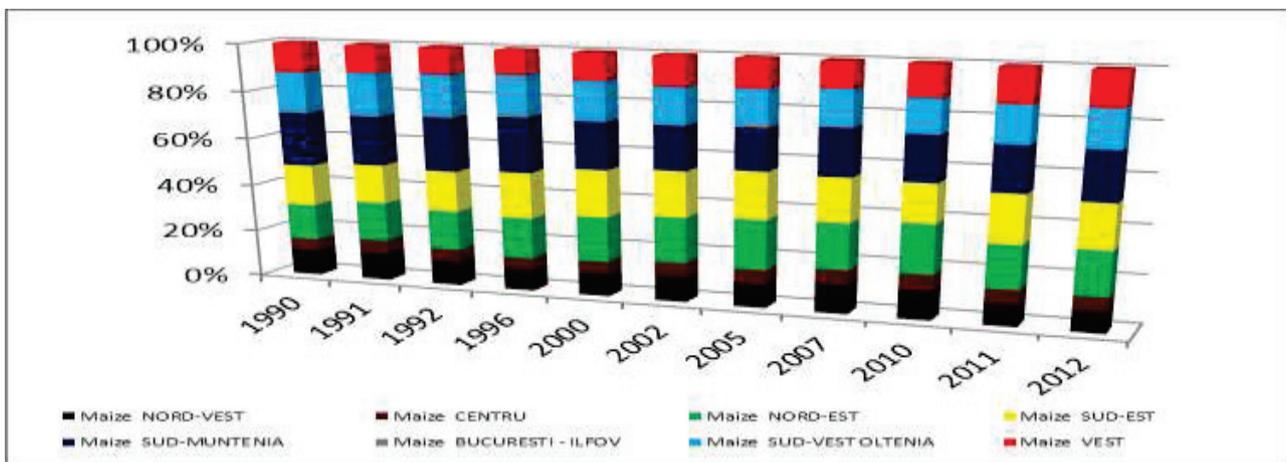


Figure 8. Maize areas by regions  
Source: Based on INS data (Tempo On-line)

Maize areas (Figure 8) show us a different situation. The areas covered by maize show that the situation is much more balanced. Still, Sud-Muntenia Region remains the most important with about 20% of total area under maize at national level but, the differences of the rest of the regions are not so evident, like in the case of wheat. Thus, Sud-Est Region and Nord-Est Region have 18-19% each, from total area. Sud-Vest Oltenia comes next with about 15%. All together, they have 70-75% of the national area under maize. We see a decreasing trend in Sud-Muntenia Region and an increasing trend in Nord-Est Region. The South of Romania is important for maize, if we have in view the cultivated areas, like in the case of wheat or total cereals.

In the next three figures we will present the cereal productions on comparative basis, by regions.

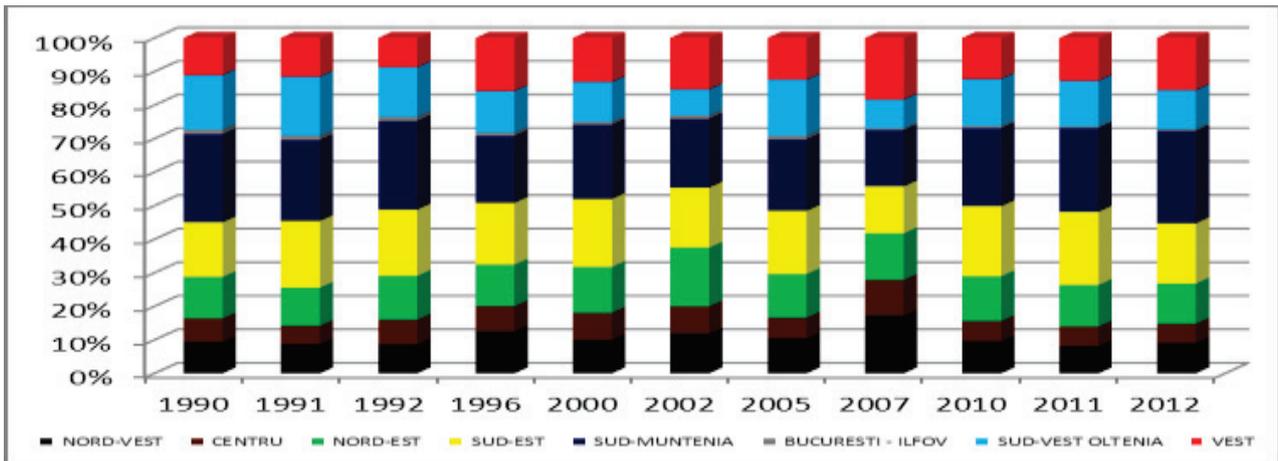


Figure 9. Cereal production by regions  
Source: Based on INS data (Tempo On-line)

The total cereal production (Figure 9) shows which the main producers of Romania are. Thus, Sud-Muntenia Region (about 25% of total) is on the first place, followed by Sud-Est Region. Both cumulate about 45% of the national production. The rest of the regions, except for Bucuresti-Ilfov and Centru have a secondary contribution with 10-15% each, of the national production. The biggest variation from year to year is found in Sud-Vest Oltenia Region, due to weather conditions and lack of modern irrigation systems.

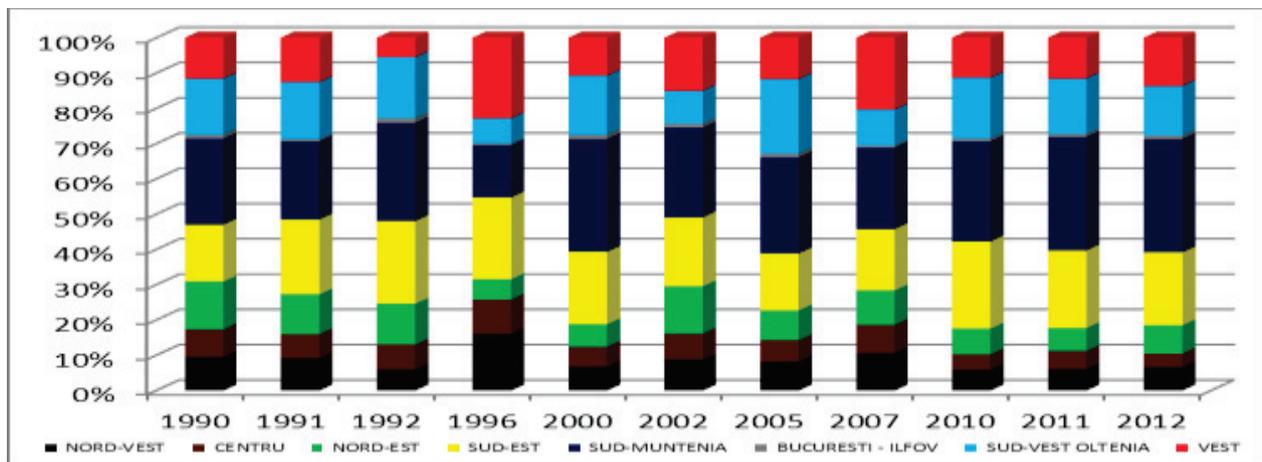


Figure 10. Wheat production by regions  
Source: Based on INS data (Tempo On-line)

In Figure 10 we present the wheat production, by regions. Sud-Muntenia Region is the main Romanian producer, followed by Sud-Est Region. Together they account for 40-55% of the national production. Sud-Muntenia Region has about 25% of total but, in certain years, it had even over 30% (like in 2011, 2012). We can notice a great production variation due to the weather conditions and even to the national policy in the field. The regions Nord-Vest, Centru, Nord-Est and Bucuresti-Ilfov are less important for wheat production.

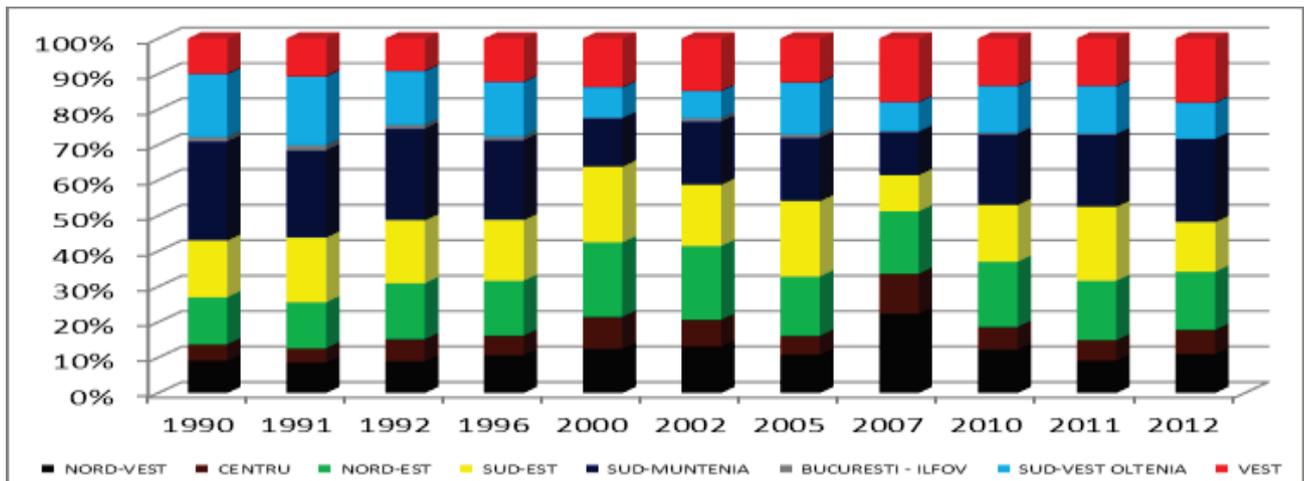


Figure 11. Maize production by regions  
 Source: Based on INS data (Tempo On-line)

Figure 11 presents the situation of maize production, by regions. Like in the case of wheat, the main Romanian producer of maize is Sud-Muntenia Region. It produces about 20-25% of the national production, but the variations from year to year are quite big (about 27% in 1990, 13% in 2000 and 23% in 2012). In the maize case the situation is more balanced if we compare the regions. There is a group of regions with similar contribution to the national production: Sud-Est, Nord-Est, Vest and Sud-Vest (10-20%), also with yearly variations. The remaining regions do not have important contributions.

In the next figures (Figure 12, 13, 14), we want to analyze the yields by regions, for total cereals, wheat and maize.

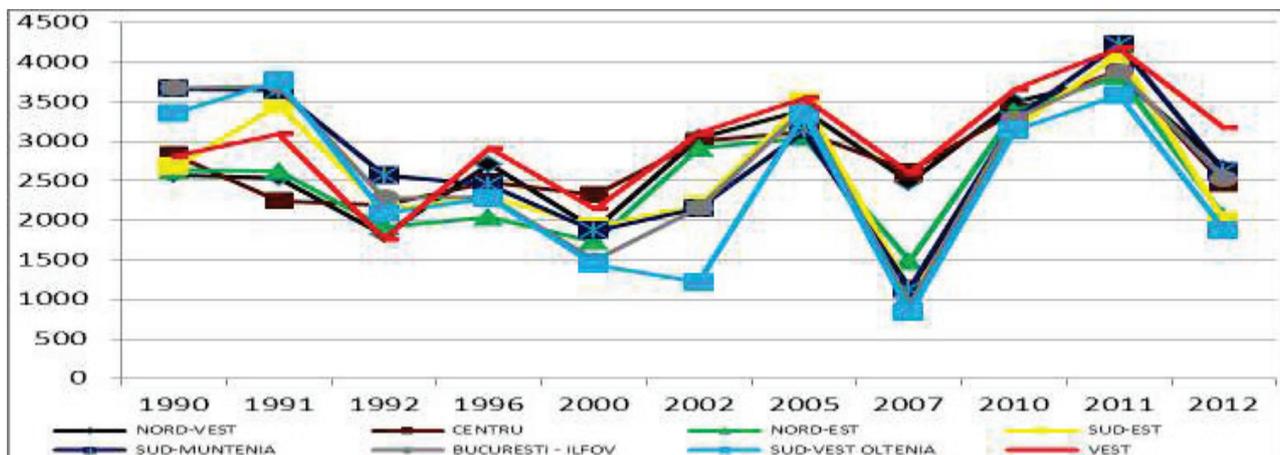


Figure 12. Cereal yields by regions (kg/ha)  
 Source: Based on INS data (Tempo On-line)

For total cereals, the yields show a few particularities at regional level (Figure 12). Firstly, they are closely connected to weather conditions, the precipitations being the most important factor of influence. In those areas where irrigation systems are used, the yields are not affected. At the same time, there are regions without irrigation systems but with a good level of annual rainfall. They can also have good level of yields. Small variations from year to year are found in the regions Vest, Nord-Vest and Centru. The rest of the regions are directly influenced by rainfall (mainly Sud-Vest Oltenia, Sud-Muntenia, Sud-Est and Nord-Est). Secondly, there is a region that improved its performances. It is the Region Vest, which presently produce on the average more than in the „90s, with yields between 3000-4000 kg/ha in recent years, after Romania's accession to the EU. The remaining regions produce on the average at the same level like in the „90s or even less (Sud-Vest Oltenia, Bucuresti-Ilfov). Generally, the yields had a constant descending trend before 2000, and then great annual variations appeared, with historical maximum and minimum.

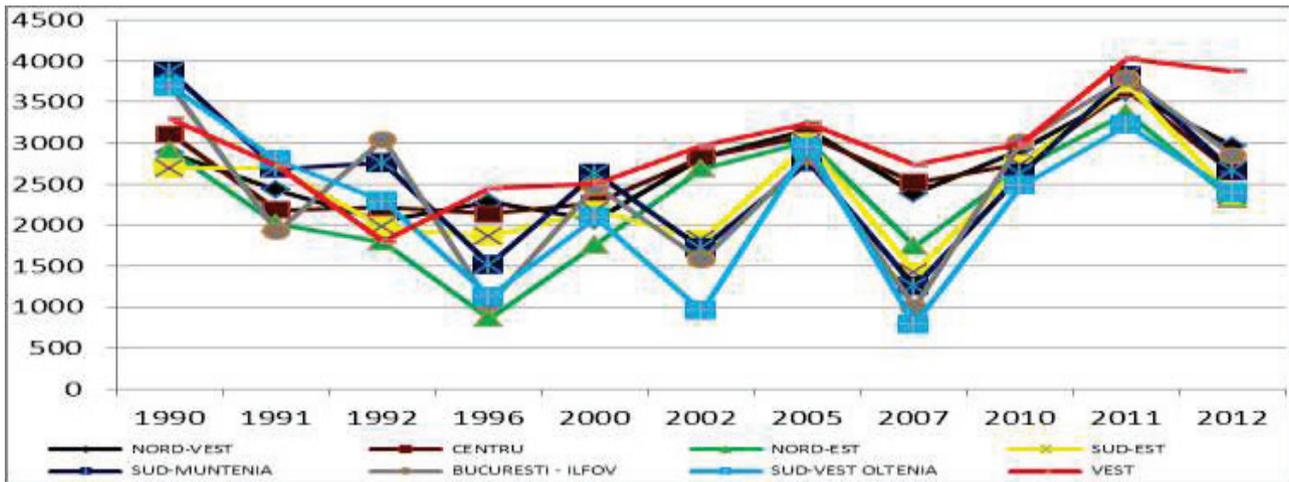


Figure 13. Wheat yields by regions (kg/ha)  
Source: Based on INS data (Tempo On-line)

If we analyze the cereal group by sub-groups, we identify a few differences. In the last years, the wheat yields have almost the same level with those from the beginning of the „90s (Figure 13). After many years of decline and yearly variations, after the accession, the yields look much more stabilized. Again, we underline the plus for Vest Region, with higher yields, which also had small variations during the analyzed period.

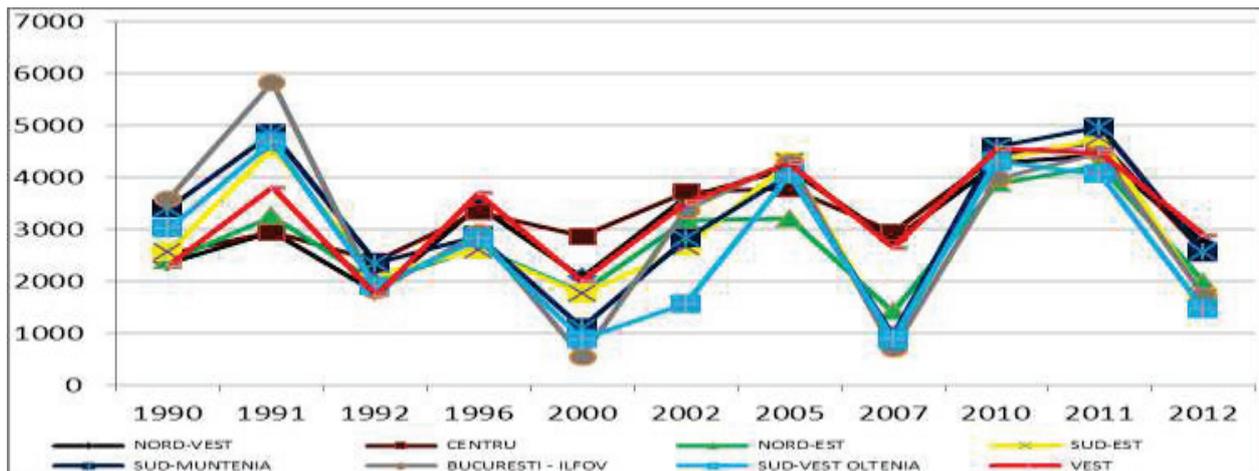


Figure 14. Maize yields by regions (kg/ha)  
Source: Based on INS data (Tempo On-line)

The situation is not the same for maize, which continues to have yearly variations (Figure 14), in all regions, especially in Sud-Vest Oltenia. Presently, the yields are smaller in all regions than at the beginning of the „90s.

## Trade

In the next part of the paper, we want to analyze the Romanian trade with cereals, in intra-EU and extra-EU zone. For this, we calculated the share of the main Romanian cereals in total Romanian agri-food exports, and the share of the Romanian agri-food products in the EU intra-trade. We also compare the trade with cereals with the trade with other Romanian agri-food products. In this way, we want to identify which are the “winners” of the last decades, among the Romanian agri-food products and especially among cereal products.

If we have in view the main Romanian cereals exported during the period analyzed, the “winners” of the last decades, which are products still competitive, are presented in Table 1.

Table 1. Share of products in total Romanian agri-food export (FOB) – “Winners”

Years	1991	1995	2000	2004	2007	2010
<b>Sheep (+ Goats)</b>	9.8	11.2	14.8	<b>20</b>	11.6	4.7
<b>Honey</b>	0.6	0.8	3.2	4.4	1.8	1.7
<b>Wheat</b>	5.7	<b>27.3</b>	4.9	0.9	7.1	19.9
<b>Barley</b>	0.03	0.2	3.4	1.2	4.1	5
<b>Maize</b>	0.2	7.4	5.1	8.5	11.6	<b>20.9</b>
<b>Rape seeds</b>	0.04	0.03	5.2	1.9	12.1	<b>17.1</b>
<b>Sunflower seeds</b>	0.04	0.8	7.1	15.4	<b>16.1</b>	11.5
<b>Sunflower oil</b>	2.4	16.5	5.2	11.4	5.4	6

Source: Voicilas, 2013

We can say that wheat and maize from the cereal group are important for the Romanian agri-food trade and (still) competitive in the world (including EU market), while barley is less important.

Next in this subchapter, we want to know the share of the Romanian agri-food products in the EU intra-trade market, in FOB prices. Which are the most competitive Romanian agri-food products on the intra-EU market? This is another estimation of the competitiveness of the Romanian agri-food products at EU level (Table 2).

Table 2. Share of Romanian agri-food exports in EU intra-trade market (FOB)

Products	2004	2007	2008	2009	2010	2011
<b>Cereals</b>	0.3	1.0	1.2	3.7	<b>4.2</b>	3.8
<b>Oilseeds</b>	1.6	1.7	5.8	5.5	6.6	<b>7.2</b>
<b>Honey</b>	7.4	5.3	5.8	<b>10.1</b>	9.4	8.4
<b>Sheep</b>	31.8	26.5	32.4	33.7	32.0	<b>36.5</b>
Wheat	0.07	0.8	1.3	3.9	3.7	3.4
Maize	1.2	1.8	1.9	5.5	7.3	6.7

Source: Voicilas, 2013

Having in view the data presented, we identify two types of products: active (honey, sheep) and passive (cereals, oilseeds). Among cereals, wheat and maize stand out. The active products have an ascending trend and very good perspectives (competitiveness) and the passive products have a linear evolution under the pressure of different factors.

## CONCLUSIONS

At the end, we would like to summarize our analysis in a few comprehensive words: undeveloped, disparities, not competitive.

In details, we can add that the cereal sector in Romania is still less developed; the majority of the regions are almost at the same level of production like at the beginning of the „90s (compared to similar sectors in other EU countries, the differences could be bigger). Only the Region Vest improved its performances, with higher yields in recent years. In the remaining regions, the sector is still developing and under the direct influences of the natural (weather) conditions.

In terms of quality of work (productivity), the Region Vest appears as the most important. If we analyze the quantities, Sud-Muntenia, Sud-Est and Sud-Vest Oltenia are the most important, having in view the size of the areas cultivated with cereals and the total production of cereals. We can imagine that, if the same technologies were applied in all these regions as those applied in the Region Vest, the results could be much better.

At the same time, the differences between regions are also the result of the weather conditions, soil quality or level of utilization of the modern technologies, including irrigation systems.

We can conclude that the cereal sector is not competitive (as a whole), but there are products or regions with good level of performances, similar to those in other competitive EU countries. For example, among cereals only wheat and maize could be considered competitive, even if in intra-EU trade these have passive role. At the same time, the cereal sector remains one of the most competitive sectors of the Romanian economy, with huge volumes and values in intra- and extra-EU trade. Among regions, we highlight Sud-Muntenia, Sud-Est, Sud-Vest and Vest, which have potential, good performances in some years and can improve their competitiveness at EU and world level.

Moreover, we can add that the lack of the stable and rigorous legislation and the weaknesses of the national institutions determined the present state of the Romanian cereal market, which cannot compete with other markets in EU or other regions in Europe.

### ACKNOWLEDGEMENTS

Work under:

**FP 7 COMPETE Project** “*International comparisons of product supply chains in the agro-food sectors: determinants of their competitiveness and performance on EU and international markets*”, Grant Agreement No. 312029

(<http://compete-project.eu/>),

with funding from the **European Community** and the Ministry of National Education from Romania through the Executive Unit for Funding Higher Education, Research, Development and Innovation, project coordinated by IAMO (Halle/Saale-Germany), partner Institute of Agricultural Economics-Romanian Academy (Team leader: D.M.Voicilas)



### BIBLIOGRAPHY

1. Voicilaş, D.M. (2013). *Gains and losses of Romanian agri-food products on EU intra-trade market*, in Popescu, G., Istudor, N., Boboc, D. (editors), Proceedings of the 2-nd International Conference “Competitiveness of agro-food and environmental economy” (CAFEE“13), Bucharest, pp. 401-409. ([http://www.cafee.ase.ro/?page\\_id=202](http://www.cafee.ase.ro/?page_id=202)) [2014 04 28].
2. \*\*\*, INS Database (*tempo on-line, www.insse.ro*)

# THE ROMANIAN TRADE WITH DAIRY PRODUCTS – THE NEED TO INCREASE THE EXPORT POTENTIAL

MARIANA GRODEA<sup>1</sup>

**Abstract:** *Although the international milk market has registered a permanent demand increase, in the analyzed period (2002-2012), the dairy products export made by Romania, have registered relatively modest values, in meeting the demand. In this period, the Romanian trade with dairy products has known an ascending trend, and, especially after the year 2007, increases were massive o imports side, but low, in comparison with those made by the main players on the international market. The method used was the comparative analysis, in the period 2000-2012, of some sets of indicatives specific for the trade with dairy products, having as source of information international reports and studies elaborated by the European Commission, the data of FAOSTAT Agriculture and EUROSTAT. From the analyses made, as a conclusion we can observe the fact that Romania is a net importer of dairy products, this category of products presenting a strongly deficit balance (in 2012, the debt trade balance for milk and dairy products was of -157552 thousand i euros, decreasing from the preceeding year by 8.2%).*

**Key words:** *import, export, dairy products, trade balance*

## INTRODUCTION

Having in view that exports represent the most relevant criterion for assessing the products' competitiveness, from the analysis made regarding the evolution of the Romanian trade with dairy products in the 2002-2013, we can observe an increase of dairy products' imports, in comparison with the dynamics of dairy products' exports. As result, Romania has become a net importer of dairy products.

On basis of most recent statistical data of international trade refering to the trend of milk and dairy products imports (International Trade Center UNCTAD/WTO, Geneva), there are some sale markets with demand for dairy products which are growing, both from the EU -27, and from outside the community space, which can support the development and diversification of the Romanian exports. The extra-community markets with significant absorbtion potential for a diverse range of dairy products, are, mainly countries from the Western Balkans, ICS, Asia and Northern Africa- the Middle East [2].

The tariff protection practiced by the greatest part of the extra-community countries at the milk and dairy products imports of East European origin can be considered of medium and low level. Exception make the developed countries, big producers of dairy products and those which have generally a trade regime of protectionist type.

The level of the duty import taxes is differentiated in function of the processing degree, the fats contents, different ingredients/food addings or package.

In the virtue of the trade agreements signed with the European Union the Romanian exports of milk and dairy products, benefit of an improved access on the market, duty taxes and/or tariff preferential contingences, as is the case of the European extra-community countries or those participants to the Euro-Mediterranean Agreement (Lebanon, , Algeria, Egypt, Jordan, Israel, Marocco and Tunis).

## MATERIAL AND METHOD

For the catching of the main aspects regarding the milk market in Romania, there were used the national data delivered by the National Statistics Institute (NSI), through the official publication– The Romanian Statistical Yearbook- as well as of the data base Tempo-online -NSI, which were afterwards processed, and information from the Ministry of Agriculture and Rural

---

<sup>1</sup> Dr. CSIII MARIANA GRODEA, Institute of Agricultural Economics, INCE, the Romanian Academy, Calea 13 Septembrie no. 13, sector 5, Bucharest, phone/fax:021/3182411; e-mail: marianagrodea@yahoo.com

Development care apoi au fost prelucrate, precum și informații Ministerul Agriculturii și Dezvoltării Rurale (MARD), The National Sanitary Veterinary and Food Security Authority (ANSVSA).

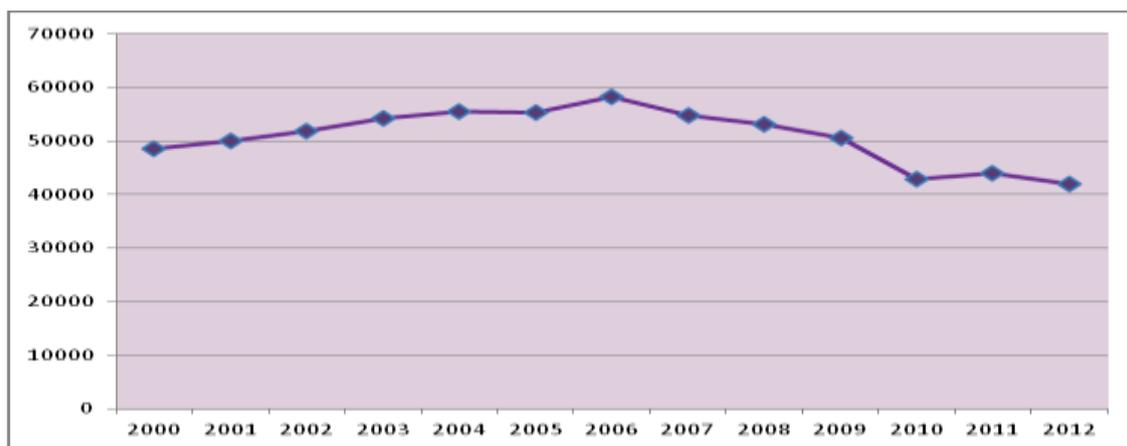
The method used was the comparative analysis, in the period 2000-2013, of some sets of indicatives specific for the milk chain (the cows' number, and their production, the farms' medium size) and of the trade with dairy products, having as source of information and reports and also international studies elaborated by the European Commission, the data of FAOSTAT Agriculture and EUROSTAT.

## RESULTS AND DISCUSSIONS

### The milk supply

The integration into the European Union did not bring any revigoration of the milk production sector in Romania, but, on the contrary, an accentuated decline of the production and livestock numbers. Thus, the total milk production was, at December 31 2012, of 48337 thousand hl (inclusively the calves' consumption ), of which cow milk and buffalo cow milk 42036 thousand hl (figure 1).

Figure 1. Evolution of cow milk and buffalo cow milk, in the period 2000-2012 (thousand hl)

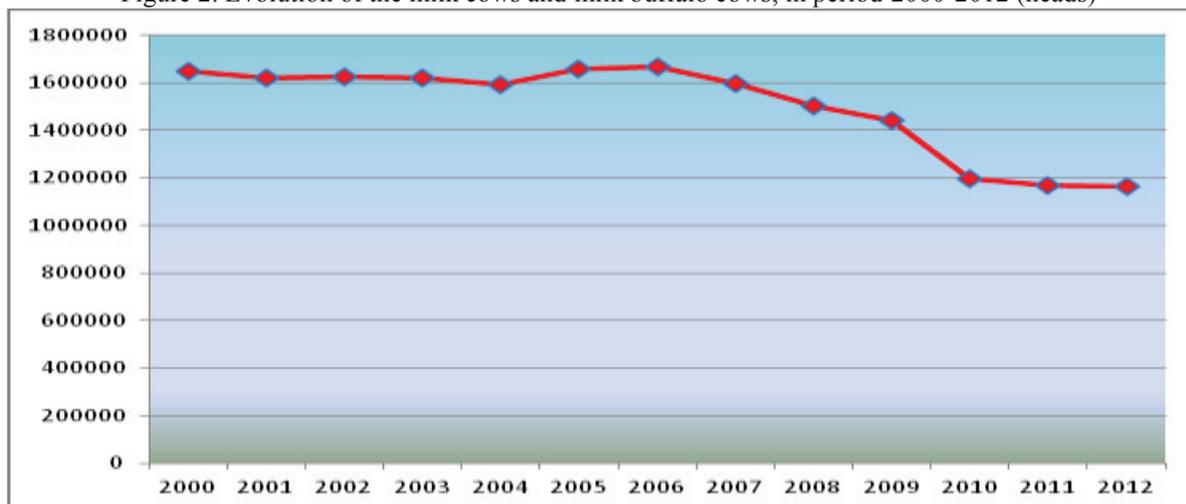


Source: The National Statistics Institute, Tempo online, 2014

Opposed to the year 2000, total production decreased by 3293 thousand hl (-6.4%), on background of the decrease of the cow milk and buffalo cow milk production by 6482 thousand hl (-13.4%) concomitently though with the increase of the milk production of sheep and goat by 3189 thousand mii (+102.4%). The increase of milk production of sheep and goat is due, mainly to the development of the ovines raising sector, but especially of the goats'. By estimating the economic efficiency indicators of the goat milk, for an average of 350 litres/head, has been demonstrated that growing and exploitation of goats is profitable [1]

In the period 2000-2012, the cows and buffalo cows number at national level, was reduced by 486524 heads (-29.5%), decrease being more accentuated in the period 2007-2010 (24.9%), year after which it is known a livestock stabilization (figure 2)

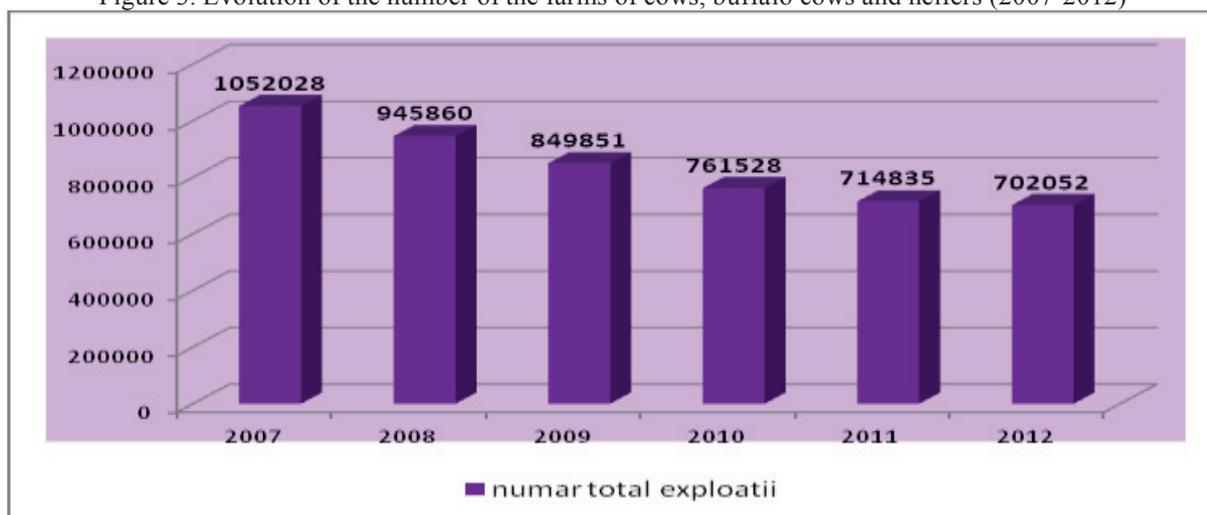
Figure 2. Evolution of the milk cows and milk buffalo cows, in period 2000-2012 (heads)



Source : National Statistics Institute, 2014

The performance of the milk sector in Romania is seriously affected also by the excessive fragmentation. Thus, at the level of the year 2012, 58 % of the total milk cows numbers is to be found in very small size farms 1-2 heads, and the total number of the farms was of 702052, with an average size of 1.86 heads /farm (figure 3).

Figure 3. Evolution of the number of the farms of cows, buffalo cows and heifers (2007-2012)



Source: information processing following Ministry of Agriculture and Rural Development  
 Vezi graf: total farms number....nota trad.!

From the total farms number, only 1717 are considered as professional farms which deliver milk directly to the processing units (the farms with over 31 heads).

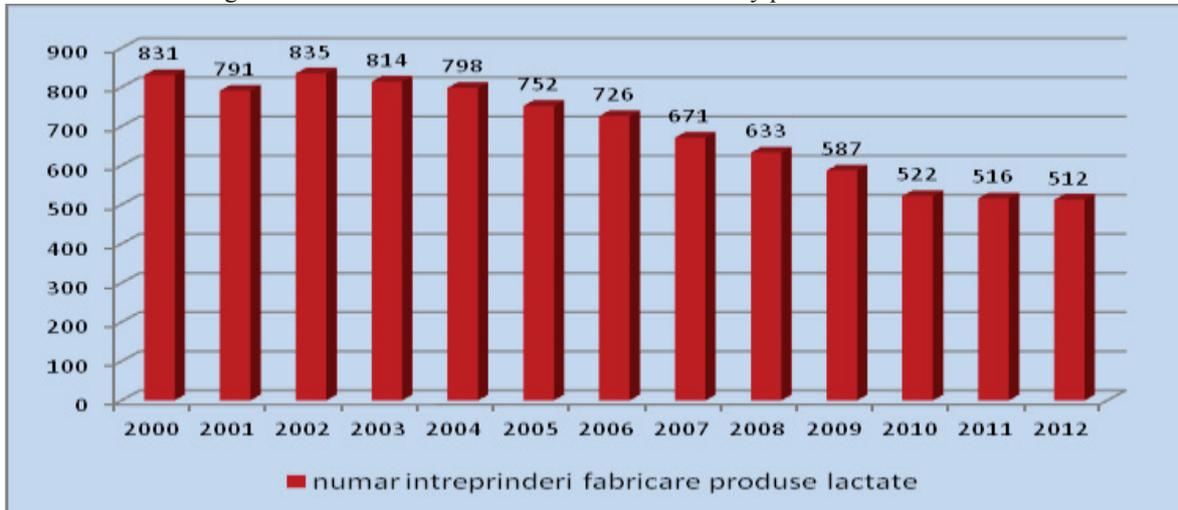
In the period 2007-2012, the total raw material milk production collected by the processing units (in the country and from import) decreased by 233107 tons (- 19,4%).

The analysis of the two sources of origin, respectively milk collected from the country and from import, shows, on one hand, the fact that the share of the raw milk imported grew from 3.6% in year 2007, to 6.1% in 2012, while the raw milk collected from the country decreased as share, constantly, from 96.3% in 2007, to 93.9%. Per total, in the period 2007-2012, the analysis shows the decrease of the quantity of raw milk collected from the farms in the country by 21.5% and the increase of the quantity of raw milk imported by 35.1%. The situation is due to the fact that, in Romania, the collecting system is not settled yet, and the prices offered by the collectors are not attractive for the producers, such as these prefer to sell their production by themselves, through family businesses.

A characteristic of the milk production in Romania (2012) is that only 20% of the milk production is valorificated towards the processing units, 38% is represented by the family consumption, 32% is directly delivered on the market, and 10% is technological consumption.

According to the data supplied by the National Statistics Institute, in 2012 there were 512 of milk processing units, by 38% less than in the year 2000, the majority being small, from the point of view of the employees' number (463 of units with less than 50 employees), replicating practically the structure at the level of primary production (figure 4).

Figure 4. Evolution of the number of units for dairy products' fabrication



Source : National Statistics Institute Tempo online, 2014

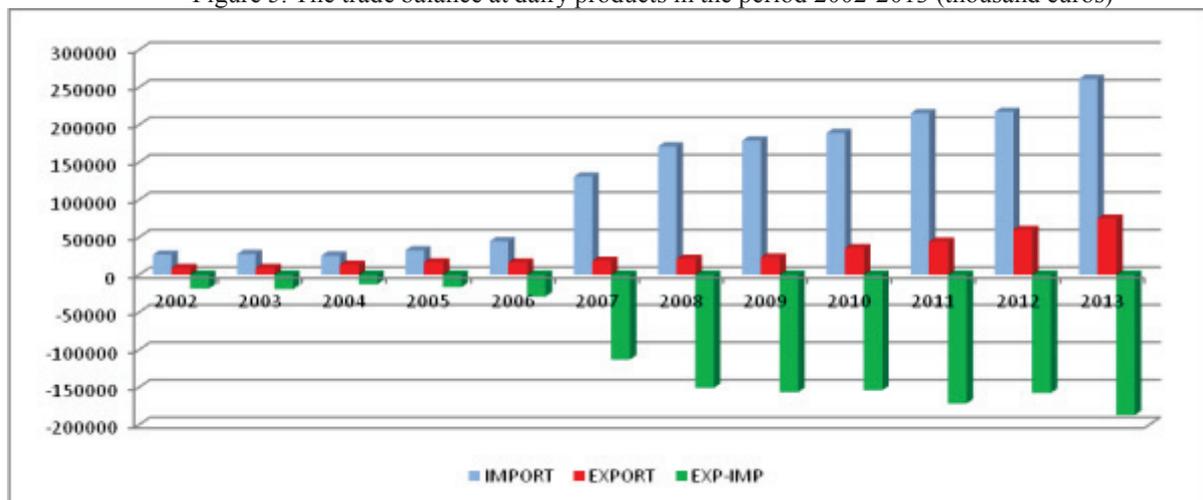
Vezi nota trad: Number units of dairy products' fabrication !

In the period 2000-2012, the dairy products' production resulted from the industrial processing registered increases at all varieties, the most spectacular taking place at the fresh dairy products (269.7%), followed by cheeses 130.6%.

### The trade with dairy products

In the period 2002-2013 Romania constantly registered a deficit trade balance from the trade with milk and dairy products (figure 5).

Figure 5. The trade balance at dairy products in the period 2002-2013 (thousand euros)

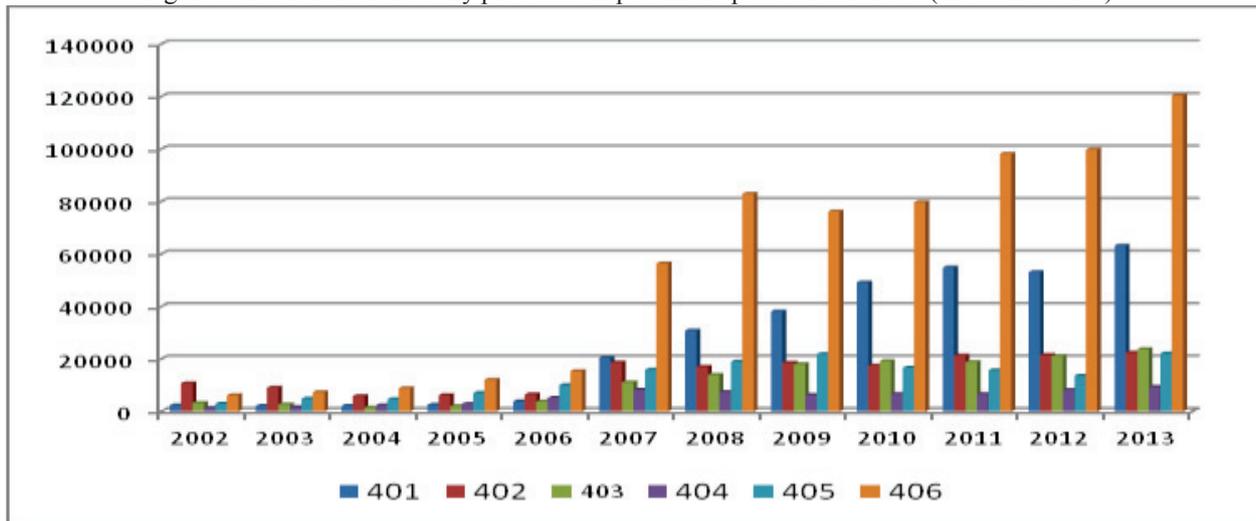


Source: <http://exporthelp.europa.eu/thdapp/comext/ComextServlet?languageId=EN&CFID=3643232&CFTOKEN=42354002&jsessionid=643038c411e8b4454515>

The trade deficit was accentuated especially beginning with the year 2007, this increasing around 6 times in the period 2006-2013, from 28875 thousand euros to 186824 thousand euros. The situation is due to the massive import of dairy products, both in the intra and extra community space, in the defavour of the export, the trend of which was increasing, but much under that of the import. Opposed to year 2002, from the value point of view, imports grew 26.8 times at nonconcentrates milk or cream (0401) and 19.3 times at cheeses and green ewe cheeses (0406). The lowest evolutions were registered at milk and cream-nonconcentrates (2 times), whey (7.0 times) butter and fresh dairy products (7.3 ori).

In the imports' structure, at the level of the year 2013, there are predominant the cheeses and ewe cheeses (0406), with 46%, followed by nonconcentrates milk and cream (0401) with 24% (figure 6).

Figure 6. Evolution of the dairy products' import in the period 2002-2013 (thousand euros)



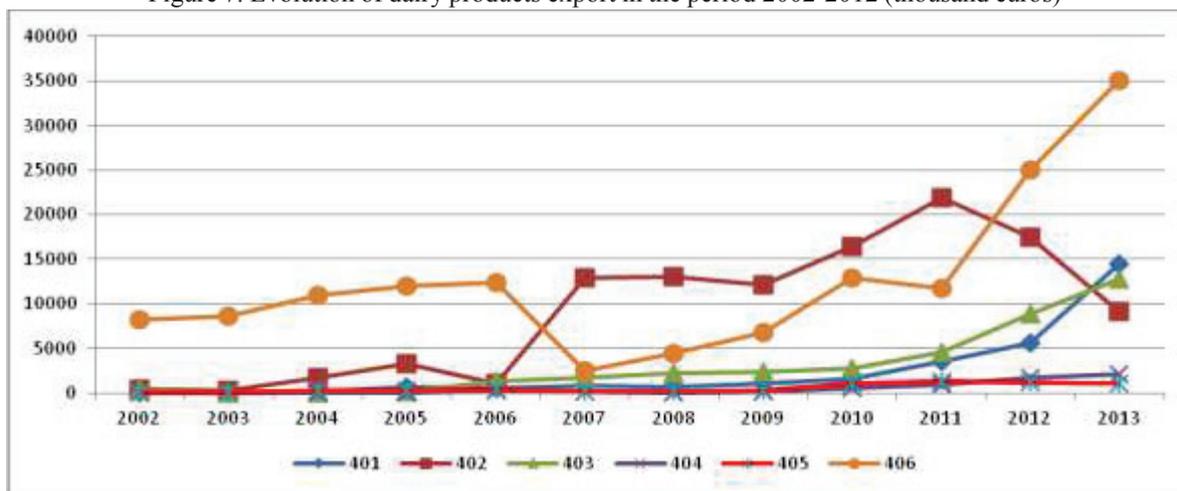
Source: <http://exporthelp.europa.eu/thdapp/comext/ComextServlet?languageId=EN&CFID=3643232&CFTOKEN=42354002&jsessionId=643038c411e8b4454515>

From the value of commercial exchanges point of view, at the level of 2013 year, we mention:

- The biggest quantity of **milk and cream nonconcentrates (0401)** imported by Romania, from the intracommunity space, comes from Hungary(63.8%). At distance there are placed the imports from the Czech Republic (10%), Poland (8,8%), Germany (7.8%), Slovakia (3.7%) and Bulgaria (2,0%).
- **Milk and cream concentrates (0402) from the intracommunity space**, Romania imports in ratio of 24.9% from Poland, 18.6% from Germany;
- **The fresh dairy products (0403)** are imported in the biggest proportion of 36.3% from Germany, of 30.1% from Poland and 20.8% from Hungary;
- At category **whey (0404)**, the **biggest quantity imported** comes from Hungary (41.0%), after which Poland is next with 16.9%. There were also imported small quantities from the extracommunity space, respectively from the United States and Switzerland;
- As it regards **butter (0405)**, we mention the fact that imports came somehow equally from Poland (30.5%), Germany (20.6%), Slovakia (10.1%) and Belgium (8.0%);
- As regards **cheeses and ewe cheeses (0406)**, we mention that the majority of import comes from Germany (47.2%) and Poland (13.5%) and Hungary (7.9%).

The exports of dairy products increased by around 8 times in the period 2002-2013. In structure, in the year 2013, the highest share is held by cheeses and ewe cheeses (46.9%) and milk and cream concentrates (19.4%), followed by the fresh dairy products with 17.2% (figure 7)

Figure 7. Evolution of dairy products export in the period 2002-2012 (thousand euros)



Source: <http://exporthelp.europa.eu/thdapp/comext/ComextServlet?languageId=EN&CFID=3643232&CFTOKEN=42354002&jsessionid=643038c411e8b4454515>

The Romanian exports at the level of the year 2013, had as destinations the followings:

- At category **milk and cream nonconcentrates (0401)** the **highest share** in the intracommunity space had as destination Bulgaria 36.3%, Greece 33.7%, Slovakia 11.2% and Italy 5.7%, and in the extracommunity space Republic of Moldova;
- **Milk and cream concentrates (0402)** in the intra-community space, Romania exported 49.6% to Bulgaria and 34.4% in Greece. In the extra-community space the exports were meant towards Republic of Moldova ;
- **The fresh dairy products (0403)** are exported greatly, in the intra-community space to Greece (48.2%), Bulgaria (22.4%) and Hungary (16.3%). In the extra-community space, there were exported to Republic of Moldova (62.9%), Albania (15.4%) and towards the ex Yugoslavian states (Kosovo 6.8%, Serbia 5.8%, Bosnia Herzegovina 5.3%);
- At category **whey (0404)**, we mention exports to Greece (43.8%), Czech Republic (33.1%), Bulgaria (7.8%);
- **Butter (0405)**, was exported greatly to Portugal (34.2%), Hungary (24.0%) and Bulgaria (15.0%);
- at **cheeses and ewe cheeses (0406)**, we precize that more than half (60.2%) from exports went to Greece, followed by Italy (10.8%), Bulgaria (10.4%), Hungary and Spain with 5.3% each, and in the extra-community space, exports were concretized in the greatest part towards the United States (39.7%), and Republic of Moldova with 17.7%

## CONCLUSIONS

The conclusion which can be drawn as regards the import, at all categories of dairy products is that, the main Romania's partners in the intra-community space, are Hungary, Germany and Poland. As regards the export, the main markets in the intra-community space are those of Greece, Bulgaria, Hungary, and that of the extra-community space is by far the Republic of Moldova.

This way is contoured the fact that the evolution of exports of products in group 0404 (whey) and 0405 (butter) was **maintained linear and low on the period analyzed**, fact which shows a lack of competitiveness of these products on the respective markets, existing the risk of even their reduction in lack of some serious investments into re-technologization.

The groups "milk and cream, from milk, nonconcentrates" (0401), as well as "fresh dairy products" (0403) had also a slow evolution until the year 2011, after which it can be seen a revigoration of the export, mainly towards the markets in Bulgaria and Greece.

The export of products in the group "cheeses and ewe cheeses" (0406) was in a continuous ascension, fact which demonstrates the existence of a potential to penetrate the external markets, which is going to be developed.

The export of "milk and cream, concentrates" (0402) was relaunched significantly after 2007 and maintained relatively constant until the year 2011, after which is registered an accentuated decline until the year 2013.

The analysis of data and information demonstrate that among the main determinants of the success on the export markets can be mentioned the good knowledge of the external competition and a higher quality of products in comparison to those similar on the external markets.

The promotion of the own production on the external markets and the identification of new clients by the exporting enterprises for dairy products can be realized through participation at fairs, exhibitions and other events especially for the promotion, by ensuring the quality standards.

A main reason for the lack of development in the exports of dairy products by the Romanian enterprises is represented by the insufficient and unstable insurance, quantitatively and qualitatively with raw milk and not least the reduced competitiveness of the Romanian dairy products on the external markets, due to high fabrication costs.

The main ways to increase the efficiency of the foreign trade with dairy products are: reduction of production costs, the increasing of the degree of products' processing, increase of products and services quality destined to the export, increase of labour productivity, identification of niches and specialization of products destined to the export, increase of the degree of complexity and diversification of products for the export, modernization and adjusting the modality for the products' presentation to the level of the requirements on the external markets.

## BIBLIOGRAPHY

- [1] Rodica Chetroiu, Ion Călin (2013), "The economic efficiency of goat milk production in Romania" Volumul *Lucrări Științifice - Seria Zootehnie* USAMV Iași, ISSN 1454-7368, ISSN 2067-2330
- [2] Cristina Mărăscu (2012), "Potențialul de export al României: Lapte și produse lactate", Centrul Român pentru Promovarea Comerțului și Investițiilor Străine
- [3] Anuarele Statistice ale României, 2001-2012
- [4] Tempo-online - Institutul Național de Statistică, 2001-2012
- [5] "Și-au atins instrumentele de gestionare a pieței laptelui și produselor lactate principalele obiective?", Raportul special nr. 14/ 2009, Curtea de Conturi Europeană, ISBN 978-92-9207-515-6

## INFLUENCE OF *NON-SACCHAROMYCES* YEASTS ON WHITE DRY WINES

POULARD ALAIN<sup>1</sup>  
PASCARI XENIA<sup>2</sup>  
GAINA BORIS<sup>3</sup>

**Abstract:** It was demonstrated a positive action of the non-Saccharomyces yeasts on the organoleptic properties of wines. Also, their participation in fermentation process did not involve an excessive accumulation of volatile acidity or other taste and aroma defects. The involvement of the non-Saccharomyces yeasts in practical oenology that keeps on recent achievements in oenological biotechnologies allow an increase of aromatic intensity (floral, fruitful etc.) in varietal wines and preserve the varietal identity of obtained wines.

**Key words:** yeasts, non-Saccharomyces, *Saccharomyces cerevisiae*, alcoholic fermentation, kinetics of alcoholic fermentation, white dry wines.

### INTRODUCTION

The last years the *non-Saccharomyces* yeasts have become increasingly studied due to those technological proprieties. Many works refer to those benefic influences on the white dry wines [2, 3, 4, 5, 7].

In view of the above, several *non-Saccharomyces* strains were proposed for co-fermentation process in association with *Saccharomyces cerevisiae*. French Institute of Vine and Wine (Nantes) last ten years were studied the fermentation process, its kinetics and also organoleptic and physico-chemical characteristics of produced wines from Melon B and Sauvignon varieties.

### MATERIALS AND METHODS

The research objective supposes the association of non-Saccharomyces yeasts with *Saccharomyces cerevisiae* in sequential seeding to prove the positive changes involved by these strains.

Non-Saccharomyces strains targeted in this study are: *Candida pyralidae*, *Metschnikowia pulcherrima*, *Torulaspora delbrueckii*.

*Candida pyralidae* is a selected strain that was studied earlier at the French Institute of Vine and Wine (Nantes). It has an oenological interest in enriching wine with aroma. The other two tested strains (*Metschnikowia pulcherrima* and *Torulaspora delbrueckii*) are already recommended to be produced and marketed.

During this study were used three Lots of different varieties and geographical provenience: LOT 1: Melon de Bourgogne, LOT 2 : Sauvignon de Poitou, LOT 3 : Sauvignon de Touraine.

Given the trends of last years of substitution of manual harvest with mechanical, in all three Lots the harvest was performed using the combine and received as marc (Melon B) and must (Sauvignon).

The success of implantation of the strains was verified by performing an implantation control when the density of musts was ranged between 1,020 and 1,030 g/dm<sup>3</sup>. Biomass analysis was realized by amplification Polymerase Chain Reaction (PCR). The genetic profile of biomass recovered from must, compared with referential strain allow the validation of successful yeast implantation. In order to determine the basic physical and chemical indexes were used recommended a standardized methods proposed by OIV [6].

<sup>1</sup> Institut Français de la Vigne et du Vin, Nantes, France

<sup>2</sup> Technical University of Moldova

<sup>3</sup> Academy of Science of Moldova

## RESULTS AND DISCUSSIONS

The analytical composition of every lots is different and especially in assimilable nitrogen. In order to ensure a reliability of alcoholic fermentation, in this study it was proceed to an increase of nitrogen content by using alcoholic fermentation activators „Go Ferm,, and „Fermaid E,, in two halves. Table 1 presents an analytical composition of 3 lots of must.

Table 1: Analytical composition of musts

Indexes	Melon B	Sauvignon de Poitou	Sauvignon de Touraine
Total acidity, g/l H <sub>2</sub> SO <sub>4</sub>	4.0 (82 me/l)	6.42 (131 me/l)	5.0 (102 me/l)
pH	3.20	3.08	3.17
Assimilated nitrogen, mg/l	66	190	55
Tartric acid, g/l	2.9 (38 me/l)	3.9 (52 me/l)	4.1 (54 me/l)
L-malic acid, g/l	5.7 (85 me/l)	8.8 (131 me/l)	7.0 (104 me/l)
Turbidity,NTU	100	50	110
Potential alcohol concentration, % vol	10.0	10.0	12.0
Carbohydrates concentration, g/l	166	166	195

Analysis results show a fundamental difference in assimilable nitrogen concentration, ranging from 55 to 66 g/l for Touraine Sauvignon and Melon B but up to 190 g/l for Poitou Sauvignon. Also, the total acidity range from 4,0 g/l in Melon B must up to 6,42 g/l in those obtained from Poitou Sauvignon.

Chemical composition of must, as well as the interactions that occur between pairs of strains involved in every fermentative process influence first of all the duration of the fermentation (table 2).

Table 2: Comparative characteristics of fermentative activity of yeasts

Yeasts strains	Melon B			Sauvignon de Poitou			Sauvignon deTouraine		
	Alcoholic Fermentation, days		Residual sugar before sulfite, g/l	Alcoholic Fermentation, days		Residual sugar before sulfite, g/l	Alcoholic Fermentation, days		Residual sugar before sulfite, g/l
	Latency	Duration		Latency	Duration		Latency	Duration	
1	2	3	4	5	6	7	8	9	10
<i>Saccharomyces cerevisiae</i>	1	20	1.8	2	16	2.0	3	10	1.9
<i>Torulaspota delbrueckii</i>	2	28	1.9	2	25	2.5	4	35	2,0
<i>Candida pyralidae</i> 2%	3	20	1.9	2	23	1.9	3	24	1.9
<i>Candida pyralidae</i> 3%	3	20	1.8	2	23	2.0	3	24	1.9
<i>Candida pyralidae</i> 5%	3	20	1.9	2	25	2.5	3	10	2.0
<i>Metschnikowia pulcherrima</i>	3	22	1.9	2	16	1.5	3	10	1.8
<i>Metschnikowia pulcherrima IFV</i>	4	20	1.8	2	11	1.25	3	10	1.5

Table 2 results shows a difference in duration (days) of alcoholic fermentation carried out with *Saccharomyces cerevisiae* strain in 24 hours, while, under the same experimental conditions, this characteristic for *Torulaspota delbrueckii* and *Candida pyralidae* strains was respectively 48 and 72 hours. In terms of the duration of fermentation of must, it is observed only small deviations

for experimented varieties, being higher in Melon B and quasi identical in the two lots of Sauvignon.

Also, the interactions between strains and the fermentation kinetics will alter (figs 1). The curves of each series had a similar shape to that of the reference sample (seeded with *Saccharomyces cerevisiae*), but the using of *non-Sachharomyces* yeasts increase the latency period because of the concurrence between the strains. *Torulaspota delbrueckii* provides a quick beginning of alcoholic fermentation but towards the end the sugar consumption decrease and the fermentation slows compared to the previous steps. This can be seen in all launched lots. *Metschnikowia pulcherrima*, didn't involve fermentation difficulties in any sample, also its competition with *Saccharomyces* is less noticeable. Regarding to *Candida pyralidae* strain, the graphs are quasi identical, showing that the initial number of microorganisms doesn't involve changes in duration and speed of alcoholic fermentation of the musts. The alcoholic fermentation of Lot Nr2 (Poitou Sauvignon) took place in a higher speed than the other two lots but the curves of lot Nr3 (Touraine

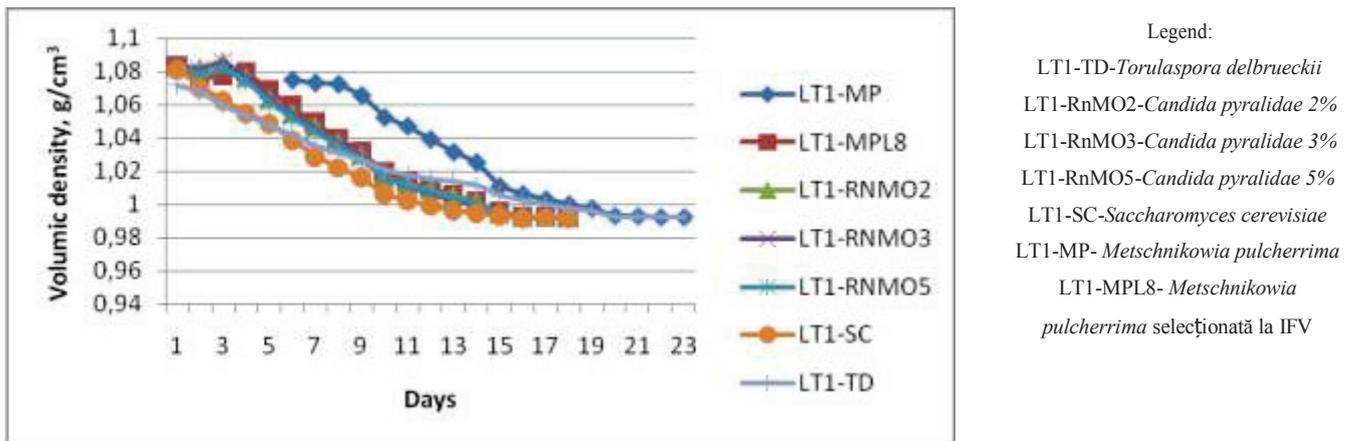


Figure 1: Alcoholic fermentation kinetics of Lot Nr1 (variety Melon B)

Sauvignon) have greater slopes at the beginning, showing that the fermentation speed decrease with the decrease of the content of sugar and increase of the content of alcohol.

A table 3 summarizes the analytical composition of produced wines.

Table 3: Analytical composition of obtained wine from variety Melon B (Lot 1)

Indexes	Melon B						
	<i>Saccharomyces cerevisiae</i>	<i>Torulaspota delbrueckii</i>	<i>Candida pyralidae</i> 2%	<i>Candida pyralidae</i> 3%	<i>Candida pyralidae</i> 5%	<i>Metschnikowia pulcherrima</i>	<i>Metschnikowia pulcherrima</i> IFV
Alcohol concentration, % vol	12.48	12.37	12.43	12.43	12.32	12.79	12.35
Glucose+Fructose, g/l	1.3	0.6	1.2	0.9	1.3	<0.4	1.2
Total acidity (in H <sub>2</sub> SO <sub>4</sub> ), g/l	4.19	4.15	4.02	4.11	4.01	4.10	4.14
Volatile acidity corrected (in H <sub>2</sub> SO <sub>4</sub> ), g/l	0.21	0.51	0.24	0.23	0.23	0.33	0.27
pH IRTF	3.23	3.28	3.25	3.23	3.24	3.24	3.22
L-malic Acid, g/l	5.0	4.1	4.4	4.3	4.5	4.6	4.7
Tartric Acid, g/l	1.4	1.6	1.3	1.4	1.4	1.4	1.5
Total sulfure dioxide (total SO <sub>2</sub> ), mg/l	89	24	113	83	107	14	100

According to table 3, the alcoholic fermentation was finished in all samples (residual sugar <2 g/l). Meanwhile, the alcohol by volume of obtained wines do not show much difference, except the lot seeded with *Metschnikowia pulcherrima*, that the analysis may be supposed an error. The total acidity of samples was within normal limits for the product. Despite the existing opinion, the results show that the seeding with non-*Saccharomyces* do not involve a rising of volatile acidity of wines. Although the sample seeded with *Torulaspora delbrueckii* has a higher volatile acidity than other samples of the same series (0,51 g/l), but its value is within the limits allowed for white wines. The activity of non-*Saccharomyces* yeast involved a high consumption of tartaric and malic acids (reducing concentrations with 1,0-1,5 g/l in relation to the initial content of these acids in must).

The sensorial analysis of wines at this stage cannot give the definitive results on the quality of products but provides an objective opinion on the ulterior development of wine during maturation. The samples do not show important organoleptic defects. The intensity of aroma and taste of the products was determined both by yeasts activity and aromatic varietal potential of grapes. Overall, the most appreciated was the Lot 2 (Poitou Sauvignon) because of more pronounced secondary aroma and a balanced taste (figure 2).

The results of organoleptic analysis are listed in figure 2.

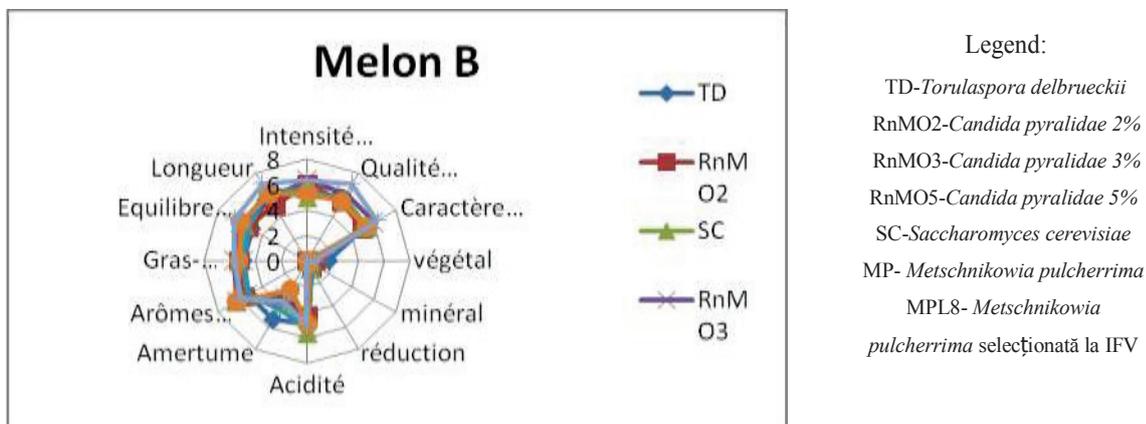


Figure 2: Sensorial analysis of wines (Lot 1)

## CONCLUSION

It was demonstrated the positive action of non-*Saccharomyces* yeasts on the organoleptic characteristics of wines. At the same time, their involvement in fermentation process doesn't achieve an excessive volatile acidity and other defects of aroma and taste. The involvement of non-*Saccharomyces* strains in practical oenology that keeps recent achievements in oenological biotechnologies allows an increase of aroma intensity (floral, fruitful etc.) in varietal wines with preservation of varietal aromas and taste in natural dry wines.

## BIBLIOGRAPHY

1. CLAUDE FLANZY, « Oenologie –fondements scientifique et technologiques», Lavoisier TEC&DOC, 1998, pag. 165-219
2. « Application à l'oenologie des progrès récents en microbiologie et en fermentation », Office International de la Vigne et du Vin. ENSAA Dijon, ENSA Montpellier 1998, pag.171-202
3. RIBEREAU-GAYON J., PEYNAUD E., „ Traité d'oenologie” . Vol I, Paris et Liège, 1960.
4. „ Maîtrise des fermentations spontanées et dirigées”, ITV-Nantes, 2008, pag.26
5. HUET Myriam, LAUZERAL Valérie „ Dictionnaire des vins et alcools” , Edition Hervas,1999, pag. 440
6. Recueil des méthodes internationales d'analyse des vins et des moûts, OIV, volume 1, Paris, édition 2011
7. Alain Poulard, Xenia Pascari, Rapport de stage « Sélection d'une souche non-Saccharomyces pour la fermentation des vins blancs », Institut Français de la Vigne et du Vin, 2013, 54 pages.
8. Gherciu-Musteță Lidia, Poulard Alain, Gore Ecaterina, « Etude de la fermentation alcoolique en flores mixtes sur Melon de Bourgogne », Technical University of Moldova, 2009, 16 pages.

# THE IMPORTANCE OF TRACEABILITY IN CERTIFICATION THE QUALITY OF ANIMAL PRODUCTS

IURCHEVICI LIDIA,<sup>1</sup> CHETROIU RODICA <sup>2</sup>

**Abstract:** *Traceability in Productis system is an innovative approach to verify the origin of food, which will have a significant impact both on final consumers, legislators and producers from the food industry, involving large cost savings. With a food traceability system according to HACCP / ISO 22000, it can intervene and recall from market at any time, precise on lot and batch, entirely and from every point of sale, the product that of a reason or other requests this thing. The traceability is seen as a way of ensuring the control, quality and efficiency.*

**Keywords:** *traceability, food safety, consumers*

## INTRODUCTION

The traceability is the capacity to identify and track a foodstuff, a forage for animals, an animal or a substance intended or expected to be incorporated into a food or a forage, at all levels of production, processing and distribution. In accordance with this definition, traceability is a process that covers the entire supply chain and in which different companies collaborate to optimize the interfaces determined of various directions, domains and sub-processes. Therefore, in our opinion, this is the way to meet consumer expectations in terms of safety and quality of products.

The current food safety policy is based on a number of principles which applied in accordance with the integrated approach „from farm to fork”, specifically include transparency, risk analysis and prevention, protection of consumer interests and the free circulation of safe and quality products in the internal market and in relation with other states. In the food policy in Romania, food safety plays an important role in the global concept of nutrition. Food safety is, for the most part, subject to the environment state and resources: biodiversity; level of pollution; water, soil, resources; climate changes; human factors and globalization. The traceability and quality of meat and meat products are requirements for domestic and European market, which require, in turn, an adequate infrastructure, equipments and service network.

## MATERIAL AND METHOD

Traceability is a solution for the consumer protection, but also an instrument of control and delineation of responsibility. If a product or a greater amount of foodstuff were altered, the producer, through a traceability system, has the capacity to check if the reason is generally related to the entire lot or batch. Or is a situation well defined and precise and the cause of this event must be investigated at dealer: the mode of storage and manipulation, presentation mode and circumstances, exposure etc.

The traceability as a process of the distribution chain, can be conducted in two distinct directions: tracking forward or downward traceability (capacity to locate a product, based on specific criteria, at any point of the distribution chain) and tracking back or ascending traceability (capacity to identify the origin and characteristics of a product based on criteria established in a uniform manner for all points of the distribution chain).

Through the traceability of meat products, are managed and monitored informative data on the origin of the materials, the processing history and deliveries to the points of sale. The meat processing enterprises are involved in a network of chains (livestock, slaughtering, meat transport,

---

<sup>1</sup> Eng. Iurchevici Lidia – Scientific researcher III, The Research Institute for Agriculture Economy and Rural Development, e-mail: lidia.iurchevici@iceadr.ro

<sup>2</sup> Eng. Chetroiu Rodica – Scientific researcher, The Research Institute for Agriculture Economy and Rural Development, e-mail: rodica.chetroiu@iceadr.ro

wholesale trade and detail trade), with common interconnection points. The traceability is referring at projecting and implementation of processes in accordance with the system requirements. According to CAC - Codex Alimentarius Commission 60-2006, traceability means the capacity to track the movement of a specific food at different stages of production, processing and distribution.

## RESULTS AND DISCUSSIONS

The traceability of the food products is done by chaining the information regarding raw material (for example - meat) and secondary on the entire production process. The meat traceability can be achieved because the production process in the meat industry has some major steps and well defined, which differ depending on the recipe and technology.

A sector with major problems in ensuring product and service quality is the production and distribution of food. In this sector was and is needed by many food safety regulations.

Events such as bovine spongiform encephalopathy, the flocks of some Western European countries, dioxin contamination of poultry, swine pest and others, have made European consumer confidence, and not only, in the products they consume, to be seriously affected; consequently, it caused a real crisis on the Unique Market. Therefore, the food security has become top priority to regain the consumer confidence. The beef market was the most affected. To remove the problems in this sector, the European Commission has commissioned a fast form of trace of bovine meat in the distribution chain. Moreover, at the proposal of the European Commission, the Council and the European Parliament adopted a Regulation of mandatory labeling of bovine meat - CE No. 1760/2000 that became mandatory in all EU countries, since January 2001. It complements other Community legislation particularly important, namely the European Directive 820/97 (entered into force on 01.01.2000), which amends, in an irreversible form, the bovine meat chain operation, requiring the parties to link the physical flow of products to the information flow, thus ensuring the traceability of beef. Realizing the complexity of this regulation, the Association of EAN International (EAN - European Article Numbering) by 16 national numbering bodies from Europe, along with 17 other community organizations and European leaders in the bovine meat trade, have made the traceability system „Traceability of Beef” based on barcode UCC / EAN-128 (SREN 799: 1998) and IA application identifiers (SREN 1571: 1998). This system is used worldwide today; it meets all EU regulations and makes possible the quality certification for the enterprises in the meat processing industry. Identification and traceability solutions include the physical flow of animals, intermediate products (carcasses and chopped) and finished products (meat packing) throughout the meat chain. The communication solutions of the EAN system refer to the information flow in the chain. In general, companies are not involved in one chain, but in a network of chains (livestock, meat, retail), with common interconnection points. By traceability of meat products is intended to provide data on the origin and processing history. For this, it is necessary that the meat chain to communicate permanently with the chain of the animals slaughtered to obtain the meat. To ensure a correct, reliable and cost effective application of the EU Directive 820/97, without creating trade barriers, the suppliers of carcasses and cut meat must identify their own products using EAN-128 bar code. Thus, printing the additional information on the package could be integrated in the existing process of EAN-13 labeling.

Also in the food sector, in terms of consumer protection and safety, there have been recorded numerous cases determined of the marketing products with a high content of harmful substances used as food additives, products in which occurred genetic manipulation of organisms etc. All these have determined the community organizations to develop new proposals and elaborate new hygiene rules for the production of food commodities. The chemicals introduced into food as additives were coded by the letter E, followed by three digits. Additives considered as hazardous to the human body (eg: E123, E142, E211) are banned in the EU, USA, CIS.

The European Commission has approved a proposal of the Parliament and the Council by which was established The European Food Authority - EFA, the body which cooperates with FAO, OMS, consumer protection bodies, etc. A topical issue of these Community bodies is to develop

regulations on the traceability of all foods and food ingredients. To achieve the requirements under this principle, the new regulations will require registration of any food business and numbering products. The evidence of suppliers of ingredients, semi-finished and finished food products will be mandatory in all sectors of the food industry. The instruments of EAN / UCC system are fully capable of meeting the requirements of these regulations, for example:

- The numbering system of commercial items and locations allow the safe international identification of commercial items and suppliers;
- Symbolization by the barcodes EAN-13, EAN-8 or UPC-A and UPC-E, and UCC / EAN-128, all accompanied by international standards ISO and European standards EN, enable transposition on labels of information about the producers and providers in standardized format. The concentration of these data using Application Identifiers - AI in barcode UCC / EAN-128 makes possible the traceability of food products. The EAN / UCC system was designed to provide standardized, unambiguous means of identification items and companies operating in different points of the national and international distribution chain. The identification data, traceability, shelf life, etc. encoded in the bar code does not replace the information clearly on the product label. These data must be identical to those listed in clear format on the label.

The traceability of food products is an indicator of the power of company on the food market. Traceability on the production line is according to HACCP / ISO 22000 (risk analysis on critical control points). This indicates the power and compliance of the producing food company that consists in building and strengthening consumer confidence in the own products because it has total control over the traceability both on own production and on the market.

A food safety hazard is any biological, chemical or physical agent present in food, with the potential to cause an adverse health effect. Risk is an estimate of the probability and severity of a hazard, is a function of probability of an adverse effect (an item of microbiological, chemical or physical nature) on the health and the severity of that effect (death, hospitalization, absence from work, etc. ). The risks are often encountered in the activities with food products, when food may endanger the public health. The major risks must be distinguished from the minor.

**A risk is major if:**

- There is an increased probability that „risky” food to be consumed
- The emergence of risk has serious consequences for public health (eg. glass shards in jam, nails, wire in the bakery products)
- There is an increased probability that consumer health will suffer from it.

**Typical critical control points are:**

- A metal detector to identify fragments of metal in the finished product.
- A stage of heat treatment specifically projected to destroy pathogens or to adjust the pH of acidified products, in order to control the pathogens.

**Establish critical limits**

- Critical limits are the criteria that distinguish between „safe” and potentially „unsafe”, are defined by law, safety standards and values scientifically demonstrated and represent measurable parameters that can be determined and monitored. Monitoring requires a systematic measurement or observation of the critical control point regarding the critical limits. Examples of factors that must be defined before the start of the monitoring procedure:

- Approach - check the expiry date, the cold store temperature and storage period
  - Frequency - weekly or daily if necessary
  - Responsibility of the economic operator, kitchen manager, chef
- The establishing of the procedures that are performed regularly and operate efficiently is based on:
- Verification: Confirm the correctitude of something by control
  - Verification of HACCP system (Hazard Analysis of Critical Control Points) through its operating capacity.

- It is confirmed that the activity involved by the HACCP program is carried out effectively, correctly and logically.
- The process must be checked at least once a year and between periods of change procedures or compositions. An example of change would be to extend your range of products which involves adding new operations.

For storing full records to prove for example the efficiency or for the inspection of the representatives of authorities, all HACCP stages must be documented.

In addition, the HACCP concept is a valuable tool that brings to consumer evidence if there are complains or even food poisoning.

HACCP documents must be retained even after expiring of the product, without exception.

Food business operators are legally required by EU legislation:

- to show the authorities that respects the principles of HACCP
- to update procedures / documents of the food safety system, whenever changes occur (eg. a new recipe that requires a new technological flow and different process parameters)
- to keep the documents and records for an appropriate period

With a food traceability system according to HACCP / ISO 22000, it can intervene and recall from market at any time, precise on lot and batch, entirely and from every point of sale, the product that of a reason or other requests this thing. The traceability is seen as a way of ensuring the control, quality and efficiency. Traceability in Productis system is an innovative approach to verify the origin of food, which will have a significant impact both on final consumers, legislators and producers from the food industry, involving large cost savings.

## CONCLUSIONS

The food sector enterprises that want to maintain or strengthen their market position, must take drastic measures in the future to ensure quality, traceability, logistics efficiency and information sharing.

By applying these measures is aimed at:

- database on production, processing, marketing of food products;
- sustainable increasing of internal production of food by reducing the risks, dangers and losses throughout the production chain to the consumer and minimize as much as possible the food waste;
- preventive security by supporting distributors and consumer confidence for products sold;
- possibility of safe operation in the event of irregularities of the product (retrieval and withdrawal of goods, or locating the source of the problem, to prevent its spreading);
- delimitation of responsibility in the traceability chain;
- the shipping code using - SSCC - as key in the logistics processes to ensure better traceability.

The paper will have a positive impact in terms of technical, also on the economic agents, in terms of increasing the quality of food offered to the market, by compliance with the techniques and application of technologies recommended by adopting traceability system and ensure compatibility with other systems at national and international levels in order to ensure transparency and confidence with the business partners.

## BIBLIOGRAPHY

1. Eugenia Alecu și colaboratorii , Trasabilitatea – element cheie al transparenței Editura Ceres, București, 2010;
2. Mariana Grodea (2013), coautor Cap. Piața laptelui în România – evoluții și tendințe post-aderare, publicata în Determinanți economici, sociali și instituționali ai performanțelor și securității alimentare, Păun Ion Otiman, Filon Toderoiu, Elena Sima (coord), Editura Academiei Române, București, 604 pagini, pag. 301-316, ISBN 978-973-27-2367-8;
3. INFO EAN ROMANIA, Buletin trimestrial de informare, Editura GENICOD, București, Colecțiile: 2002, 2003, 2004, 2006;
4. Istudor Nicolae, Proiectarea unui sistem informațional pentru monitorizarea trasabilității în producția cărnii de porc, București, 2010.

## RISK ANALYSIS IN THE CRITICAL PIGMEAT CONTROL POINTS

ANCUȚA MARIN<sup>1</sup>

**Abstract:** *The pig meat is of particular importance in human food due to the high content of vitamins and minerals. To prevent the hazard of microbial contamination, physical contamination, chemical contamination, etc., before slaughtering and during slaughter of animals has been developed and implemented the system Hazard Analysis by Critical Control Points (HACCP).*

**Keywords:** *pork meat, HACCP, organoleptic indices, contamination hazard*

### INTRODUCTION

Meat is particularly important for the proper functioning of the body due to increased protein content and quality of minerals. Fats from pork meat has a high caloric content, while lean pork is a good source of protein, iron and zinc and contains a small amount of sodium.

Pork is a good source of vitamin B1, with the highest concentration among all types of meat. Pigmeat has a higher amount of saturated fats comparing with unsaturated fats and an increased content of linoleic acid, involved in the fight against cancer and cardiovascular diseases. Iron, zinc and D vitamin available in pork are easily assimilated by the body. It must be said that the described benefits are for lean meat and is recommended to avoid fatty meat and pig meat products that contain a high concentration of fat.

### MATERIAL AND METHOD

The H.A.C.C.P. (Hazard Analysis and Critical Control Point) is a scientific approach to the process of control in general and the process of autocontrol in particular. The H.A.C.C.P. was designed in 1960 to prevent the biological, physical or chemical contamination for meat and meat products.

Food Safety and Inspection Service (FSIS) published final Regulation in July 1996, mandating that HACCP to be implemented as a process of the control system in all pork processing businesses inspected. Also, FSIS has developed generic models for each process, models which can be used on a voluntary basis by companies inspected.

The approach of a H.A.C.C.P plan in the units of meat industrialization and meat products will be a modern method of self-control and analysis, which aims at keeping food innocuousness (property of a physical, chemical, or biological agent, not to be a danger for the body) and eliminate the adverse effects over the health status of the consumer due to non-compliant food.

Generally, meat products, by their composition (protein, fat, vitamins, minerals and moisture) and the whole chain of processing, storage and disposal, fulfill favorable conditions for contamination and possibilities of transmitting certain pathogenic microorganisms with adverse effects on the health of the consumer.

Preliminary conditions for implementing of self-control based on HACCP in the units of this type are imposed ever since the design and construction of the unit, from the materials of which it is built, the location and proper water supply, to the place of the pipes and plumbing, that, by design, avoid crossover between salubrious and insalubrious portions of these facilities.

To avoid events related to physical risk, glass components require protection (lighting devices, windows etc). As is known, the existence of lockers "filter type" is mandatory in the meat industry; they are intended for separation of personal street clothes and of the protective equipment (working). Wearing the protective equipment will be carried only after a proper body hygiene of staff (mandatory shower).

---

<sup>1</sup> PhD. Ec. – Research Institute for Agriculture Economy and Rural Development, e-mail: marin.ancuta@iceadr.ro

In the crossing space, at the exit/entry workspaces (sections) there will be floor mats imbued with disinfectant solution or disinfecting pools for rubber boots fitted with water jets for footwear washing. Adequately equipped sinks for washing and disinfecting hands will be also installed.

State of health of staff will be monitored at the entrance to the station by an official (head of department). There will not be accepted workers with injuries and infected wounds on the hands (unprotected) or carriers of contagious diseases (diarrhea in particular). Health status will be checked and tested with documentary evidences of the periodic medical examination. Operations of cleaning, washing and disinfection will be carried out after a well established schedule and whenever necessary. Both microbiological water quality and the effectiveness of the washing and disinfecting of the working surfaces, machinery and utensils will be checked periodically by laboratory tests (hygienic tests, sanitation tests, alkalinity tests).

Staff will be trained and formed to comply with good working practices and hygienic and sanitary conditions in their daily work, related both to condition of the equipment of protection and rules of proper food handling.

Monitoring methods will be extended to the immediate vicinity of the unit being controlled cleanliness of the outer zone to eliminate the possibilities of development and propagating rodents. Supervision will refer to municipal waste landfills for which there will be a firm periodic evacuation schedule. It will be taken in consideration measures against insects and rodents, all according to established programs and their effectiveness will be reviewed.

To control and supervise all hygienic and sanitary conditions will be designated a person in charge who can follow the company hygiene compliance, which is usually HACCP team member. The main goal of all measures initiated by this person will be to avoid contamination or re-contamination of these products. He also will be responsible for the operations of washing and disinfection of means of transport and delivery. It will follow the water for washing, to have for auto means, temperatures above 80 ° C, their refrigeration system will be checked regularly, and for this vehicles, to be authorized by the competent health authorities.

To prevent the contamination hazard an important role has the study of the documentation relating to the evaluation of quality of pork meat and products. The most frequent possibility of contamination of pork meat is associated with bacterial risk source that is represented by a sick animal at slaughter and subsequent the contamination after slaughter. To prevent the contamination from human carriers of germs, rodent, insect, or from water used, or from dust, animal health issues at slaughter is the responsibility of the veterinarian while checking meat and meat products is the responsibility of ANSVSA.

Control team H.A.C.C.P. will be responsible of achieving the technological flow diagram (schematically), which will clearly outline each technological step that will move a product from raw material receipt to delivery of the finished product.

Broadly, production of meat preparations includes the following:

**1. Reception of raw materials and ingredients.** Harmlessness of the finished product will depend on the microbial load of raw materials and ingredients used, as well as their association with certain chemical risks. Establishments producing meat uses especially beef and swine. Cattle and pig meat comes dried, chilled and frozen. The reception consists in the general examination of meat and meat marking control. The product will be accompanied by sanitary documents - proving harmlessness of product (meat) and that it comes from healthy animals. Stamp on pig carcasses indicates that they have undergone examination for trichinosis and that the animals were healthy. Even if through a strict control can not eliminate risk, especially microbiological the control is a guarantee of reducing these types of risks to acceptable limits. Parameters monitored will be the temperature of the meat at the reception and organoleptic examination of meat as a sensory way of establishing of its freshness condition. Controlling hygienic and sanitary conditions of transport means of the meat will be important in selecting the supplier and the prevention of contamination.

The reception will appreciate meat organoleptic indicators based on the parameters listed in Table 1.

Table 1

MEAT ORGANOLEPTIC INDICATORS			
ASSESSMENT INDICATORS	FRESH MEAT	MEAT RELATIVELY FRESH	TAINED MEAT
Aspect	The surface covered with a dry film, in the section: bright, light humid	Surface covered with a hard shell, or a wet layer, sometimes mucus; in section: wet with turbid juice	Dry or sticky surface; very sticky in section;
Colour	On the surface: pink to red; in section: red characteristic of the breed and of the anatomical region	Matte at surface and in section	On the surface: gray or greenish; in section: is discolored or like on the surface
Smell	Pleasant, characteristic of breed	Sour, slightly pungent, of mold;	Rotten, unpleasant
Fat	In cattle, white or yellowish, hard consistency; white or pink for pigs, soft, elastic; White for sheep and compact; characteristic odor	Matt appearance, consistent, less firm. Strong smell of stale, stifling	Gray; sometimes mucilaginous or mold surface; rancid odor
Bone marrow	Elastic, glossy; in section completely fills the intramedullary canal	soft; in section mat, sometimes light gray; detach from the intramedullary canal	Soft, gray dirty, does not fill the medullary canal
Tendons and joints	Glossy, elastic, strong, clear synovial fluid	Mate, soft, covered with mucus, turbid synovial fluid;	Gray, covered by mucus, lot of turbid synovial fluid.

**2. Storage of raw materials and ingredients.** After the reception, pork meat is stored in refrigerating rooms at temperatures of 2 to 4°C for cooling purposes. At this stage, it will monitor the storage temperature, which will have as upper limit the critical value of 4°C.

**3. Cutting, deboning and meat choosing.** In the industrial establishments preparing the meat and meat products from the European Union, due to the fact that also slaughterhouses have implemented HACCP self-control begins with the cutting of meat, the stage must comply very strict hygienic and sanitary conditions. Air temperature in the cutting and boning chamber must be within 10 ° C. The second parameter that requires monitoring is the process of cutting. It is good that the whole process of cutting does not exceed two hours duration in order not to be real possibility of multiplication of microorganisms existing cryophilic. It is recommended that each worker to be equipped with two knives. Working knife for carcass and a second knife in a bowl with 1% chloramine for disinfection. Process will resume cyclically with changing utensils used and disinfection after each cutted carcass.

**4. Meat salting.** Pigmeat will be salted with a salting mixture. Salting operations will strictly comply with technical rules that indicate what quantities to use each of these ingredients.

The mixture of salt and saltpeter will be made only by the laboratory and the content of nitrates and nitrites will be periodically monitored by the laboratory, since nitrates and nitrites, when not respected the recipe, represents a significant chemical risk.

The mixture of nitrates and nitrites is added both for the color preservation of the product after heat treatment and especially as a prophylactic method for the prevention of botulism.

This stage is encountered only in cold cuts manufacturing technology.

**5. Organoleptic examination** will follow the color temperature foaming rinse the taste smell and flocculation. (Table 1).

**6. Chemical examination** will follow the pH content of ammonia, salt and nitrite content. Areometric will be determine the brine concentration.

**7. Grist and minced meat paste preparation and storage.** Grist means meat meal selected, cut into pieces of 6-10 cm salted and stored in a refrigerator for maturing. Pieces of meat can be minced through the screen and then put in trays in the refrigerator to speed up the process. The storage should be carried out in refrigerated rooms at 4 ° C for 24-72 hours. It is advisable not to exceed 72 hours time or to use meal before switching to 24 hours of production. Minced meat paste (bradt) is a paste finely chopped from meat mixed with salt and water so that they form a thick paste for meat and water, which is still stored in refrigerated space for maturing. This paste is used to bond the composition of the majority of sausages. Water for preparation of the minced meat paste (bradt) must be as cold as possible during processing because in the meat cutter temperature increases so much that "bradt" "cut". minced meat paste (Bradt) is stored at the same temperature for a period of at least 48 hours, but preferably within 72 hours. During maturation, minced meat paste became "bound", is thickened, it changes color from pink to red and it catch a glossy darker crust at surface, its appearance after 72 hours is a good indicator for assessing quality. Grist and Bradt, refrigerated for maturing, are used to prepare the paste (in the wolf). The operation consists in mixing different proportions of meat, fat and spices to obtain sausage processors. It is recommended that, at this stage, to be determine in the laboratory the ammonia and hydrogen sulfide content, as well as the pH. If the test results are inadequate, the blank should be removed from production.

Once prepared the composition is introduced into membranes, after which the membranes binds such that the composition can not escape from it. Filled membranes are hung on sticks washed and disinfected. Binding bars must be manufactured carefully in order sausages not to fall down during the smoking process or boiling. It is recommended that thick sausages to be pierced to remove the air from them.

Heat treatment (smoking hot, boiling, cold smoking) is performed in the same rooms that have control devices which allows the monitoring. In view of the fact that the heat treatment leads to the elimination of microbiological risk, this step is typically a critical control point in which the temperature and duration should be monitored.

Hot smoking: Cubicle load must be controlled to be done correctly. The red color of membranes is an indication that the hot smoked is finished, the product is elastic. This process increases the keeping quality of the product. Wood and sawdust used for hot smoked should be a hardwood and not moldy.

During boiling, the temperature should be monitored frequently. When boiling is done at low temperatures will not succeed in eliminating or reducing pathogenic germs, so that both the boiling point and the duration should be monitored. After boiling some assortments (mortadella, hot dogs) should be cooled in the shower, so as not to wrinkle. Cooling is done until salami reach temperatures of 40-45 ° C and products that are not smoked shall be kept in refrigerated warehouses. Cooling must be carried out as quick as possible.

Half smoked sausages must be cold smoked. The operation aims pronounced drying and smoking them because by lowering humidity increases keeping quality of the product. After cold smoking, sausages acquires a reddish-brown color and a characteristic luster.

Some products follows another technological flow. Meat specialties (bacon, gypsy tenderloin, smoked specialties etc.) are salted after cutting after previously were well chilled. Salting is done all with a mixture of salt, nitrates and nitrites. Brine salting is done by injecting brine into the meat, either by placing meat in brine pools. Brine should be clear, no foam, no sour taste. At this stage it controls the amount of salt in salted meat and nitrites and it is performed a bacteriological exam as a control method. After salting, the products are rinsed with water, shaped cut and tied (gypsy tenderloin). At the boiling of products will be monitored temperature and duration of boiling, depending on the size of the products. After boiling products are pressed to eliminate voids are trimmed and gypsy tenderloin is smoked.

**8. Checking the finished product.** At the introduction of self-control management, product harmless examination by the method of rapid tests (pH, temperature, duration) is completed with the determination of ammonia and hydrogen sulfide, and periodically checking will be done by determining pathogen agents. Along with organoleptic examination will be made also determinations regarding technological control.

**9. Storage and delivery.** The finished products are stored in refrigerated rooms at a temperature between 0°C and 6°C in the case of fresh meat . Fresh meat shall not be kept for more than 4 days until consumption and smoked or half smoked sausages are kept hanging, without touching each other, at temperatures of maximum 10°C in dark warehouses, dried, well-ventilated and ventilated. The appearance of mold can raise issues of biological contamination. Rooms where meat products are stored are disinfected at least three times a year with lime chloride solution of 1% or chloramine.

## RESULTS AND DISCUSSIONS

Failure to implement the protective measures provided by the HACCP plan involves significant risks to human health namely:

### 1. The risks of contamination by microorganisms

**A. Microorganisms that affect the animal or carcass.** This category includes the bacteria. For this reason, studies have been made in close connection with the flow technological the product. For pork main specific pathogens are:

**1. salmonella.** Salmonellosis is the disease most commonly occurs in animals. Salmonella can contaminate both animal by ingesting feed and water, and meat, which makes the illnesses caused by them to prevail among food-borne. Carcass contamination is done by the contamination of from carcass already contaminated. To avoid contamination of meat with Salmonella during cutting is recommended to apply the following preventive measures:

- temperature regulation of cutting rooms below 10 ° C, which will lead to stopping the multiplication of Salmonella existing on work surface or carcasses;
- introduction to cutting only the carcasses cooled at temperatures below 6 ° C;
- washing and disinfecting cutting rooms after each shift.

All these measures will not prevent Salmonella contamination of meat, but will reduce it. From the above it can be deduced that the essential measure remains holding carcasses at temperatures below 6°C, the temperature at which salmonella multiplication is much diminished.

**2. Clostridium.** Clostridial reach the meat from the surface of animals (fur, leather) from the feces and not properly sanitized environment, or from the environment in which animals are cut, the meat is stored and handled. For animals slaughtered in accentuate tiredness status, those eviscerated later after bleeding, clostridium along with other clostridial bacteria from the digestive tract can penetrate deep muscular masses.

**3. *Staphylococcus aureus*** can contaminate carcasses frequently since obtaining them, or later when meat suffer more handling. Various pathogenic bacteria can come from the hands of personnel injuries. Staphylococcal toxin is thermostable, can not being destroyed by heating, and its presence in food can cause foodborne disease.

**4. *Campylobacter jejuni*** is quoted more often in recent years as a frequent contaminant of meat, being a criofil germ. At temperatures below 10°C, will continue to multiply. For these reasons, chilling of carcasses must be carried out as soon as possible after preparation. For these reasons it is recommended as a critical limit temperature monitoring to preserve carcasses before cutting, 5°C. This temperature value will help reduce microbiological risk without eliminating it.

**B. Pathogenic microorganisms contaminating frozen meat.** During the freezing process, a small amount of pathogenic microorganisms present on fresh meat are destroyed. During storage of frozen meat to freezing temperature, reducing the number of microorganisms will continue, but more slowly. Bacteria the most sensitive to these temperatures are Gram-negative bacteria and bacterial spores will remain unaffected. During defrosting the number of bacteria on the meat surface cryophilic increases about 100 times. Defrosting with hot air or hot water, favor the multiplication pathogenic germs, increasing the bacterial risks associated with product and leading to adverse impacts on the health of the consumer. Maintaining the storage of meat frozen at a temperature of -5°C to -10°C can lead to proliferation of pathogenic mold. Pathogenic germs are the same existing on meat before freezing but after freezing only reduces their number. We emphasize that the spores are resistant to freezing. A particular aspect is provided by *Yersinia enterocolitica* which is able to grow and multiply at a temperature of about 0°C and also grows well in vacuum conditions. For these reasons, during thawing process, more attention should be paid to cryophilic flora.

**C. Pathogenic microorganisms from meat products heat treated by pasteurization.** Preparations of this class (smoked and precooked) that is heat treated by pasteurization at a temperature of 70 ° - 75 ° C while maintaining the temperature in the deeper layers for a period of at least 10 minutes. In all products that are heat treated, spores bacteria of the genus *Clostridium* can survive. To prevent contamination of these preparations are added preserving agents. Among the pathogens that can be found in meat products and may trigger foodborne disease we emphasize: *Salmonella* and *Staphylococcus aureus*. *Salmonella* can survive in these products (mortadella, salami, half-smoked) when they are heat undertreated. It is recommended as a critical limit for the thermal process the value of 70°C and to maintain the product at this temperature for at least 10 minutes. For these reasons it is recommended for the verification of the compliance with heat treatment operations, to determine the following pathogens:

- at meat and salted products, fermented and dry will be determined *Staphylococcus aureus* (which must not exceed 10 / g immediately after processing);
- boiled meat products will be determined as pathogens: *Salmonella*, *Staphylococcus aureus*, and *Escherichia coli* *Clostridium perfringens*. The presence of *Salmonella* and *Staphylococcus aureus* reveals improper heat treatment or subsequent contamination (personal, work surfaces);

**D. Pathogenic microorganisms found in the meat half-canned.** HACCP team must have in sight pathogenic bacteria with high potential risk on canned meat. Internationally, the following bacteria are considered dangerous for their large epidemiological implication: *Salmonella*, *Shigella*, *Staphylococcus aureus*, *Clostridium botulinum*, *Clostridium perfringens*. Preventive measures in wards obtaining half-preserved meat will be especially targeted to prevent their contamination with bacterial species mentioned above. Depending on the possibility of contamination with microorganisms, certain preventive measures are required: veterinary examination before slaughtered, land disinfecting solution of potassium permanganate or sublimated, meat sterilization by boiling, autoclaving, brine, permanent pest control in farms pigs, confiscation.

## II. The risks of contamination by viruses

**1. Foot and mouth disease** is a disease caused by a virus present in cattle, sheep, pigs etc. The man infected by contact with the contents of the vesicle from the animal, meat or organs by consumption. The virus persists for 6 months frozen meat, salted meat products 2-3 months. Acidity destroy the virus. Prophylactically when cases of FMD is observed among animals sent for slaughter, the whole batch will be slaughtered in the sanitary slaughterhouse. Meat from these animals will be sterilized by boiling and delivered so to the meat industry.

**2. Q fever or Pneumoretziosa** is a disease caused by the *Rickettsiaburnetti*. Man can become infected from sick animals. Suspected diseased animals are seized and treated and slaughtered only in the sanitary slaughterhouse. Damaged meat and organs are released after sterilization for technical industrialization.

**III. The risks of contamination by parasites.** The main consumer parasitic diseases transmitted by meat consumption are:

**1. Trichinosis** - *Trichinella spiralis* is a small roundworms (2-4mm), hardly visible macroscopically. In the adult state is the parasite of the small intestine, while the larval form is localized in the muscle where encysted. *Trichinella spiralis* is a parasite of man accidentally also appears in pigs, rats, dogs, cats, and wildlife bear, fox and wild boar. Man ingesting meat infected with larvae trichinella becomes ill of the so-called trichinosis. Encysted larvae are released in the intestine from cystic envelope and within 24 to 48 hours, become adults, male or female. Maturing process takes place in a period of about 8 days from the ingestion of infected meat. Subsequently from eggs are released larvae in the intestinal mucosa, where they migrate either lymphatic or venous, throughout the body. Typically, larvae affects muscles with increased activity, diaphragm, intercostal muscles, neck muscles and muscles of the extremities, being localized near the tendon. In about two weeks the larvae grow, reaching their final size. Due to its size, is spiraling and is coating with a cystic surrounding that isolates the larvae. *Trichinella spiralis* cyst closes 1-2 larvae then calcify. Such encapsulation larvae may remain viable and infesting for a period of time up to 2-3 years. In animals, the larvae remain alive, and if their meat is consumed by humans or animals, the cycle resumes.

Trichinosis is a zoonosis whose prophylaxis for humans depends on good organization of veterinary measures, of meat control using trichinosis exam, compulsory in all slaughterhouses. Practice has shown so far that incidents in our country were caused by cutting the animal in households conditions or less from consumption of meat from wild animals (bear, boar). Since the main vector of spread of trichinosis is represented by rats that devour each other, especially in the pig farms using pest control methods that performs better, will prevent animals infestation. Thermal processing of the meat to a minimum 77°C, within the pieces of meat, will prevent disease. Must be avoided consumption of raw meat, or meat derived from veterinary uncontrolled cutting. *Trichinella* larvae have a good resistance to cold, even living at -12°C for 2 months and at -15°C for 3 weeks. Salting and smoking methods fail to destroy the larvae from depth and larvae, is therefore, recommended for exposure to boiling for 30 minutes per kg of meat.

**2. Cysticercosis** is a disease caused by the larvae of *Taenia saginata* and *Taenia solium*. Infection in humans is through ingestion of meat, vegetables, fruits, salads, etc., unwashed and contaminated with tapeworm eggs. From egg are formed larvae or cysticercus. Larvae localize in skin or muscle tissue. Worst forms occur when larvae are localized in the brain, causing brain compression, cardiac level and pituitary level. To prevent contamination is necessary to take some measures to avoid infections such as: detection and treatment of patients, mandatory control of meat, washing fruits and vegetables, avoid use of contaminated water for irrigation agriculture, destruction of eggs and larvae by boiling and scalding.

**3. Hydatidosis or echinococcosis** is the larval form of *Taenia echinococcus granulosus*, which is parasite in the small intestine in some domestic animals such as cats and dogs. Infected dogs eliminate with feces, a large number of eggs, which, in the external environment can withstand at low temperatures for about 1-2 years. These eggs can reach accidentally in meat. Man can be infected only on oral way with eggs. It is obvious that preventive measures must aim: banning dogs and cats in slaughterhouses and farms, veterinary inspection of meat and animals.

**IV. The risks of chemical contamination.** Such risks can be harder to control through HACCP. If HACCP team can control and prevent risks arising from the use of food additives (nitrates - nitrites), the specialists will control and eliminate more difficult, or to reduce to acceptable limits, chemical hazards caused by environmental pollution (water, air, soil) or by industrial pollution. Among chemical risks associated with meat and meat products recall: pesticides, antibiotics, detergents, mycotoxins, etc.

**V. The risks of physical contamination.** They come from technological operations represented by: glass, stones, bone chips, closing clips, bits of packaging, pieces of metal, paint particles etc.

## CONCLUSIONS

This paper brings to the attention of interested parties (producers, processors, consumers) quality control criteria of pork and pork meat in accordance with the HACCP system.

Systematization of the controls based on HACCP system in slaughter plants and industrialization of meat and meat products, specifying methods to prevent contamination with microorganisms, viruses, parasites, chemical and physical contamination of meat and pork, as well as their presentation, have the role of inform correctly and to the point the workers in the industry and consumers about the dangers that can occur in the technological flow, helping to reduce the incidence of diseases.

## BIBLIOGRAPHY

1. Boboc Dan - *Analysis of product quality*, Economic Tribune Publishing House, Bucharest, 2002
2. Canelea Daniela-Cristina - *Capitalizing upper housing part and pigmeat by creating new products*, PhD Thesis, USAMV, Bucharest, 2007
3. Dobre Iuliana - *Management of the structure in agricultural holdings production*, ASE Publishing House, Bucharest, 2003
4. Gottschalk P. – *Strategic Knowledge Management Technology*, Hershey, PA Idea Group Publishing, 2004
5. Istudor Nicolae coordinator - *Designing an information system for monitoring traceability in pork production*. Grant Agreement signed with the Ministry of Agriculture and Rural Development, Bucharest, 2010
6. Popescu D and collaborators. - *Zoo-hygiene and environmental protection*, Didactic and Pedagogic Publishing House, Bucharest, 1981
7. Sen A., Jacob V.S.- *Industrial strenght data warehousing: Why process is so important and so often ignored*, Communication of the ACM, 1998

## ANALYSIS OF SUNFLOWER PRODUCTION, AT MACRO AND MICROECONOMIC LEVEL. CASE STUDY

GEORGIANA ROTARU, MARIANA NĂSTASE<sup>1</sup>

**Abstract:** *In this study, the production technology of sunflower crop was analyzed, by comparison, in Calarasi county and a company located in Baragan area. The technological system components were analyzed regarding the technology of sunflower crop, practiced in the farm subject to the case study, namely: crop rotation; tillage; fertilization; seed and sowing; maintenance; harvesting. These components are joined by labor force and equipment used, materials and supplies consumed, way of organization and of course, corresponding costs. Also, the study is elaborated by passing from the national plan, to the county medium plan (Calarasi county) and micro, for the studied company with reference to surfaces, production, financial and economic results. The analysis made at macro and microeconomic level highlighted the importance of compliance with the technology fiche plan and with the crop and soil requirements, in terms of materials used, with particular emphasis on varieties and hybrids recently established on the market, which bring great production increases.*

**Key words:** *technology fiche, efficiency, average production, gross margin, crop technology.*

### INTRODUCTION

For the application of some modern technologies in the farms, there are framework technologies on crops, which set out the component technical works, with general parameters to execute them. The framework technologies adapt to the local specific climatic conditions in each farm.

In determining technologies it is considered that the same average production can be achieved by using several technological options, convenient in terms of satisfaction of the plant requirements, but not equivalent in terms of economic efficiency; it requires the use of technology in unity and interdependence of technical and economic aspects. [5].

Regarding the technical aspect, we can say that the works and resources have been designed to create favorable conditions for the growth and development of plants and for obtaining some high productions per area unit.

The economic side highlights the economic effort to allocate resources and to perform works in order to achieve higher productions on area unit, with low power consumption, minimal cost, unit cost and higher profits per hectare. [4].

### MATERIAL AND METHODS

The analyzed production technology in the studied companies focused on sunflower crop. All crops were mentioned successively, by: establishing the economic and plant importance, favorability areas, description of the period of vegetation, seeding, harvesting, the main varieties used, quality conditions, description of work processes by characterizing the necessary manual and mechanized labor force, agricultural machinery, materials recommended for achieving optimal quantity and quality.

The study focused on the analysis of data provided by SC Ildu Ltd, Vâlcelele commune, Calarasi county, on the data of achievements of INCDA Fundulea, as well as other specific publications in the specialized literature and scientific articles in the analyzed databases [3,4]. In analyzing the production technology of the crop, the following economic and technical indicators were used: average production per hectare (kg/ha); average production for an analyzed period; income per hectare (V), (lei/ha); direct costs per hectare (Ch d) (lei/ha) as a result of direct costs

---

<sup>1</sup> PhD University Assistant Georgiana ROTARU, PhD University assistant Mariana NĂSTASE, University of Agronomical Sciences and Veterinary Medicine Bucharest, Calarasi subsidiary

incurred in the crop technology; Gross margin ( $MB = V - Ch d$ ); coefficient of variation; confidence limits for risk; determination coefficient and correlation coefficient.

## RESULTS AND DISCUSSIONS

The sunflower crop has a special significance in our country; therefore, the crop is spread over large areas, being appreciated in areas with difficult climatic conditions. The sunflower fruits (*achene*) contain a of 50%, oil with exceptional food quality and high conservation degree; they are used in human food (*refined*) and in the food industry (*margarine, cans, soap, lecithin phosphatides, etc.*) [8]. The sunflower can be placed in rotation after autumn or spring cereals. It is not recommended sowing sunflower seeds after sugar beets, alfalfa, Sudan grass, as they dry ground strong and deeply. It is not recommended also to sow sunflower after rape, peas, soybeans, beans, as these crops have many common diseases (*Sclerotinia, white and grey mold, etc.*). The sunflower in crop rotation should lie on the same field not earlier than 7-8 years, in order to prevent the accumulation of soil in the seed of broomrape (*Orobanche*) and infectious diseases. It is interesting that, by the established eco conditions compliance, the sunflower should not be grown on the same site (plot, sub-plot) for more than 2 consecutive years, because it extracts from soil large amounts of nutrients and it promotes proliferation of some weeds, pests and specific diseases [8]. We believe that the failure of this condition encourages the exhaustion of the soil, in order to achieve some short-term profits by growing large areas of sunflowers. The land preparation is done in autumn or spring by superficial work in order to keep water reserve in the soil. The seedbed is prepared in a single pass with total grower or combiner, before sowing, at a depth of 5-6 cm. The germination capacity; minimum 95%; need for seed - 3.5-5 kg/ha (for an optimal harvest density of 30-50 thousand plants/ha); 5-13 thousand seeds per kg. The age of seed: you have to take into account the water reserve in the soil, the pressure of pests and diseases, weed pressure and used variety. The optimum time of sowing is in spring when the soil at 4-6 cm seeding depth recorded a temperature of 6-7 degrees. The density is determined depending on the biological potential of the variety, quality indexes seed and plant health, sowing time, seedbed quality and pressure of diseases at increased. Early hybrids 52 000-55 000; mid early hybrids 50 000-53 000; tardy hybrids 48 000-50 000; weight of 1000 grains: 50-80 g. Seed quantity per hectare: 3.5-5 kg. Seeding depth: 4-6 cm. The harvesting begins when seed moisture content is 15-16%. It is not harvested at full maturity due to large losses by shaking. The production can be obtained up to 4000 kg/ha [8]. Following the evolution of grown area (Table 1) with sunflower, an increase of 27% in 2013 compared to 2008.

Table 1 The evolution of the surface, average and total productions at sunflower crop at the country level, for the period 2007-2013

Specification	UM	2008	2009	2010	2011	2012	2013	Average (kg/ha)	$\delta$ (kg/ha)	c (%)
Surface	Thousands ha	835.9	813.9	766.1	790.8	995.0	1064.8	877.8	81.4	9.3
	%	100.0	97.4	91.6	94.6	119.0	127.4	X	X	X
Average production	Kg/ha	654	1437	1433	1597	1798	1313	1372.0	354.9	25.9
	%	100.0	219.7	219.1	244.2	274.9	200.8	X	X	X
Total production	Thousands to	546.9	1169.7	1098	1262.9	1789.3	1398.2	1210.8	363.5	30.0
	%	100.0	213.9	200.8	230.9	327.2	255.7	X	X	X

Source-\*\*\*MADR,2014, *Techincal plants*, <http://www.madr.ro/ro/culturi-de-camp/plante-tehnice.html> [9].

The average production per ha in the country has experienced remarkable growth, from 654 kg / ha in 2008 to 1798 kg / ha in 2012, with a variation around the average production (1372 kg / ha) of 25.9%. Calarasi county lies entirely on the plains, for which agriculture is the main economic activity, which is mainly oriented to the crop production. In Calarasi county, the main field crops are wheat, barley, maize, sunflower, canola, soybean and field vegetables [2]. During

2000-2013, the surface of grain cereals increased by 5.5% from 252,587 ha in 2000 to 266,574 ha in 2013 [1].

In the large agricultural companies crops generally prevail that have a high degree of mechanization, because of labor force shortages. The agricultural associations and family households [3], which have sufficient labor force, plants are grown which require even under advanced mechanization conditions, high consumption of labor (vegetables, sugar beet etc.).

Table 2 The evolution of average sunflower crop in Calarasi county, during 2000-2013

Specification	MU	2000	2005	2010	2013	Average (kg/ha)	$\delta$ (kg/ha)	c (%)
	kg/ha	869.1	1338.1	1669.0	1909.3	1446.4	314.3	21.7
Sun flower	%	100.0	154.0	192.0	219.7	X	X	X

Source: \*\*\*I.N.S.,2014, Territorial Statistics, Territorial Statistics \_2014.pdf Adobe Reader[1].

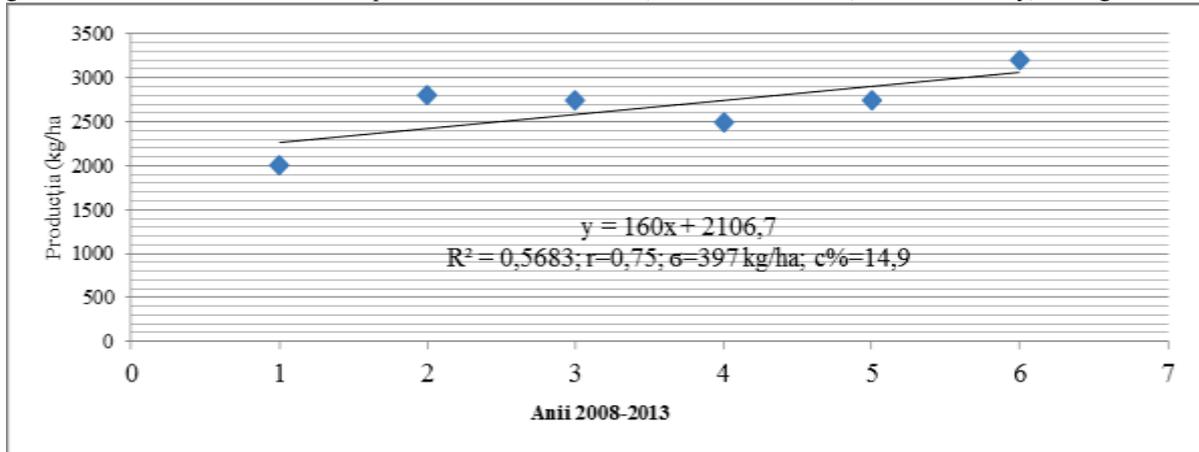
In the farm SC Ildu Ltd, the sunflower crop provides a high productivity. SC ILDU Ltd- is Romanian legal person, privately owned. SC Ildu Ltd was established in 1994, privately owned company; single associate is Vasile Iliuta . The company has as main activity "Growing cereals and other crops and livestock, farm work to obtain milk. [7] The geographical position near Calarasi town ensures sale market for the products. It has access to EAFRD program to complement the technical and material and agricultural machine able of operation in terms of efficiency of agricultural land in use and at the same time allowing farm expansion, the company has made in recent years investment from its own resources, embodied in agricultural machinery of good quality [6].

Table 3 The evolution of the main indicators characterizing the technology of sunflower crops in SC Ildu Ltd, Vâlcelele comon, Calarasi county, during 2008-2013

Specification	Sunflower	Years						average	standard deviation	c (%)	standard deviation quadratic (kg/ha)	average interval quadratic90%(t=2,13)			
		UM	2008	2009	2010	2011	2012					2013	min	Max	DEv (+/-) to medium
average production	kg/ha	2000	2800	2750	2500	2750	3200	2667	397	14,9	162	2321	3012	691	25,9
sale price	USD/to	659	712	1337	1397	2035	1050	1198	511	42,7	209	754	1643	890	74,2
income	USD/ha	1318	1994	3677	3493	5596	3360	3240	1487	45,9	607	1946	4533	2588	79,9
Gross margin	USD/ha	118	494	1777	1293	3096	1020	1300	1056	81,3	431	381	2218	1837	141,4

Source: Data from records SC Ildu Ltd, Vâlcelele comune, Călărași county[7]

Figure 1 The evolution of sunflower production in SC Ildu Ltd, Vâlcelele comune, Calarasi county, during 2008-2013



In recent years, the income was quite similar, except for 2012, the income reached a higher threshold of 5596 kg / ha (Figure 2). The average gross margin is 1300 lei / ha, with a large deviation of 1056 lei / ha and a coefficient of variation of 81.3% (Figure 3).

Fig. 2. The evolution of income per hectare of sunflower in SC Ildu Ltd

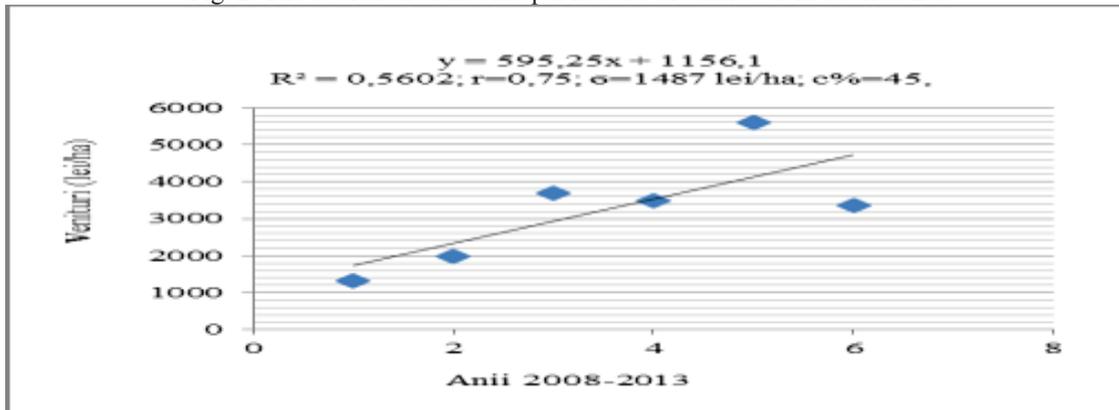


Figure 3 The evolution of sunflower gross margin in SC Ildu Ltd

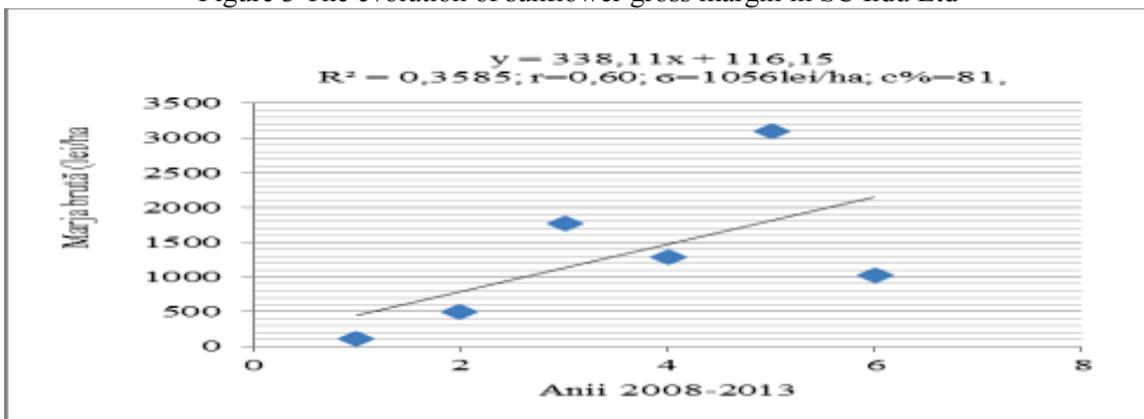


Table 4. Sunflower hybrids grown in SC Ildu Ltd the period 2008-2013

Crop /year	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Sun flower	LA PAMPA	LA PAMPA	AMIGO, LA PAMPA	Gt FLORINIS	PR <sub>39</sub> A <sub>15</sub>

Source: Data from records SC ILDU LLC, Valcelele, Calarasi county[7].

Hybrid LA PAMPA: accented stay-green but quickly loses water at maturity; high ecological plasticity; tolerant to broomrape (*Orobanche Cumana*) - to G race; good resistance to *Phomopsis* sp. and other specific disease; MMB = 60 g; MHL = 40 kg seed oil content = 50-52%; potential production: 4.5 to 4.7 t / ha.

## CONCLUSIONS

1. The agricultural technologies are characterized by joining work processes with natural biological processes. It is necessary that the sequence of works and operations necessary for the completion of each technology components must be determined according to this specific.

2. Since the production technology requires a set of work processes, dependent on the nature and structure of used production resources, its optimization is not only a technical activity, but also an economic one. The two sides of production technology, technical and economic must be addressed in interdependence, because each technology component involves the allocation of resources and of expenditure.

3. To organize and lead the application of technology means ordering components to achieve their sequence according to the technical, economic, energy and green criteria.

4. In Romanian agriculture, technologies of a high area variety are needed and depending on the form of land use.

5. The vast majority of farms does not have sufficient resources for the practice of modern technologies because only existing varieties and hybrids can not become performing without proper use of other factors (fertilizer, water, etc.).

6. While strengthening the private sector in agriculture, new technological options are required that will meet the cooperation and integration on food chains organized in the conditions of functioning on the free market. The future technologies must be simple, effective, low energy, protect the environment, they must not favor food pollution. The new technologies must ensure obtaining products in large lots, unpolluted, superior quality and cheap.

7. The factors in elaborating these technologies are scientific research institutes, industries and technical means for agricultural materials, agricultural specialists, guidance bodies and orientation of agriculture.

8. The new policies and agricultural strategy will have to implement proper agricultural technologies for the soil use and protection in order to preserve the quality of natural resources, creating an ambient environment to promote healthy prosperous agriculture, a sustainable economy, an increased chance for food security of the population;

9. The case study, by characterizing the main indicators of sunflower crop has revealed the following:

- Compliance with safety technology plan is of great importance in improving the production plan;

- Use of high quality varieties and hybrids, adapted to environment conditions specific to the crop, leading to extra quality and quantity of production;

- The use of inputs such as fertilizers, herbicides and plant protection products must be carried out as required and soil culture and their quality must be respected;

- SC Ildu Ltd is specialized in the field of crops than the growing of the main cereal crops with good results for its development;

- SC Ildu Ltd, presented a high stability of production, managing to have high production increases.

## BIBLIOGRAPHY

[1] \*\*\* Romania Statistical Yearbook 2001 -2014, INS

[2] \*\*\*Calarasi county-economic profile, 2013, <http://cartiere.ro/129913-judetul-calarasi-profilul-economic>

- [3] Cretu Daniela, Andrei Radu Iova- Analysis of the natural potential and of the agricultural structures in the rural area; Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, U.S.A.M.V. Bucharest, Volume 13, Issue 3, 2013, Print ISSN 2284-7995, E-ISSN 2285-3952
- [4] Cretu Daniela, Andrei Radu Iova-Technical economic optimization of field crop technologies, by econometric methods. Case study. The 13th International Symposium, Prospects for 3rd millennium agriculture, 25-27 September, 2014, Cluj Napoca, Romania
- [5] Crudu Georgiana- Research on technical and economic optimization of crop technology field. Case Study., PhD Thesis,USAMV București, 2014
- [6] Iova Radu Andrei, Daniela Cretu - Aspect of economic development in the rural area in Romania. Case study, South Muntenia Development Region, Scientific Papers Series “Journal of the Union of Scientists in Ruse” Angel Kanchev University of Ruse, Bulgaria, 25-26<sup>th</sup> October 2013
- [7] \*\*\*\_Data from company records ILDU
- [8] \*\*\*Sunflower crop, 2012, Agriculture gazette, <http://www.gazetadeagricultura.info/plante/plante-tehnice/470-floarea-soarelui/351-cultura-de-floarea-soarelui.html>
- Sunflower crop, 2012, Agriculture gazette, <http://www.gazetadeagricultura.info/plante/plante-tehnice/470-floarea-soarelui/351-cultura-de-floarea-soarelui.html>
- [9] \*\*\*MADR,2014, Technical plants, <http://www.madr.ro/ro/culturi-de-camp/plante-tehnice.html>
- MARD, 2014 crops, [http://www.madr.ro/ro/field\\_crops/plants\\_tehnice.html](http://www.madr.ro/ro/field_crops/plants_tehnice.html)

## THE MAIZE CROP TECHNOLOGY CHARACTERIZED BY ITS MAIN INDICATORS AT THE COUNTRY LEVEL AND IN CĂLĂRAȘI COUNTY

CRUDU GEORGIANA<sup>1</sup>, MOHAMED DHARY YOUSIF EL-JUBOURI<sup>2</sup>, NECULA RALUCA<sup>3</sup>

**Abstract:** *The aim of this paper was to analyze the maize crop at the country and the Călărași county level and in the two companies submitted to the case study. This analysis highlighted the importance of the maize crop, crop that is being cultivated on large areas of the country and county, and that also occupies a larger area of the total area of the two companies. The maize crop is very popular in our country because it finds good environmental factors conducive to a proper development, yields per hectare are very good if the technology requirements are complied. The indicators used have emphasized the evolution of this culture during the analyzed periods and its capitalization in the companies studied.*

**Key words:** *average production, gross margin, maize, revenues, selling price.*

### INTRODUCTION

The crop that was subject of analysis is one of the main crops in our country and in the world, occupying a very important place in the national and international economy.

Maize (*Zea mays* L.) is one of the most important crop plants with multiple uses in human nutrition, industry, animal feed. (According to FAO statistics, the distribution of consumption is 21% of human food, animal feed 72%, 7% industry). The maize is a very important cereal grain for the Călărași County agriculture too [3].

The maize grains are used in starch industry, alcohol, glucose and dextrin; seeds are used for oil extraction used in dietetics nutrition.

The Călărași County has a natural agricultural land, which occupies over 84% of the County area. Soils, most of them are different types of chernozem and alluvial soils, they have a high fertility, which allows a large scale agriculture, predominantly being the cereal character of vegetal production. This is why, the maize surface and production are higher in this county, in comparison with other counties from this area.

Maize is used as concentrate forage feed (grain), green mass maize (silage), stems (cobs) in combination with urea and molasses, silage (juicy forage).

Phytotechnical particularities: good resistance to drought and heat, relatively small number of diseases and pests, adaptability to different climatic conditions, being a hoeing crop, leaves the field clean of weeds, is a good precursory for many plants, a good capitalization of organic and mineral fertilizers, it reacts strongly to irrigation, a great multiplication coefficient, a very important mellifera and medicinal plant.

The maize is a very important cereal grain for the Călărași County agriculture too.

The Călărași County has a natural agricultural land, which occupies over 84% of the County area. Soils, most of them are different types of chernozem and alluvial soils, they have a high fertility, which allows a large scale agriculture, predominantly being the cereal character of vegetal production. This is why, the maize surface and production are higher in this county, in comparison with other counties from this area.

---

<sup>1</sup> Ph.D, University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 744 6474 10, Email: georgianacrudu@yahoo.com

<sup>2</sup> Ph. D Student, University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 744 6474 10,

<sup>3</sup> Ph. D, University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone/Fax: 00 40 744 6474 10, Email: raluca\_nec@yahoo.com

## MATERIAL AND METHODS

In the paper we used the following indicators: arithmetic mean, standard deviation, mean square deviation, coefficient of variation, confidence limits for a given risk, average annual growth rate, the limits amplitude for a given risk towards the average and statistical significance of these indicators.

The formulas used to calculate these indicators are presented [1], [4], [10]:

For the arithmetic mean =  $\bar{X} = \frac{\sum xi}{n}$  ; where:

(i);  $\bar{X}$  = the arithmetical mean;  $X_i$  = The average production values for a number of years

$n$  = number of years taken into account

The average annual rate of growth [1] =  $r_{2008-2013} = \sqrt[n]{\prod (p1/p0) - 1}$  ; where:

$r_{2008-2013}$  = average annual growth rate;  $\prod p1/p0$  = entangled growth indicators

For the standard deviation =  $\hat{\sigma} = \sqrt{\frac{\sum (\bar{x} - xi)^2}{n-1}}$  ; where:

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

For mean square deviation =  $\hat{\sigma}_x = \sqrt{\frac{\sum (\bar{x} - xi)^2}{n(n-1)}}$  ; where:

$\hat{\sigma}_x$  = mean square deviation;

The confidence limits corresponding to a given risk  $X = \pm \delta x * tp$ , in which:

$X$  = the arithmetic average; average square deviation;

$tp$  = tabular value for the probability of transgression (risk)

Amplitude of oscillation of the limits of confidence[4] =

=  $\frac{(X + \delta x * tp) - (X - \delta x * tp)}{X} * 100$

Coefficient of variation =  $C = \frac{\delta}{\bar{X}} * 100$ , where:

$C$  = coefficient of variation (expressed as a percentage)

Coefficient of variation can be: between 0-10% variation; between 10-20%-sized variation; more than 20%-large variation

The linear trend equation:  $Y(\text{kg/ha}) = At + b$ , where  $a$  and  $b$  are the equations coefficients ;  
 $t$  = time

The equation significance is done by:  $R^2$  (the determination coefficient) and  $r$  (correlation report)[2]

The data used was source: internal database of SC Toma SRL, SC ILDU SRL, the data from the literature.

## RESULTS AND DISCUSSIONS

At the country level, as shown in Table 1 maize is a highly valued crop being cultivated on large areas of our country. In the year 2007, the maize surface was about 2524700 ha, years 2008, 2009, 2010 bring a lower level, followed by an increase in 2011 and 2012 with 2,6% towards 2007 and respectively 7,8%.

Although it is a crop that carries out important production per hectare, at the country level, the average yields are situated around 3195 kg / ha, with a high degree of dispersion, of 30.9%.

Table . The surface, average production and total production evolution of the maize grain crop at the country level for the period 2007-2012

Specification	UM	2007	2008	2009	2010	2011	2012	Average (kg/ha)	$\delta$ ( kg/ha)	c (%)
Surface	mii ha	2524.7	2441.5	2338.8	2098.4	2589.7	2721.2	2452.4	164.7	6.7
	%	100.0	96.7	92.6	83.1	102.6	107.8	X	X	X
Average Production	Kg/ha	1526	3215	3409	4309	4525	2188	3195.3	986.6	30.9
	%	100.0	210.7	223.4	282.4	296.5	143.4	X	X	X
Total Production	mii to	3853.9	7849.1	7973.3	9042.0	11717.6	5953.4	7731.6	2335.0	30.2
	%	100.0	203.7	206.9	234.6	304.0	154.5	X	X	X

Source \*\*\*MADR,2013, Cereals, <http://www.madr.ro/ro/culturi-de-camp/plante-tehnice.html>

In Călărași County the maize crop average productions has values higher than the country (Table 2). In 2011 were obtained about 5291 kg / ha, and the years average is about 4124 kg / ha, with about 1000 kg / ha higher than the national level.

Table 2. The maize grain average production evolution in Călărași County, during 2000-2011

Specification	UM	2000	2005	2010	2011	Average(kg/ha)	$\delta$ ( kg/ha)	c (%)
Maize grain	kg/ha	1306.8	4941.4	4956.6	5291.6	4124.1	1524.7	37.0
	%	100.0	378.1	379.3	404.9	X	X	X

Source:\*\*\*I.N.S.,2013, territorial Statistics, Statistică teritorială\_2013.pdf Adobe Reader[9]

In the figures 1 and 2 are illustrated the maize average production evolutions, both at the country level and in the county of Calarasi. Calculated by linear regression estimates a favorable trend for the coming years.

Figure.1. The maize grain average production evolution at the country level for the period 2007-2012

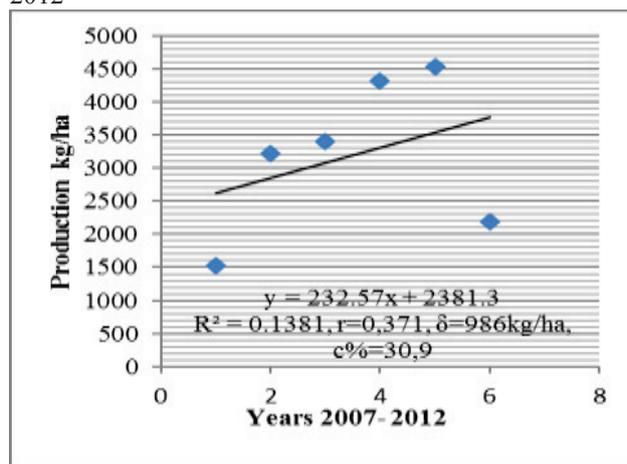
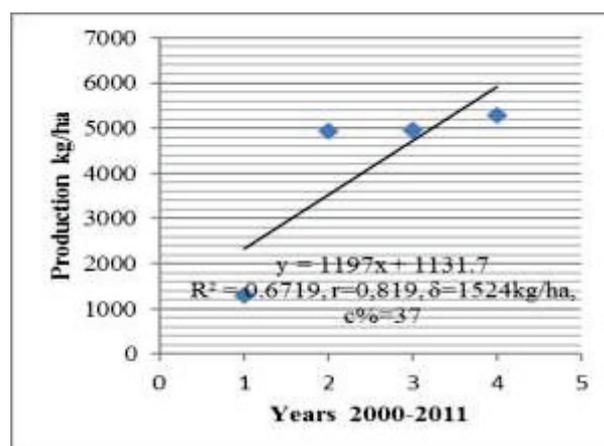


Figure. 2 The maize grain average production evolution in Călărași County, during 2000-2011



## A. SC TOMA SRL ANALYSIS

Table 3. The main indicators evolution characterizing the maize crop technology in SC Toma SRL, Modelu village, Călărași County, during 2008-2013

Specification	Maize crop	Years						Average	Stand. Dev.	c (%)	Mean square dev. (kg/ha)	Probability 90% (t=2,13)			
		UM	2008	2009	2010	2011	2012					2013	min	max	Abs (+/-) toward average
Average production	kg/ha	5100	5400	7800	8000	5200	9000	6750	1713	25,4	699	5260	8240	2979	44,1
The selling price	lei/to	354	408	652	717	1047	580	626	249	39,7	102	410	843	433	69,1
Incomes	lei/ha	1805	2203	5086	5736	5444	5220	4249	1757	41,4	717	2721	5777	3056	71,9
The gross margin	lei/ha	2214	3652	27406	3327	24334	2051	1856	1282	69,0	523	7421	2971	2229	120,1

Source: Own processing after the record data from SC Toma SRL[11]

Regarding SC Toma SRL, the technological indicators maize crop were as follows:

- Production / ha has an average per year of 6750 kg / ha, the highest production being obtained in the last year, 2013, 9000 kg / ha. (Figure.3)

- The selling price has variable values along the analyzed period, the year 2012 representing the year with the best capitalization price , of 1047 RON / to of maize. (Figure 4).

Figure 3. The maize crop production evolution in SC Toma SRL, Modelu village, Călărași County, during 2008-2013

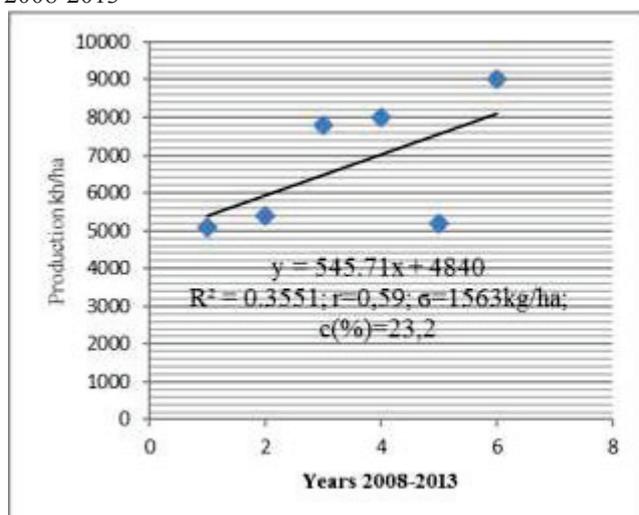
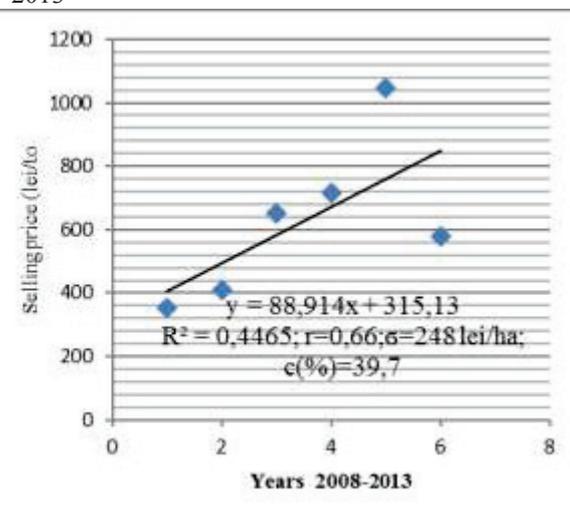


Figure 4. The maize crop price evolution in SC Toma SRL, Modelu village, Călărași County during 2008-2013



- Although the highest production was carried out in 2013, taking into account the selling price and the production achieved , the highest revenues were achieved in 2011, 5736 lei / ha, with 516 lei more than in 2013 . (Fig.5)

- The gross margin shows a wide variation, with a c% of 69%, a standard deviation of 1282 lei / ha and an years average of 1856 lei / ha. (Fig.6)

Figure 5. The maize crop revenues evolution in SC Toma SRL, Modelu village, Călărași County, during 2008-2013

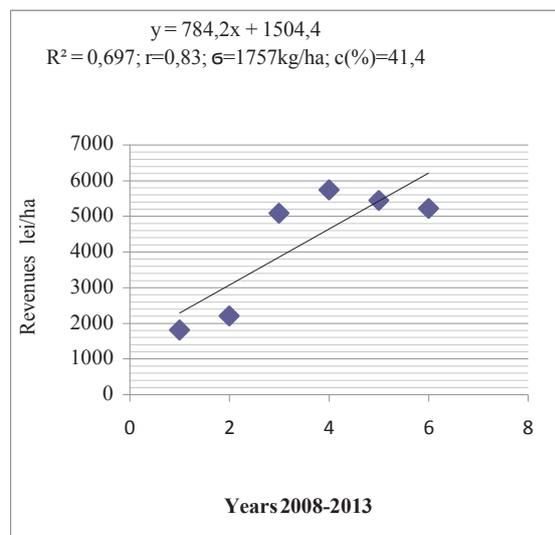


Figure 6. The maize crop gross margin evolution in SC Toma SRL, Modelu village, Călărași County, during 2008-2013

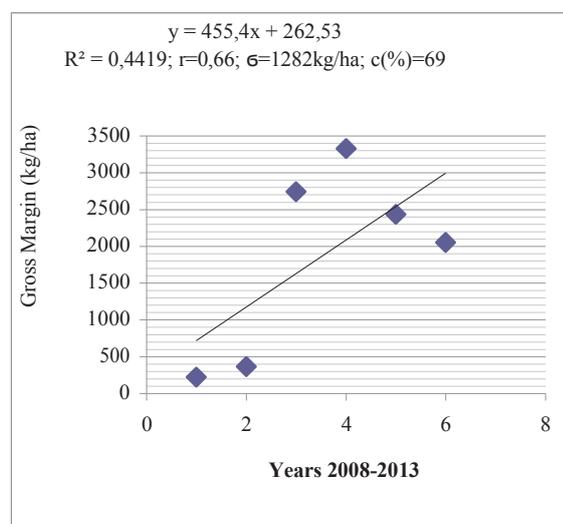


Table 4. The maize hybrids cultivated in SC TOMA SRL for 2007-2013

Crop/year	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Maize	OLT	HELGA	FLORENCIA	Flato	PR35F38	PR37F73

Source: Own processing after the record data from SC Toma SRL[11]

Following the maize hybrids used (Table 4) our attention is drawn by those who gaved the highest yield per hectare:

Flato [6] which has as strengths: starting in very vigorous vegetation, a fast-drying capacity of grains on the cob at the end of the growing season (over 0.8% / day), the "stay green" capacity until the harvest, an excellent tolerance to Fusarium, Helminthosporium, Ustilago.

The plants are short, low insertion of the corn cob and the vigorous strain which adds security and the early flowering causes tolerance to drought.

The potential yield is of 14200 kg / ha, the seed at a density of 70000 plants / ha.

PR37F73 [6] is a simple semi-early hybrid with exceptional adaptability and stability, ensuring stable and reliable production.

Advantages: Drought tolerant; the character "stay green", good resistance to breaking and falling.

## B. SC ILDU SRL ANALYSIS

The main indicators evolution of the maize crop technology in the second company subject of our study case, SC ILDU SRL is shown in Table 5 and Figures 7, 8 and 9.

The average production / ha recorded higher values compared to the production obtained in SC Toma SRL, in the years 2010, 2012 and 2013 productions yielding 9000 and 9200 kg / ha.

The average production per year / ha is of 7367 kg/ha, with 617 kg / ha higher than the years average of the other company (Fig 7).

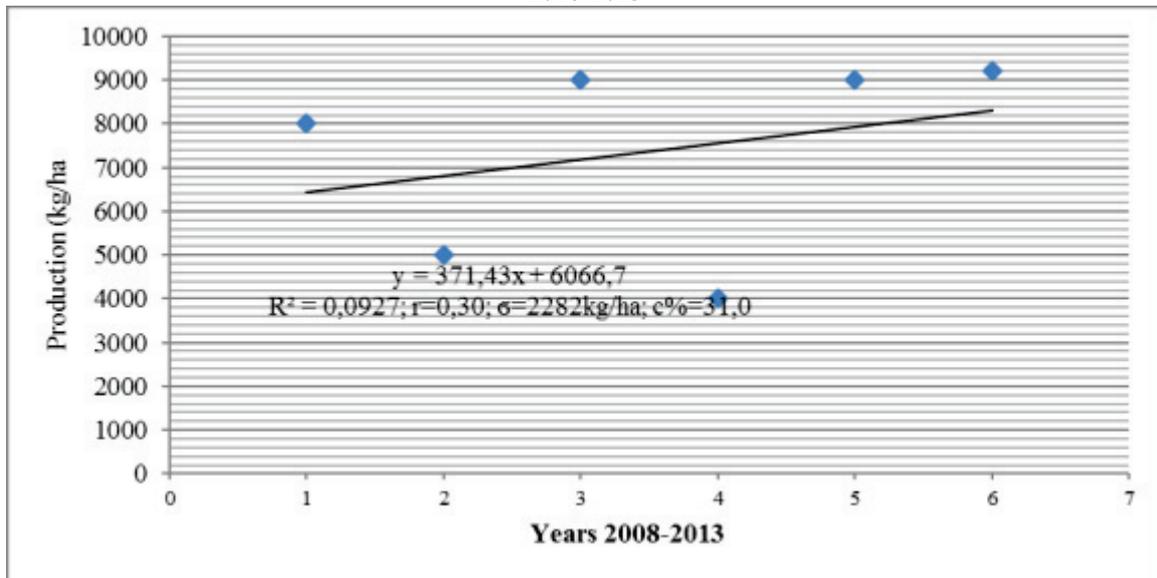
Table 5. The main indicators evolution characterizing the maize crop technology in SC ILDU SRL, Vâlcelele village, Călărași County, during 2008-2013

Specification	Maize crop UM	Years						Average	Stand deviation	c (%)	Mean square dev.	Probability 90%( t=2,13)			
		2008	2009	2010	2011	2012	2013					min	max	Abs (+-) f	%
Average production	kg/ha	8000	5000	9000	4000	9000	9200	7367	2282	31,0	932	5382	9351	3968	53,9
Selling price	lei/to	354	408	652	717	1047	580	626	249	39,7	102	410	843	433	69,1
Revenues	lei/ha	2832	2040	5868	2868	9423	5336	4728	2757	58,3	1125	2331	7125	4794	101,4
Gross margin	lei/ha	1582	590	4018	968	6923	2424	2751	2380	86,5	972	681	4821	4140	150,5

Source: Own processing after the record data from SC ILDU SRL[8]

The selling price of production knows significant fluctuations from 354 lei/ tonne in 2008 to 1047 lei / tonne in 2012, with an average of 626 lei / tonne and a deviation of 249 lei / tonne.

Figure 7. The maize crop production evolution in SC ILDU SRL, Vâlcelele village, Călărași County, during 2008-2013



Given the high value of production obtained and the selling price, the year 2012 recorded the highest revenues of 9423 lei / ha (Figure 8), and the gross margin is also the highest, of 6923 lei / ha (Fig. 9).

The two indicators variations, calculated using the coefficient of variation, are very high, with values of 58.3% and 86.5%.

Figure 8. The maize crop revenues evolution in SC ILDU SRL, village Vâlcelele, Călărași County, during 2008-2013

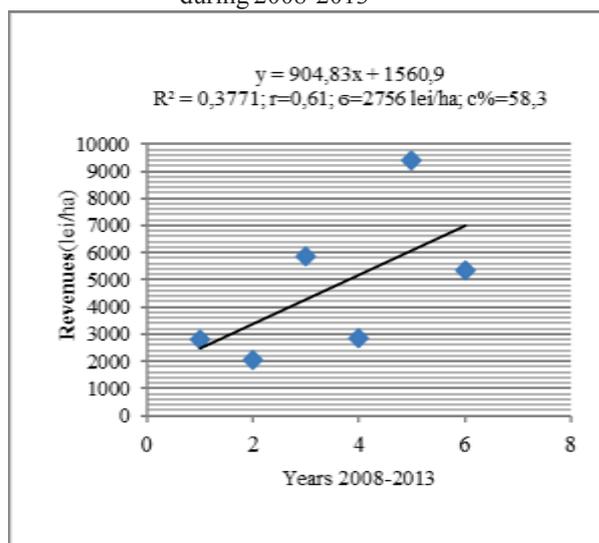


Figure 9. The maize crop gross margin evolution in SC ILDU SRL, Vâlcelele village, Călărași County, during 2008-2013

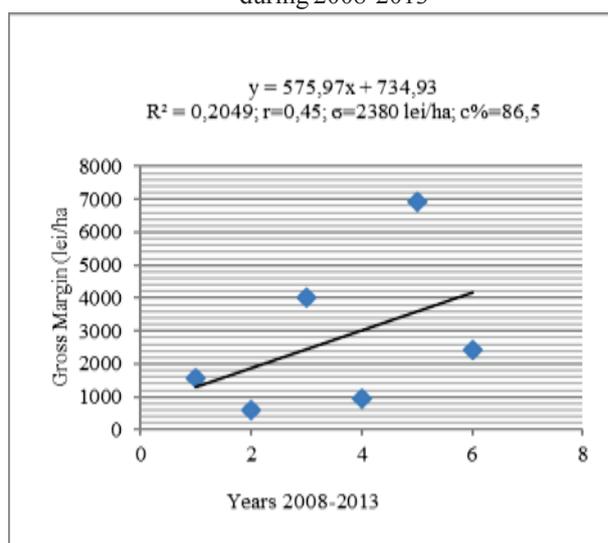


Table 9. The maize crop hybrids cultivated in SC ILDU SRL, 2007-2012

Crop/ year	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Maize	ZAMORA	PR <sub>5</sub> A <sub>24</sub> , D <sub>25</sub>	ZAMORA	DKC 4608	P <sub>94</sub> 94, D <sub>81</sub>

Source: Own processing after the record data from SC ILDU SRL[8]

The company uses maize hybrids categorized as cutting-edge products in the Romanian agriculture, receiving generous productions (Table 9):

DKC 4608 is a new generation of hybrids, achieved by selecting the best possible combinations and proven by higher production worldwide.

The P9494D81 [7] hybrid is a part of FAO 350-400. It has excellent performance with low humidity, resulting in yields of 10 to 11 t / ha. The achievements in crop technology, as an average over the period 2008-2012 showed good expenditure management so that the total technology that has spent less , 2912 lei / ha, compared to SC Toma SRL where they amounted 3170 lei / ha .

## CONCLUSIONS

1. Following the maize crop results at the country level, we notice the fact that although Romania has a large maize cultivated area, the productions per hectare are lower compared to the predominantly cereal countries, both in EU and globally.

2. In the Calarasi county, were recorded higher production then the national levels, particularly in the recent years, surpassing by almost 1000 kg / ha the country's average (2011);

3 . Extrapolating by the trend equations, it demonstrates an increasing trend, both at national and at the county level.

4. The study of the two agricultural companies, by characterizing the maize crop main indicators have revealed the following:

- The use of the high quality hybrids, adapted to the environmental conditions specific to the culture, lead to extra quality and quantity of production;

- Both companies (SC Ildu SRL, SC Toma SRL) are specialized in large crops field with good maize crop development;

- SC Ildu SRL, compared with SC Toma SRL showed greater stability of production, managing increase production, with higher incomes.

## BIBLIOGRAPHY

1. Ceapoiu N. Applied statistical methods in agricultural experiments and statistical Ed. Agro-Silva, Bucharest 1968
2. Cornelia Nistor, 2005, Elemente de statistică, Ed. Cartea Universitară, București
3. Gavril Crășneanl, 2012, Recolta.eu, 2013, Fișă tehnologică - cultivarea porumbului, <http://www.recolta.eu/arhiva/fisa-tehnologica-cultivarea-porumbului-10030.html>
4. M. Draghici, Mara Fl statistical indicators characterizing meat animal production at the level country and the Virginia county during 2000-2008, ICEADR Session 2010
5. Mitu D., 1999, Stabilitatea producției unor hibrizi de porumb în perioada 1989-1999, LA S.C.A. TELEORMAN, Genetică și ameliorarea plantelor, AN. I.C.C.P.T., VOL. LXIX, 2002
6. \*\*\*Seminte de porumb, [http://www.covera.ro/ferma/seminte-profesionale/seminte-porumb/seminte-porumb-euralis-es-flato-80-000-seminte-sac\\_3334/](http://www.covera.ro/ferma/seminte-profesionale/seminte-porumb/seminte-porumb-euralis-es-flato-80-000-seminte-sac_3334/)
7. \*\*\*RL, Bani & afaceri, Agricultura românească, un domeniu competitiv în 2014?, <http://www.agro-business.ro/produse-de-ultima-ora-in-agricultura-romaneasca/2011/02/15/>
8. \*\*\* SC ILDU SRL, Internal database
9. \*\*\*I.N.S., 2013, Statistică teritorială, Statistică teritorială\_2013.pdf Adobe Reader
10. \*\*\*Demographic growth, [http://www.dictsociologie.netfirms.com/\\_IndDem/IndReproducere.htm](http://www.dictsociologie.netfirms.com/_IndDem/IndReproducere.htm)
11. \*\*\*SC Toma SRL, Internal database

# PHYSIOLOGICAL PROPRIETIES FROM CORN INFLUENCED BY THE DIFFERENTIATE APPLICATION OF NITROGEN AND PHOSPHORUS

ION BOZGĂ<sup>1</sup>, OLIMPIA PANDIA<sup>1</sup>, ION SĂRĂCIN<sup>2</sup>

**Abstract:** *The paper enumerates several physiological processes that take place at the Champion corn hybrid and the interaction between the hybrid in the irrigated and un-irrigated culture, as well as the appliance of NP fertilizers. To obtain performances at this type of corn culture, soil analyses were made before the establishment of experimental parcels and it was aimed the moment when the corn plants had already formed eight leaves to emphasize the results better. The determinations and the laboratory analyses emphasizes the most important physiological processes from plant life, where the water and fertilizer dosages had a crucial role in obtain of positive results.*

**Key words:** *physiological processes, respiration, transpiration, carotene, hybrid*

## INTRODUCTION

In our country, the maize crop (culture) occupies an important area of the arable land and it represents one of the main cereal crops because of its importance in nourishment, feeding the animals and in industry.

The demographic growth of the population as well as the animal effectives imposed an extension of crop areas and a growth of production/ area; these two aspects were possible by an intensification of maize crop by using chemical fertilizers and irrigation systems.

Because maize culture is the most extended culture in the world, not only in our country, research into discovering new productive and qualitative hybrids have been performed, for human beings, animals and also industry, and different properties and processes were had in view.

Because corn can adapt at almost all types of soil in Romania, numerous varieties and hybrids were created, thus it occupies the largest culture surface from Romania. The corn culture has a vast area of spreading and in the southern and western parts can be made big productions of corn, even for satisfying the needs necessary of national economy.

Because in the human nutrition, corn grains are consumed in different forms, it is important to have healthier corn cultures, so that the products that derives from them to be beneficial for our organisms.

In the human nutrition only corn grains are considered and they are an important aliment consumed in various ways, specific to each nation. The grains are used as they are, as boiled or baked corn (very indicated for this type is the sweet corn). Sweet corn grains detached from the cob in milk maturation are used boiled or canned like grained peas.

## MATERIAL AND METHOD

The study was performed using an Champion maize hybrid, when the 8 full-grown leaves became visible and this hybrid was cultivated in the north-western part of Olt District, at Grădinari, on chernozem, and both irrigated and non-irrigated systems were a used, after a precursory wheat culture in 2012, and physiological analysis were performed in order to point out the changes of the chemical composition of plants when applying different dosage of NP.

Analysis were performed by using variants disposed in four repetitions having as an example one row graduated multi-staged plots of land method. The sowed area of the variant is of 22.4 m<sup>2</sup>, and its density is of 50,000 plants/hectare. Analyses of soil were effectuated at 0-25 cm and 23-34 cm. depth.

---

<sup>1</sup>Conf.univ.dr. Ion Bozgă: University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania, e-mail: veterinar\_serv@yahoo.com, <sup>1</sup>Sl.univ.dr.ing. Olimpia Pandia: e-mail: olimpia\_pandia@yahoo.com

<sup>2</sup>Prof.univ.dr.ing. Ion Sărăcin: University of Craiova, Faculty of Agriculture, Romania, e-mail: ion\_saracin@yahoo.com

Table 1

Chemical properties of the argic chernosiomus from the Grădinari-Olt

Genetic level	Depth(cm)	pH value (H <sub>2</sub> O)	S.B. m.e/100g	S.H. m.e	Humus %	N total %	P p.p.m.	K p.p.m.
ApI	0-25	7,02	24,37	3,43	2,78	0,141	22,7	166,8
Ap1	0-25	7,03	24,39	3,47	2,77	0,143	22,9	166,5
Ap2	0-25	7,01	24,36	3,45	2,77	0,142	22,7	166,7
Ap3	0-25	7,02	24,38	3,43	2,76	0,141	22,8	166,5
ApII	25-34	7,19	26,85	2,32	29,18	0,133	28,2	172,9
Ap1	25-34	7,16	26,84	2,34	29,19	0,135	28,2	172,7
Ap2	25-34	7,18	26,85	2,31	29,18	0,133	28,4	172,8
Ap3	25-34	7,19	26,86	2,33	29,17	0,134	28,3	172,8

### Field research method

Establishing an optimum fertilization system which positive influences the quantity and the quality of the culture and which implies an improving of the soil fertility potential represents an important way of increasing the economic efficiency. The influence of chemical fertilizers upon the maize culture is related to physiological processes which take place at a plant level in certain moments of its growth.

The experiment has in view two important factors:

Factor **A**: irrigating system

B1 – irrigated

B2 – non-irrigated

Factor **B**: applying the dosage of fertilizer

Within the experimental filed an important moment was followed, respective the 8 full-grown leaves phase, and lab tests were kept in order to perform physiological determinations.

Table 2

Influence of the nitrogen and phosphorus on some physiological processes of the crop hybrid Campion - 20 June non irrigated system 2012

Variant	Photosynthesis mgCO <sub>2</sub> /cm <sup>2</sup>	Respiration mgCO <sub>2</sub> /100g m.v.	Absorption capacity g/apă	Suction force atm	Chlorophyll pigments			
					Chlorophyll A mg/dm <sup>2</sup>	Chlorophyll B mg/dm <sup>2</sup>	Caroten mg/dm <sup>2</sup>	Total mg/dm <sup>2</sup>
N <sub>0</sub> P <sub>0</sub>	228,6	183,6	5,89	4,1	0,363	0,168	0,199	0,728
N <sub>60</sub> P <sub>40</sub>	253,5	189,8	5,94	4,2	0,369	0,173	0,21	0,75
N <sub>80</sub> P <sub>60</sub>	256,6	201,4	5,87	4,13	0,368	0,175	0,205	0,746
N <sub>100</sub> P <sub>80</sub>	260,9	210,5	6,03	4,13	0,372	0,174	0,202	0,746
N <sub>120</sub> P <sub>100</sub>	253,5	206,6	5,95	4,17	0,377	0,172	0,207	0,753

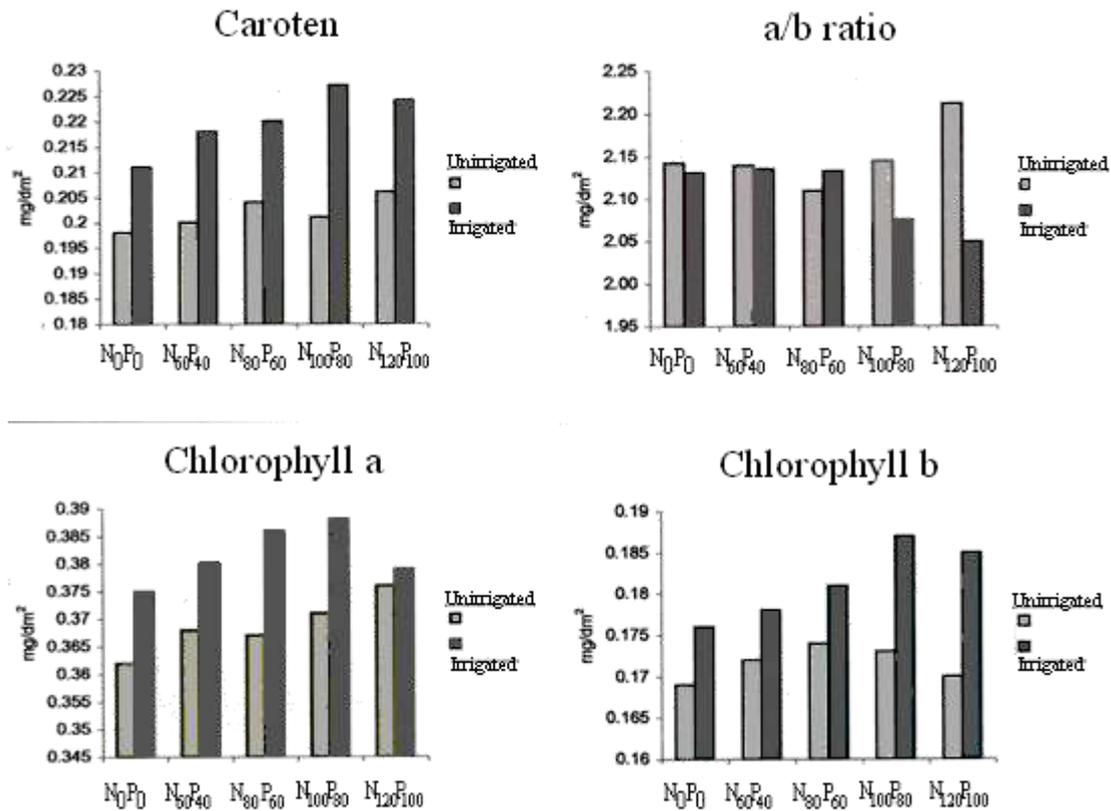
Table 3

Influence of the nitrogen and phosphorus on some physiological processes of the crop hybrid Campion - 20 June irrigated system 2012

Variant	Photosynthesis mgCO <sub>2</sub> /cm <sup>2</sup>	Respiration mgCO <sub>2</sub> /100g m.v.	Absorption capacity g/apă	Suction force atm	Chlorophyll pigments			
					Chlorophyll A mg/dm <sup>2</sup>	Chlorophyll B mg/dm <sup>2</sup>	Caroten mg/dm <sup>2</sup>	Total mg/dm <sup>2</sup>
N <sub>0</sub> P <sub>0</sub>	239,8	186,6	6,02	4,1	0,376	0,177	0,212	0,763
N <sub>60</sub> P <sub>40</sub>	262,5	192,4	6,11	4,19	0,39	0,179	0,219	0,777
N <sub>80</sub> P <sub>60</sub>	268,4	205,5	6,22	4,3	0,387	0,182	0,23	0,788
N <sub>100</sub> P <sub>80</sub>	270,6	215,8	6,16	4,3	0,389	0,188	0,228	0,803
N <sub>120</sub> P <sub>100</sub>	276,9	220,5	6,24	4,27	0,378	0,186	0,225	0,789

After lab determinations of physiological processes which took place in the case of this hybrid in two different systems and after applying different doses of fertilizers, the results were also graphically represented.

Influence of the nitrogen and phosphorus doses on some physiological processes of the crop hybrid Campion- 20 june year 2012



The chlorophyll pigments represented by 'a' and 'b' chlorophyll and carotene are very influenced by irrigated variants compared to non-irrigated ones (figure 1.)

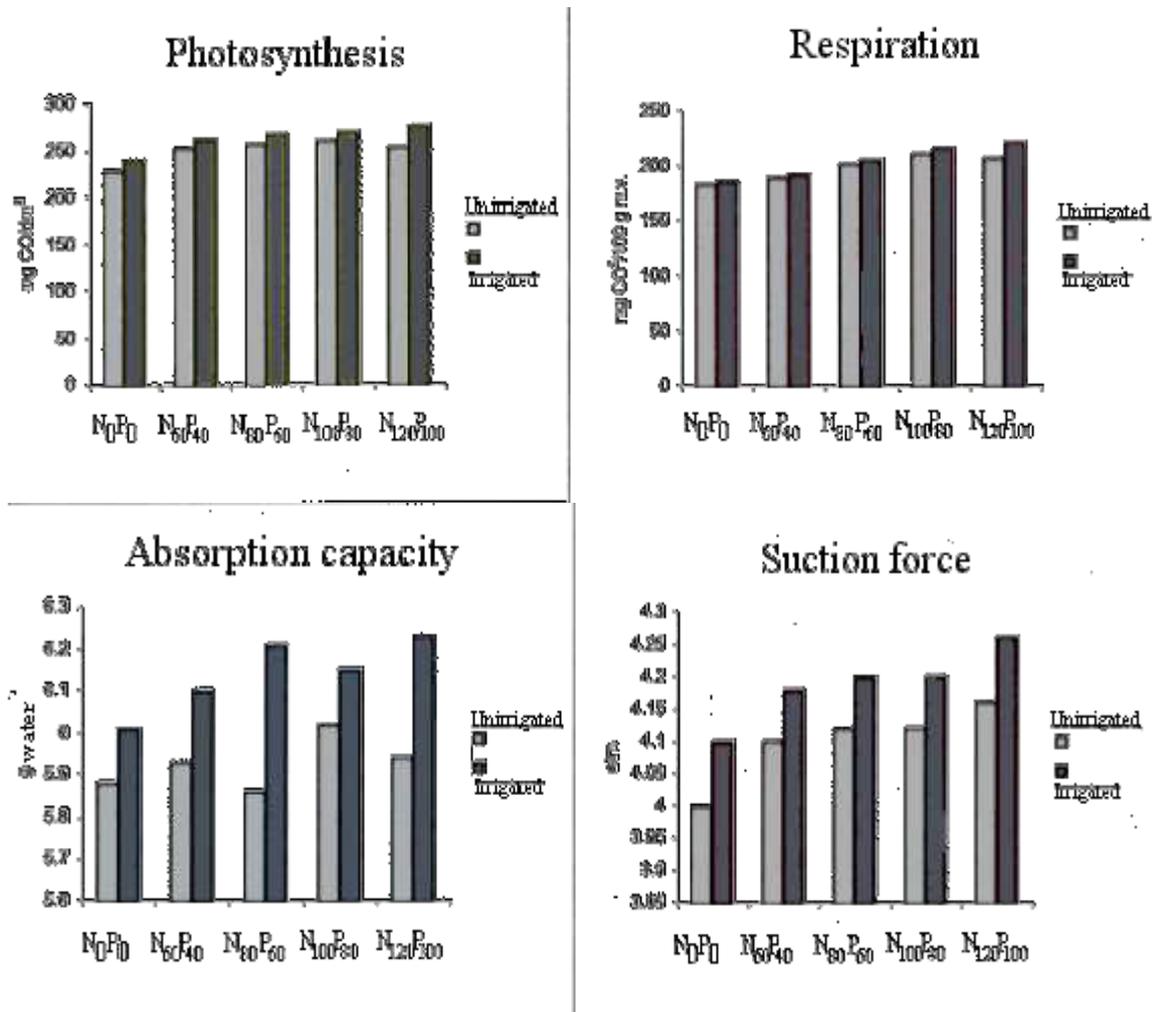
An increase of the content of chlorophyll 'a' in the case of the irrigated system is noticeable, no matter what dose of fertilizer was applied, significant values are observed when applying N<sub>100</sub>P<sub>80</sub> and N<sub>120</sub>P<sub>100</sub>.

Chlorophyll 'b' has values that have a weak fluctuation no matter what dose of fertilizers was applied, an import factor in this case is the irrigating the area which led to a significant increase of this assimilative pigment.

The content of carotene has significant values towards the control, compared to variants where fertilizers were applied. Irrigating, when applying N<sub>100</sub>P<sub>80</sub> and N<sub>120</sub>P<sub>100</sub>, led to an important increase of this pigment.

Combined irrigation and applying moderate dose of fertilizers (N<sub>100</sub>P<sub>80</sub>) led to a maximum carotene quantity.

Influence of the nitrogen and phosphorus doses on some physiological processes of the crop hybrid Campion- 20 june year 2012



The evolution of photosynthesis (picture 2 and 3) expressed by mg CO<sub>2</sub>/dm<sup>2</sup> that was determined in the first moment, that is the 8 full-grown leaves, has an important increase when comparing the non-irrigated and the irrigated variants, and also within the same variant.

Thus, a 20% increase of the photosynthesis intensity towards the control in the case of irrigated variant towards the non-irrigated control is noticeable.

The optimum dose, as it is noticed in figure 2, was recorded in the case of the irrigated variant, when using N<sub>120</sub>P<sub>100</sub>, compared to the non-irrigated variant where better results were obtained when applying a dose of N<sub>100</sub>P<sub>80</sub>.

Regarding the respiration process, expressed as mg CO<sub>2</sub>/100 g.m.v., significant values on June, 20 are ascertain within the irrigated system as well as the non-irrigated system as well, the quantity of eliminated CO<sub>2</sub> being significant in the case of the studied variant.

The capacity of absorption, g/H<sub>2</sub>O, has minimum values in the case of non-irrigated variants, excepting the N<sub>100</sub>P<sub>80</sub> variant which has the highest value, that is 6.02 g/H<sub>2</sub>O.

Within the irrigated variants, the difference is important and it is static assured once the content of fertilizer in the case of N<sub>120</sub>P<sub>100</sub> variant increases.

The suction force (figure 2d), expressed as atmospheres, has a tendency of slow increase in the case of the first non-irrigated variants, after which it starts to increase and it reaches from 4 to 4.16 atmospheres. In the case of variants where irrigation was applied, the most evident suction force was registered when applying a N<sub>120</sub>P<sub>100</sub> dose.

## CONCLUSIONS

The combined influence between hybrid and culture technology (irrigation and applying the right dose of fertilizers) determines modifications of the main physiological processes which lead to obtaining maximum production when rationally applying dose of fertilizers.

The studied hybrid acted differently from the culture technology point of view, the registered values from the physiological point of view were different, each of them using the right quantity of fertilizer.

The effects of simultaneously applying variable doses of fertilizers and irrigation were studied and its effect upon the main physiological processes which depend on them.

All analyzed physiological processes lead us to the conclusion that the Campion hybrid has a high physiologic and biochemical potential, and the acquired information situates it among the most productive hybrids that have been studied.

The combined influence of culture system (irrigated non-irrigated) as well as the applied doses of fertilizers determined, from the quantitative point of view, remarkable differences in the case of all qualitative features of the Campion hybrid.

We highly recommend Campion hybrid for production, when using an irrigated system and applying a maximum dose of N<sub>120</sub>P<sub>100</sub> and N<sub>100</sub>P<sub>80</sub> for an economic efficiency.

## BIBLIOGRAPHY

1. Abu-Awwad A. M. (1999). *Irrigation water management for efficient water use in mulched onion*. Journal of Agronomy and Crop Science vol. 183.
2. Goian M. F. Sala, Adina Berbecea, Isidora Radulov, C. Gherban . (2000). *The effect of mineral fertilizers upon the bean production of maize, on cambic chernozem within the Timisoara Didactic Research Station, between 1997 and 1999*. Scientific research U.S.A.M.V. Timisoara, Agriculture Category. volume XXXII, part I. Agroprint Publishing House. Timisoara.
3. Hera C. (1972). *The influence of fertilizers upon certain maize hybrids sowed on different types of soils in Romania*. An. ICCPT. Fundulea XXXVII.
4. Marghidanu, N. *et al.* (1985). *Economia mecanizării agriculturii*. Editura Ceres. București.
5. Mărghitaș Marilena, M. Rusu. (2003). *Utilizarea îngrășămintelor în agricultură*. Ed. AcademicPres. Cluj-Napoca.
6. Oancea, I. (1998). *Tratat de tehnologii agricole*. Editura Tehnică. București.
7. Olimpia Pandia. (2006) *Fertilizer doses, different methods applied for establishing the quality of two hybrids Danubiu and Minerva*. Scientific research I.N.M.A.T.E.H.I. Bucharest.
8. Sărăcin, I. (2005). *Energetic Base for Agriculture. Transmissions*. Unversitaria Publishing House. Craiova.
9. Sima E. (2002). *Ecological Agriculture and Changing Perception in the Case of Quantity and Quality*. The Information and Economic Reference Material Center. Bucharest.

# THE CORRELATION BETWEEN THE DOSES OF NITROGEN AND PHOSPHORUS APPLIED ON THE NON IRRIGATED SYSTEM AND PHYSIOLOGICAL PROCESSES OF THE CROP HYBRID CAMPION – YEAR 2012

ION BOZGĂ<sup>1</sup>, OLIMPIA PANDIA<sup>1</sup>, ION SĂRĂCIN<sup>2</sup>

**Summary:** *The paper purposes to follow the supply of corn plant with a nitrogen and phosphorus supplement in different quantities in two systems: irrigated and un-irrigated. The most important physiological processes that take place in plant life were followed also and from these there were chosen to be studied: photosynthesis, respiration, absorption capacity and suction force. Mathematical calculus was made to interpret the results, taking into account the variance analysis which represents only a first important phase of systematization of information. The conclusions formulated show the necessity of irrigated system collaborating with fertilizer appliance to obtain larger crops and healthier plants.*

**Key words:** *correlation, research, interaction, graphic representation, respiration, photosynthesis*

## INTRODUCTION

The importance of fertilizers within maize culture logically come from the great production capacity of this culture for which important quantities of nutritive elements extracted from soil are necessary. The research that took place in the last two years emphasized the powerful impact of chemical fertilizers combined with applying an adequate technology upon the carried out physiological processes, that is assimilating and dissimilating and the repartition of dry substance in the plant.

The corn belongs to *Graminaceae* family, *Maydeae* species, *Zea* genus. Linné denoted it by *Zea mays*, a name that was kept until today. The name of *Zea* genus appears to derive from the Greek word *Zea*, which means „I live”, as well as „dressed wheat”. The species name *mays* used by Columbus, derives from the word „mahis”, which is the name given to corn by the villagers from Haiti Island.

Among the main cultures, very important is the maize culture which is compared to „cultures that have golden beans”. Maize is considered nowadays one of the most important cultivated plants for the agriculture of our country, as well as on a global scale because of the significant area that maize holds as well as high productions/hectare that are obtained.

Because of its high capacity of adaptation to soil and climate conditions as well as because of the ample improvement process, maize culture has a spreading area that guarantees the satisfaction of all requirements of every county in our country, and, in many counties –mainly the southern and the western ones – may accomplish important availability in the case of our national economy.

The present work tries to establish the role of irrigation and applying variable doses of Nitrogen and Phosphorous, it also tries to ground, from the physiological point of view, the contribution of each factor in achieving high quantitative and qualitative productions.

Within the experimental filed an important moment was followed, respective the 8 full-grown leaves phase, and lab tests were kept in order to perform physiological determinations.

After lab determinations of physiological processes which took place in the case of this hybrid in two different systems and after applying different doses of fertilizers, the results were also graphically represented.

---

<sup>1</sup>Conf.univ.dr. Ion Bozga: University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania, e-mail: veterinar\_serv@yahoo.com, <sup>1</sup>Sl.univ.dr.ing. Olimpia Pandia e-mail: olimpia\_pandia@yahoo.com

<sup>2</sup>Prof.univ.dr.ing. Ion Sărăcin: University of Craiova, Faculty of Agriculture, Romania, e-mail: ion\_saracin@yahoo.com

## MATERIAL AND METHOD

The study was performed using an Campion maize hybrid, when the 8 full-grown leaves became visible and this hybrid was cultivated in the north-western part of Olt District, at Grădinari, on chernozem, and both irrigated and non-irrigated systems were used, after a precursory wheat culture in 2012, and physiological analysis were performed in order to point out the changes of the chemical composition of plants when applying different dosage of NP.

Analyses were performed by using variants disposed in four repetitions having as an example one row graduated multi-staged plots of land method. The sowed area of the variant is of 22.4 m<sup>2</sup>, and its density is of 50,000 plants/hectare. Analyses of soil were effectuated at 0-25 cm and 23-34 cm. depth.

### Mathematical calculation of experimental results

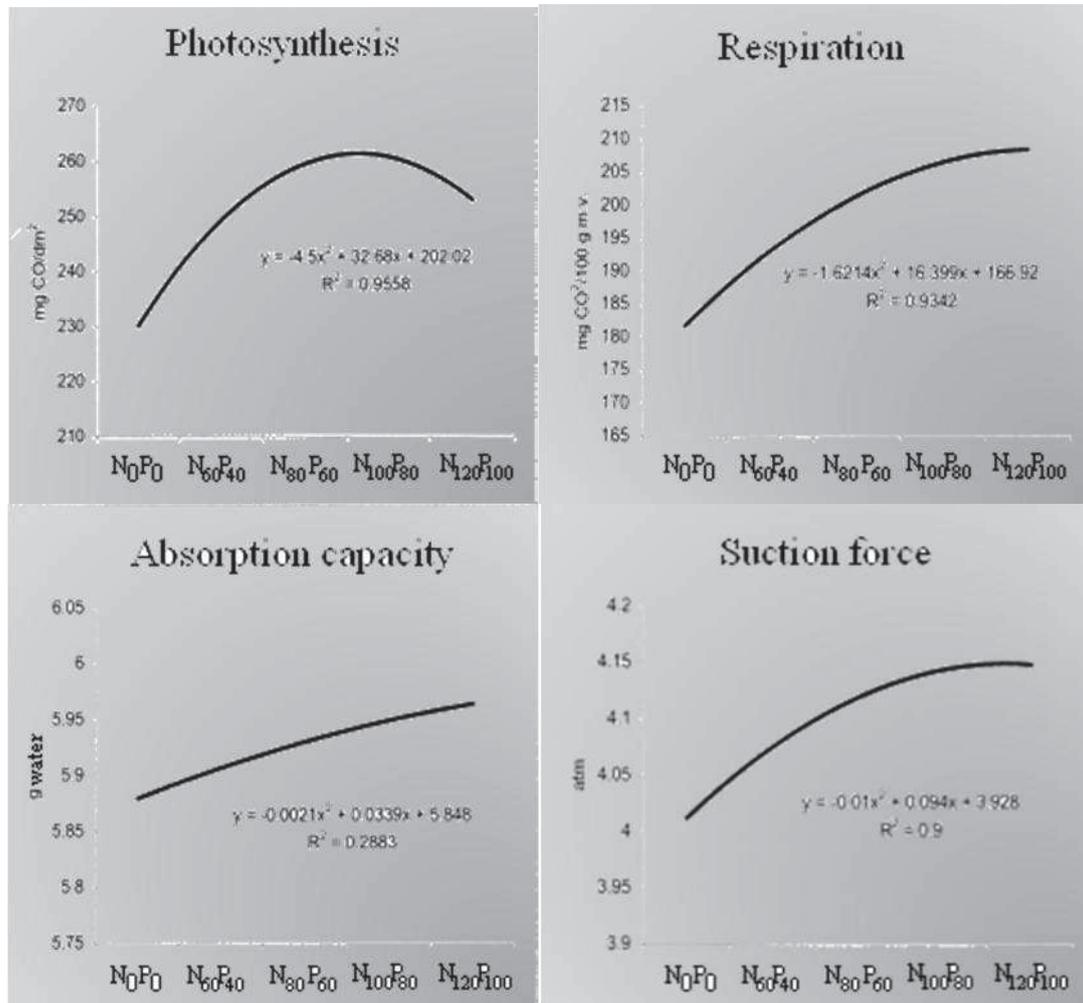
When presenting the experimental results, the analysis of variation represent the first important systemizing information, distinguishing different contribution of sources of variability. The study of the relation between variables may be performed when using modern statistic methods such as correlation, simple linear regression, square regression, etc.

The correlation coefficient is relative; it doesn't depend on measure units that are used for the respective variant.

Except an analysis of variation and the calculation of square regression, graphic representation was used – column diagrams.

Figure 1

Correlation between doses of Nitrogen and Phosphorous that were applied within non-irrigated system and some physiological processes of the Campion hybrid in the year 2012



In the case of the irrigated variant, the intensity of photosynthesis increases and it reaches a higher value than 270 mg CO/dm<sup>2</sup> when applying the same doses of fertilizers above. The correlation coefficient, instead, is of 0.9558 (Figure 1. a).

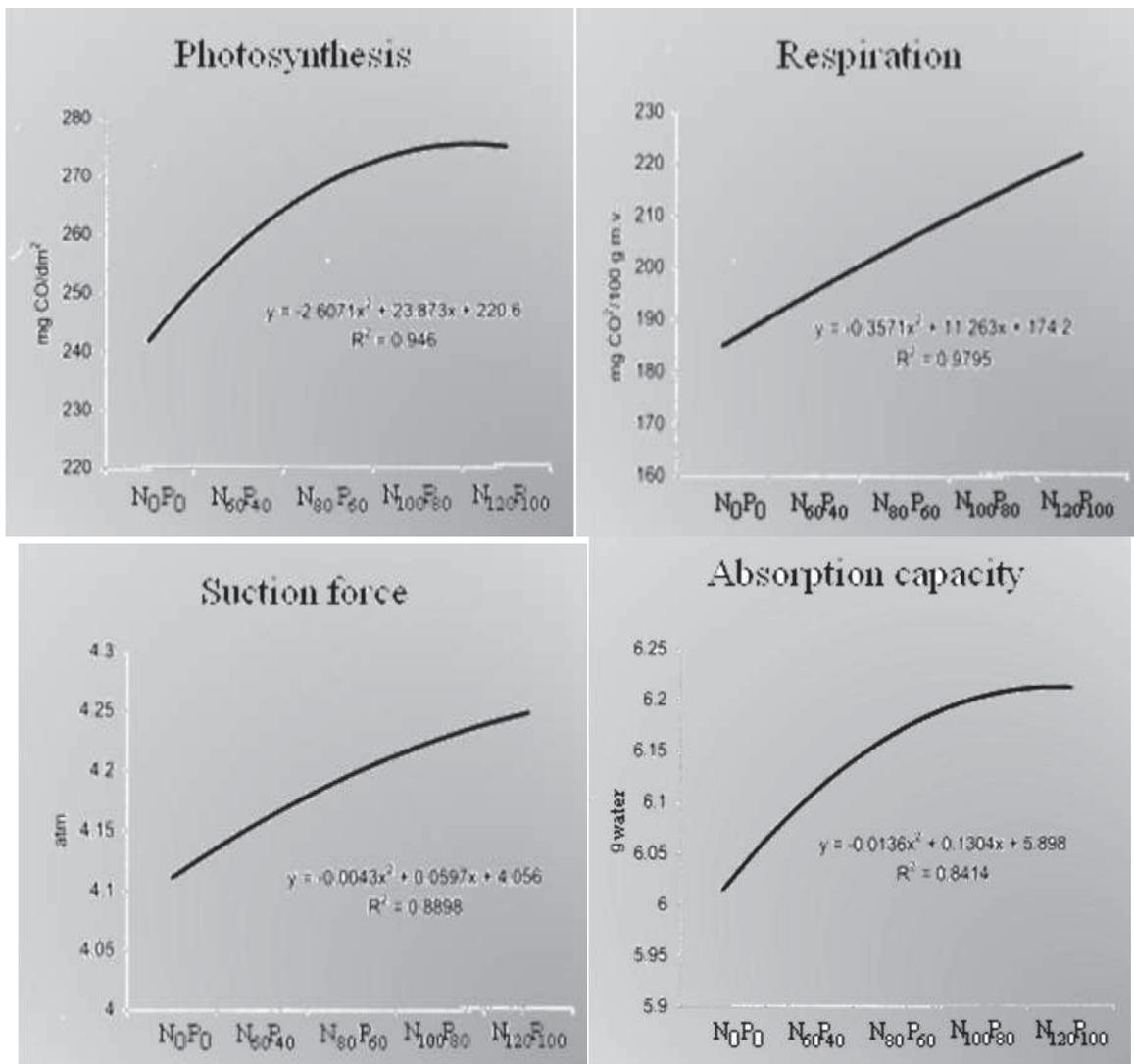
The respiration process is assured by the regression coefficient, but it is 0.9342 static assured, and the curve reaches the maximum value when using N<sub>120</sub>P<sub>100</sub> within non-irrigated system (Figure 1.b).

In the case of non-irrigated system, that is figure 1.c, a slow increase of absorption capacity is noticeable once the mineral fertilizers content increases, R=0.2883, compared to irrigated variants where the absorption capacity is maximum in the case of N<sub>100</sub>P<sub>80</sub> variant, the correlation coefficient is of 0.9.

The regression coefficient is static assured and it is descending in the case of the non-irrigated system (Figure 1.d), the suction force has high values when applying an N<sub>120</sub>P<sub>100</sub> dose.

Figure 2

Correlation between doses of Nitrogen and Phosphorous that were applied within irrigated system and some physiological processes of the Campion hybrid in the year 2012



In the case of the irrigated variant, the intensity of photosynthesis increases and it reaches a higher value than 270 mg CO/dm<sup>2</sup> when applying the same doses of fertilizers above. The correlation coefficient, instead, is of 0.946 (Figure 2. a).

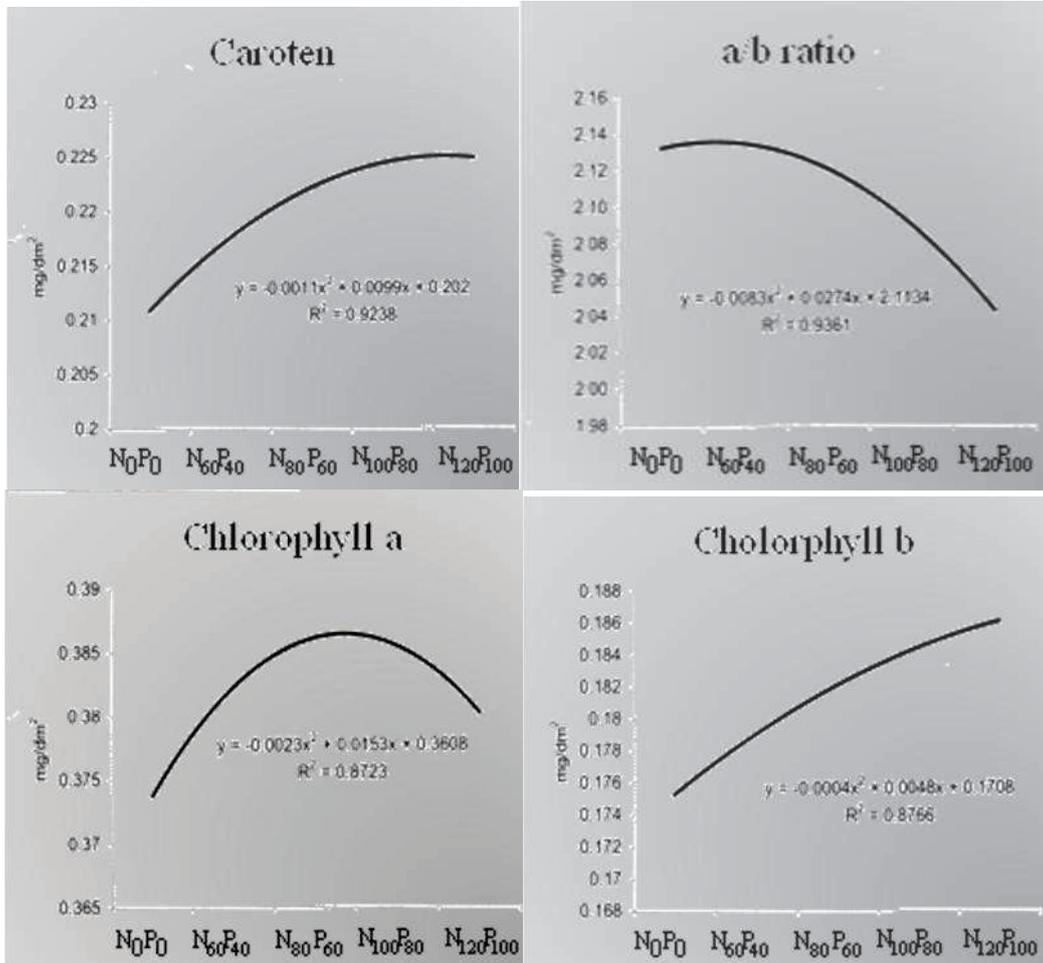
In the case of the irrigated system, the regression curve has a linear tint, and the coefficient is static assured R=0.9795 (Figure 2.b).

In the case of irrigated variants, the difference is significant and it is static assured once the content of fertilizers increases (Figure 2. c),  $R=0.8414$ .

The suction force has a descending tint, in the case of irrigation and application of maximum doses of fertilizers,  $R=0.8898$ . (Figure 2.d).

Figure 3

Correlation between doses of Nitrogen and Phosphorous that were applied within irrigated system and some physiological processes of the Campion hybrid in the year 2012



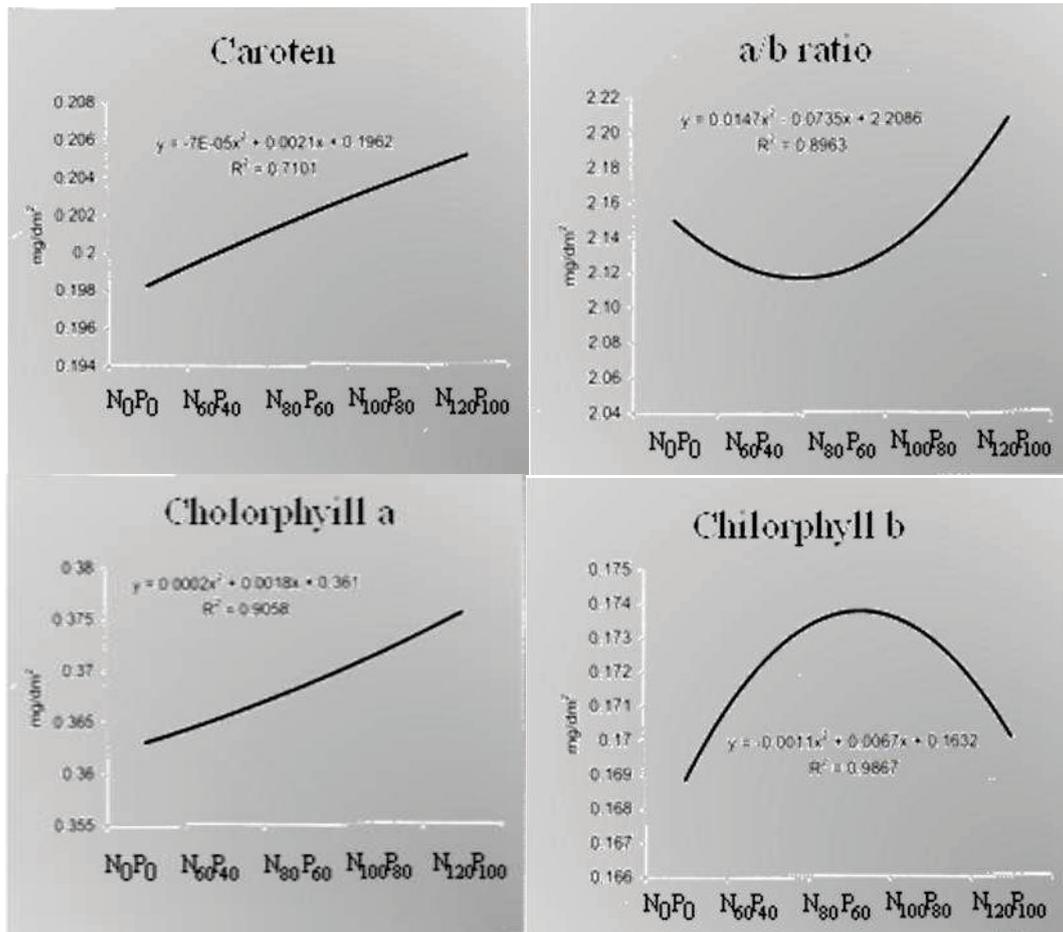
The physiological processes which determine the chlorophylls, the following results are obtained:

The regression coefficient, in the case of the irrigated variant, is 0,8723 static assured (Figure 3.a), and the curve of chlorophyll 'a' has a descending tint, which record maximum values when applying the dose of  $N_{100}P_{80}$ .

Chlorophyll 'b' reaches the maximum of its curve when applying a dose of  $N_{80}P_{60}$ , after that the values decrease and  $R^2=0.8766$  (Figure 3. b).

The carotene is represented by an ascendant curve; its maximum values are recorded when applying an  $N_{120}P_{100}$  dose (Figure 3.c).

Correlation between doses of Nitrogen and Phosphorous that were applied within non-irrigated system and some physiological processes of the Campion hybrid in the year 2012



The physiological processes which determine the chlorophylls, the following results are obtained:

The regression coefficient, in the case of the non-irrigated variant, is 0.9058 static assured (Figure 4.a), and the curve of chlorophyll 'a' has a descending tint, which record maximum values when applying the dose of N<sub>120</sub>P<sub>100</sub>.

Chlorophyll 'b' reaches the maximum of its curve when applying a dose of N<sub>80</sub>P<sub>60</sub>, after that the values decrease and  $R^2=0.9867$  (Figure 4. b).

The carotene is represented by an ascendant curve; its maximum values are recorded when applying an N<sub>120</sub>P<sub>100</sub> dose (Figure 4.c).

Regarding the relation between a and b, it is noticeable a sudden decrease when applying the dose of N<sub>80</sub>P<sub>60</sub> dose, after that it increases until applying a dose of N<sub>120</sub>P<sub>100</sub> and then it reaches high values.

## CONCLUSIONS

The main purpose of using fertilizers is obtaining important productions when the expenses are minimally. The cost of fertilizers increased a lot in the last decades because the fertilizers are obtained by high consumption of fossil energy, and that is why it's of great interest the way of administrating the production process in order to obtain a maximum efficiency.

The fertilization that uses Nitrogen and Phosphorous creates a stable balance of the soil elements.

Phosphorous and Potassium as well applies the brake to the acidification of soil by

Nitrogen. These two elements, especially Potassium, intensify the absorption of Nitrogen and balance the ionization report within the plant.

It is necessary that, when applying fertilizers correctly depending on the provision soil degree in assimilable substances and plant needs, the soil reserve of macro-elements and sometimes microelements, to be complete.

The best results are obtained when using an irrigated system of culture and variable doses of Phosphorous and Nitrogen fertilizers, the maximum supply being of N<sub>120</sub>P<sub>100</sub>.

## BIBLIOGRAPHY

1. Abu-Awwad A. M. (1999). *Irrigation water management for efficient water use in mulched onion*. Journal of Agronomy and Crop Science vol. 183.
2. Goian M. F. Sala, Adina Berbecea, Isidora Radulov, C. Gherban . (2000). *The effect of mineral fertilizers upon the bean production of maize, on cambic chernozem within the Timisoara Didactic Research Station, between 1997 and 1999*. Scientific research U.S.A.M.V. Timisoara, Agriculture Category. volume XXXII, part I. Agroprint Publishing House. Timisoara.
3. Hera C. (1972). *The influence of fertilizers upon certain maize hybrids sowed on different types of soils in Romania*. An. ICCPT. Fundulea XXXVII.
4. Marghidanu, N. *et al.* (1985). *Economia mecanizării agriculturii*. Editura Ceres. București.
5. Mărghitaș Marilena, M. Rusu. (2003). *Utilizarea îngrășămintelor în agricultură*. Ed. AcademicPres. Cluj-Napoca.
6. Olimpia Pandia. (2006) *Fertilizer doses, different methods applied for establishing the quality of two hybrids Danubiu and Minerva*. Scientific research I.N.M.A.T.E.H.I. Bucharest.
7. Sărăcin, I. (2005). *Energetic Base for Agriculture. Transmissions*. Unversitaria Publishing House. Craiova.
8. Sima E. (2002). *Ecological Agriculture and Changing Perception in the Case of Quantity and Quality*. The Information and Economic Reference Material Center. Bucharest.

**ASSESSMENT OF PUBLIC GOOD ENERGY ENVIRONMENT - SOY****MIHAELA CRISTINA VLAD<sup>1</sup>, BEREVOIANU ROZI LILIANA<sup>2</sup>**

**Summary:** *There are sectors of agriculture, manufacturing processes where conventional power is indispensable, although it may be more savings and better managed. Agricultural production consumes large amounts of conventional energy, especially oil to the normal process flow results more or less efficient in terms of yield per hectare. Renewable energy sources must be considered in the context of climatic resources of a country, bioconversion processes, the phenomenon of photosynthesis in the plant world, which have sometimes unimaginable opportunities for agriculture to provide various forms of energy available. Agro energy new field of study and research is closely linked to climate resources, primarily those from the sun, as totally free.*

**Keywords:** *biodiversity, ecosystems, agricultural production, energy balance*

**INTRODUCTION**

Biodiversity is necessary to sustain ecosystem functions, structure and processes, having a significant impact on production, which can meet various needs of farmers and society in general. It must be well managed in order to provide options for optimizing agricultural production and contribute to ecosystem resilience and risk mitigation within them.

Good management of biodiversity can lead to sustainable agricultural production. This can be achieved by following good agricultural practice of ecosystem-based approaches to improve the sustainability of production systems. They aim to meet consumer needs for agricultural products of high quality, safe and produced in a responsible way towards the environment and society.

**MATERIAL AND METHOD**

Material underlying this work consists of an extensive bibliography, literature and research reports ADER project 4.1.3 "Irrigated crop impact assessment / intensive soybean agriculture soil characteristics on the balance sheet, the economic environment and productive while minimizing loss of biodiversity in agro-ecosystems in order to define specific environmental public goods." The method used is to calculate consumption and production of energy efficiency and energy balance for irrigated soybean crop in the system, the methodology for calculation and analysis of energy efficiency in agriculture. The area considered for soybean crop is 1 hectare, and the costs of materials and supplies, work materials, mechanical works are the optimal framework of technology related to a major production of 1500 kg.

**RESULTS AND DISCUSSION**

In order to comply with the code of good agricultural practices in vegetable crops in our case for soybean crop in irrigated system, should be considered calculating and energy. Calculate the energy and optimal allocation can be based fertilizers, materials and supplies, and perform mechanical work in the farms.

If the system irrigated soybean crop on an area of 1 hectare obtained 12.522kwh energy production, directly influenced by the level of production of 1500 kg / ha (Table 1).

Table 1 - Production of energy from soy crop irrigated system

Specification	U.M.	Value
Primary production	kg / ha	1500
Main production factor	kwh	5.78

<sup>1</sup> PhD. Ec., Research Institute of Agricultural Economics and Rural Development, cristina.vlad@iceadr.ro

<sup>2</sup> D. Ing., Research Institute of Agricultural Economics and Rural Development, berevoianu.rozi@iceadr.ro

Secondary production	kg / ha	900
Coefficient of secondary	kwh	4.28
Energy production for primary production	kwh	8670
Energy production for secondary production	kwh	3852
<b>TOTAL PRODUCTION OF ENERGY</b>	<b>kwh</b>	<b>12522</b>

Source: own calculations

Direct active energy is the energy expended to produce power (work) for the operation of various tools of harsh labor work object. By their nature, direct active energies are: human energy; Energy animal traction fossil fuel: diesel, gasoline, coal, natural gas; electricity; thermal energy (steam); solar energy; wind energy; hydraulic energy. Active Energy Direct soybean crop in irrigated system is 779 kWh, which includes hours mechanized human energy (days worked / culture) and diesel consumption for the agricultural machinery (Table 2).

Table 2 - Direct energy consumption active soybean crop in irrigated system

Specification	U.M.	Value
Hours Motor + Z.O.	no. / hour	38.5
Human energy coefficient	kwh	0,074
Total human energy consumption	kwh	3
Diesel consumption / ha	it	63855
Coefficient diesel	kwh	12.15
Total diesel consumption	kwh	776
<b>Total energy consumption activities directly</b>	<b>kwh</b>	<b>779</b>

Source: own calculations

Indirect active energy is the energy spent for manufacturing or extracting various substances (materials) to increase production or to avoid crop loss. From this group of drugs are chemical fertilizers, amendments, pesticides, herbicides, micronutrients. Also in this group includes manure, but whose power was equated with energy requirements for the production of nitrogen, phosphorus and potassium content in them chemically.

Table 3 - Energy consumption active indirect soybean crop in irrigated system

Specification	U.M.	Value
Nitrogen fertilizer consumption	kg to	34
Coefficient nitrogen fertilizer	kwh	25.7
Phosphorus fertilizer consumption	kg to	70
Coefficient of phosphorus fertilizer	kwh	5.65
Total fertilizer consumption	kwh	1269
Pesticide consumption	kg	0.3
Pesticide consumption	it	3.5
Coefficient pesticide	kwh	73
Total pesticide consumption	kwh	277
Seed consumption	kg	110
Coefficient seed	kwh	5.78
Total seed consumption	kwh	636
<b>TOTAL ENERGY CONSUMPTION indirect activity</b>	<b>kwh</b>	<b>2183</b>

Source: own calculations

Energy consumption passive soybean crop is 71 kWh and is the energy expended to manufacture fixed assets - tractors, machinery, construction etc. inert materials and for the manufacture of, for example, wire, rope, etc. (Table 4).

Table 4 - Energy consumption passive soybean crop in irrigated system

Specification	U.M.	Value
Twine	kg	2
Coefficient string	kwh	7792
Consumption string	kwh	16
Power consumption of tractors and agricultural machinery	kwh	55
<b>TOTAL ENERGY CONSUMPTION PASSIVE</b>	<b>kwh</b>	<b>71</b>

Source: own calculations

Total energy from one hectare of soybeans, with a production of 1500 kg, is 3,033 kWh and power structure of the course emphasizes a high level of active energy indirect, direct energy representing only 26% of total energy consumed (Table 5).

Table 5 -Power total energy in the system soybean crop irrigated

Specification	U.M.	Value	%
ENERGY CONSUMPTION activities directly	kwh	779	26
ENERGY CONSUMPTION indirect activity	kwh	2183	72
PASSIVE ENERGY CONSUMPTION	kwh	71	2
<b>TOTAL ENERGY CONSUMPTION</b>	<b>kwh</b>	<b>3033</b>	<b>100</b>

Source: own calculations

The soybean crop energy balance is positive with a value of 9.490 kWh / ha (as the difference between the energy produced and consumed). In terms of energy efficiency it shows high efficiency, being 4.13 kwh energy obtained per unit consumed.

Table 6 - Annual energy soybean crop irrigated system

Indicator	Symbol	Value
Energy production / ha	PE / ha	12522
Total energy consumption / ha	Cte / ha	3033
Energy balance	BE	9490
Energy efficiency	RE	4.13

Source: own calculations

## CONCLUSIONS

Climate resources are a fundamental component of the energy of the biosphere, the ecosystem, which determine crop yield. They are integrated components of the agricultural environment that have a role in the storage and use of energy.

Solar power plant production capacity depends if you ensure its optimal storage conditions and rational use of other forms of energy from the ground. Solar energy is the origin of all forms of energy and power; solar energy falling on the Earth is estimated at about 129 billion MW, equivalent to 100 million nuclear high. For photosynthesis using a small part of the energy which is used in the production of metabolic processes yield. This free energy is introduced in the ecosystem, which determines life on earth and human nutrition.

Solar district heating based on solar radiant energy is found in agriculture, it is widespread in the domestic sector housing heating, hot water in countries with excessive radiative regime with high insolation throughout the year. Solar district heating is available for various sectors of

agriculture - greenhouses, hotbeds, workshops, small industries. In greenhouses, heat is accumulated as a result of penetration of sunlight through the roof of transparent glass or plastic, having the effect of reducing heat losses. Photosynthesis is one of the most effective technologies to produce energy in large quantities in the biosphere reserve inexhaustible. The useful vegetation, water and carbon dioxide from the air, it is a factory energy and self control can still take several billion years. 1961 Nobel laureate in chemistry, Melvin Calvin, in laboratories Berkeley - California, made the first artificial cell that mimics photosynthesis. Photosynthesis will become a true technology of the future in the service of agriculture.

Energy conservation and energy storage means and its output in the ecosystem. Ecosystems receive large amounts of energy in different forms: solar radiation, wind energy, plant and animal organic matter, mineral matter from chemical fertilizers, organic matter in soil animals and insects. The main objective of the effective leadership of the ecosystem is to be able to calculate at least in theory, all energy inputs.

There is a tendency to obtain increasing amounts of agricultural products per unit area occur specific energy consumption even higher. This energy must be limited or reduced in the manufacturing process.

Intensive agriculture involves direct energy consumption (fuel and electricity) and indirect (fertilizers and equipment) that is a matter of great importance. Energy conservation by saving requires an optimal ratio between direct and indirect energy, reduce energy consumption, especially in the second half.

In agriculture, crop production is the only branch of the energy consumed in the form of labor, fuel, electricity, fertilizer, etc., and fixed agricultural materializes generators.

Renewable energy, along with energy efficiency improvement, is benchmarks in the development of cleaner energy, both in industry and in agriculture. Renewable energy sources must be analyzed on a case by case basis to assess the consequences and long-term economic ECOTEHNIC.

## REFERENCES

- [1] I. Teșu, Baghinschi V. (1984), "Energy and Agriculture", Ceres Publishing
- [2] 4.1.3 ADER Project "Impact Assessment irrigated culture / on balance sheet intensive soybean agriculture soil characteristics, environmental and economic productive while minimizing the loss of biodiversity in agro-ecosystems, to define environmental public goods specific".

# THE ECONOMIC EFFICIENCY FOR THE VEGETABLE CULTURE IN PROTECTED AREA

Necula Diana Maria<sup>1</sup>

**Abstract** *In this study, it is considered setting up a vegetable farm in protected areas and the economic efficiency of the proposed vegetable crops. The investment itself involves setting up a vegetable farm in protected areas, whose capacity will be of 1,000 square meters. The proposed vegetable varieties for cultivation are: tomatoes, cucumbers and spinach. The solarium will consist of two modules with metal structure covered with plastic wrap in dual inflatable fitted with drip irrigation and fertigation. For water supply is provided drilled and purchase of equipment needed in the production flow: tiller, drill, plug, etc. In the analysis performed we estimated two hypothetical situations: where basic investment expenditures (106,578 lei) are covered by the loan to the bank and the situation in which the investment is financed 40% by way of grant and 60% loan form the bank. Are calculated for each of these two cases the basic investment expenses, receipts and payments for a period of 5 years at the date of investment.*

**Keywords:** *Vegetable farm, investment, payments and receipts.*

## INTRODUCTION

The vegetables are part of the daily food ration of man, either fresh or processed, which has a significant economic importance, both for the consumer and producer of vegetables.

The statistics show that the main vegetables produced in Romania, in order of weight are, potatoes, followed by cabbage, tomatoes, sugar beet, melons, onions, cucumbers and peppers.

Although Romania has favorable conditions for the cultivation of vegetables, horticultural system degradation led to the Romanian market entry of imported vegetables: tomatoes, peppers, cucumbers, peas, potatoes, onions, etc. The vegetables import is done for reasons of demand substitution, not to make something that does not grow in our country.

The amount of vegetables consumed is influenced by several trends that currently occurs on Romanian market.

First, there is a tendency for consumers to switch to local products, especially when it comes to seasonal products. Romanian taste and quality are recognized and appreciated by consumers preferring them at the expense of another origin.

Secondly, a tendency to move towards a healthier diet that includes a higher intake of vegetables and fruits. In Romania, the annual consumption of fruits and vegetables is about 120 kg / capita, and the EU average, is between 180-200 kg/capita.

## MATERIAL AND METHOD

This study was gone through two hypothetical situations: where the costs for the basic investment loan is covered by the bank and the situation in which the investment is funded through grants and bank loan.

As a method of analysis it was used the normative and constructive method which consists of a comparative analysis of two hypothetical situations proposed.

## RESULTS AND DISCUSSION

### 1. Project Description

The solarium is designed specifically for both the climate in Romania coverage recommended height (trough height: 2.30 m Ridge height: 4.00 m), ventilation and resistance to the strong winds 110 km / h and deep snow (50kg / m vertical load).

---

<sup>1</sup> Researcher Diana Maria Necula, ICEADR, necula.diana @ iceadr.ro

The solarium coverage is made with plastic, inflatable double system with long-term use. Isolation front end is made of double-layer inflatable foil.

To access the greenhouse is mounted a metal sliding door with the opening of two pieces of 3.3 m covered with poly carbonate (lexan) of 6 mm and the rail is secured in concrete, with a height of 2.25 m. The side ventilation is achieved through openings wound manually operated.

**For power supply** KIT is proposed installation of a PV power 840W to ensure consisting of polycrystalline 280W solar panels, size: 1956 \* 992 \* 50mm.

**For water supply** we proposed the establishment of a deep drilled 30 m to ensure crop irrigation for water needed. It is provided with a manhole and will use PVC tube with a diameter of 125mm.

**The irrigation system and drip fertigation, comprising:**

- Main water supply pipeline,
- 10 drip hose lines (tube) diameter 16 mm solar module, the droppers are placed at 30 cm distance / rate of 2.0 l / h / dropper.
- Pump Dispensers (type DOSATRON) mounted on backbone connected to the source of water and fertilizer tank.

The fertirrigation drip system is the most effective solution for irrigation of vegetables in greenhouses and in the field. The drip irrigation has a plurality of advantages listed below, leads finally to obtain a production increase of up to one hundred percent and increase product quality.

**Advantages of irrigation and drip irrigation are:**

- Allows accurate dosing of water required different types of crops, eliminating losses;
- Allows management of fertilizers and various treatments during irrigation;
- Maintain soil structure and texture so that the root system of plants can grow much better than other methods of irrigation;
- The drip irrigation does not cool the soil which eliminates the stress of the plant that would have had if other than drip irrigated;
- Collapse possibility of developing wet weeds because the only active area of plant roots in culture, resulting in the elimination of weed control treatments;
- Collapse can spread throughout the crop diseases and pests;
- Low energy consumption and water;
- Dry areas between the rows of plants allow easy access within specific cultures so that work can be made easier and faster .;
- Manpower necessary for the operation of drip irrigation system is much lower compared to other forms of irrigation, which means more time for other activities and reduce costs;
- Drip fertigation installation does not require skilled labor exploitation;
- As an accumulation of some of the benefits listed above, drip fertigation system can provide increased productivity by up to 100%;

It will acquire the technological equipment necessary: tiller, plow, rotary, etc.

**The motorized hoe** is a machine of simple construction, low power motor performs:

- Preparing the soil (with drills) for sowing and planting;
- Maintenance of cultures (with hoeing and rarity);

Specifications:

- Engine capacity: 7 hp / 5.14KW (power calculated at 3600 revolutions/min.)
- Adjustable Working width: 800-1400mm;
- Units: Rare adjustable weeding, metal wheels, plug plowing, rubber wheels, milling, digging, couple.

**2. Estimate of expenditure**

Expenses necessary to achieve the objective are divided in:

- **Costs for utilities necessary** lens contains water supply costs and electricity supply.
- **Expenses for design and technical assistance** include expenses for field studies, design, technical support, etc.

- **Expenses for investment**, costs include construction and installation, assembly machines, tools and equipment necessary for conducting agricultural activity.
- In Chapter other expenses enter the site organization costs and fees expenses.

**Table 1. The expenditure shown in the general budget to achieve the objective by category of expenditure**

Crt.	Categories of expenditure	Lei	%
1	Costs for utilities necessary objective	24767	16.6
2	Expenses for design and technical assistance	10347	6.9
3	Expenses for the basic investment	106.578	71.4
4	Other expenses	7524	5.1
Total Investment		149.217	100

### 3. Annual costs for agricultural activity

- *Annual costs for raw materials* - **include** the amount for the purchase of raw materials and materials in agricultural activity in the solar vegetable cultivation: planting, disinfectants, support material, fertilizers, pest treatment, packaging, fuel, etc.

Table no. 2 The annual costs for raw materials

Raw materials	UM	Consumption unit	Annual Consumption	Unit Price (VAT included)	Total annual payments
				LEI / UM	LEI / UM
Spinach seed	kg	2g / sqm	February	23.34	46
Tomato Seedling	pc	2.5 plants / m	1250	One	1250
Cucumber Seedling	pc	2.2 plante / sqm	1100	One	1100
Fertilizers, pest treatment	l	aprox. 2 l solution / 500 sq m	10	30	300
Disinfectants ground	l	70 l / 1000 sq.m.	70	13.5	945
Twine support	kg	1kg equivalent to 1600ml	5	15	75
Black film mulching	kg	approx. 35 kg (equivalent to 2400 mL)	70	12	840
Wire support	kg	10 lines / 50 m / row about 2 Kg	4	Three	12
Packing	pc	capacity 10 kg / pc	400	1.5	600
Fuel consumption	l	about 1.8L / h	16	6.3	101
Total expenditure on raw materials					5269

- *Personnel expenses in the amount of 17.100 lei / year* is the monthly salary costs including social security contributions.

Labor necessary agricultural activities will be provided by a single employee and family members.

- *Payments for agricultural activity*, worth 4350 lei / year represents insurance spending, distributes and administrative expenses.

**Table 3. Other payments to agricultural activity**

Specification	Total disbursements annual LEI
Expenditure insurance	1,350
Distributes expenses	1,200
Administrative expenses	1,800
<b>Total other payments</b>	<b>4350</b>

*In Chapter other payments* - Values of local taxes on land and construction costs estimated at 5.5% tax contributions to CASS and 31.3% for CAS, pay VAT tax rate is 24%, net income tax ( 16%).

**Table no. 4 Other pay the local taxes**

Specification	Total annual disbursements LEI
Local taxes	969
Expenditure tax contributions due	4531
VAT	2,490
Income tax net	2180
<b>Total other payments</b>	<b>10170</b>

#### 4. Production-capacity estimate.

To estimate production capacity of varieties of vegetables grown in solar resulting in:

- Crops spinach, on 1000 sqm productivity average of 2 kg / sqm / month resulting annual production of 2,000 kg.

- To crop cucumbers on 500 sqm average productivity per month for 5 kg / m<sup>2</sup> and a sampling period of 4 months, resulting annual production of 10000 kg.

- The tomato crop on an area of 500 square meters, the average productivity per month 3 kg / m<sup>2</sup> and a sampling period of 4 months, follows an annual production of 6,000 kg.

The culture of spinach in the solar system is in successive cultures, in this case before the basic culture (tomatoes, cucumbers, etc.).

The quantity and value forecast revenues from agriculture, is as follows (table 5):

**Table no. 5 Income annual physical and value crops of tomatoes, cucumbers and spinach.**

Nr. Crt.	Category	Price / Unit	Physical Sales	Sales value
		lei / kg	KG	LEI
1	Tomatoes	Three	6000	18000
2	Cucumbers	2.5	10000	25000
3	Spinach	4.5	2000	9000
<b>Total sales</b>			18000	52000

In this study we analyzed two situations:

A. The situation where the costs for the basic investment (106,578 lei) are covered by credit from the bank (hypothetical situation no. 1).

In this hypothetical situation (No.1) was considered necessary investment bank loan for the amount of 106,578 lei worth base representing a rate of 71.4% and own contribution in the amount of 69,358 lei.

The following table presents rates, interest and fees associated with the loan contracted for 6 years with an annual interest rate of 8%, the first year of grace, year of the project, starting pay rates since February (the first year of forecast).

**Table 6 panel of bank loan repayment (hypothetical situation No.1)**

Specification	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Rate	0	21316	21316	21316	21316	21316
Interest and commissions	7816	7745	6039	4.334	2,629	924
<b>Total Payments</b>	<b>7816</b>	<b>29060</b>	<b>27355</b>	<b>25.650</b>	<b>23945</b>	<b>22239</b>

**Table No. 7 Estimate the hypothetical situation no. One**

Nr. No.	Category	UM	TOTAL YEAR 1
1	Own contribution	LEI	69358
2	Other income (interest, etc.)	LEI	27289
3	Loans contracted	LEI	106.578
Total receipts		<b>LEI</b>	<b>203.225</b>
4	Payments for debt repayment:	LEI	<b>7817</b>
5	- Loans taken from banks and interest	LEI	7817
6	Payments related to the project	<b>LEI</b>	<b>149.217</b>
<b>TOTAL PAYMENTS</b>		LEI	<b>157.034</b>
<b>AVAILABLE CASH AT END OF PERIOD</b>		LEI	<b>46191</b>

Table. 8 contains estimates of revenue and payments for a period of 5 years after the investment.

Includes revenues from agriculture, estimated at the same level throughout the period, payments to settle the debt (bank loan), taxes on agricultural activity, which consists of payments for raw materials and other payments to agricultural activity (staff costs and administrative payments, distribution, etc.).

In the part of other expenses payments are included VAT, taxes and fees.

**Table 8 Estimate of receipts and payments over a period of 5 years from the investment**

Nr. Crt.	Category	UM	Year 1	AN 2	YEAR 3	YEAR 4	AN 5
<b>Proceeds from agriculture</b>		LEI	<b>52,000</b>	<b>52,000</b>	<b>52,000</b>	<b>52,000</b>	<b>52,000</b>
<b>Payments for debt repayment:</b>		LEI	<b>29060</b>	<b>27355</b>	<b>25.650</b>	<b>23945</b>	<b>22239</b>
<b>Payments for farming:</b>		LEI	<b>26719</b>	<b>26719</b>	<b>26719</b>	<b>26719</b>	<b>26719</b>
One	- Payments for raw materials	LEI	5.269	5.269	5.269	5.269	5269
February	- Other payments	LEI	21450	21450	21450	21450	21,450
<b>Other payments</b>		LEI	<b>10170</b>	<b>10170</b>	<b>10170</b>	<b>10170</b>	<b>10170</b>
<b>TOTAL PAYMENTS</b>		LEI	<b>65949</b>	<b>64244</b>	<b>62539</b>	<b>60834</b>	<b>59128</b>
<b>SURPLUS / DEFICIT</b>		LEI	<b>-13,949</b>	<b>-12,244</b>	<b>-10,539</b>	<b>-8834</b>	<b>-7128</b>
<b>CASH AVAILABLE FROM THE PREVIOUS PERIOD</b>		LEI	<b>46191</b>	<b>32242</b>	<b>19997</b>	<b>9458</b>	<b>623</b>
<b>AVAILABLE CASH AT END OF PERIOD</b>		LEI	<b>32242</b>	<b>19997</b>	<b>9458</b>	<b>623</b>	<b>-6505</b>

By estimating receipts and payments table, for a period of 5 years from the time of investment demonstrates that the investment available cash in the first year of implementation is 46,191 lei in the first year of forecast earnings from agriculture are worth 52,000 lei and total payments worth of 65,949 lei, resulting in available cash at the end of the first year of 32,242 lei. In the coming years the forecast available cash at the end is becoming smaller, with proceeds from agricultural activity cannot cover, thus Year 5 tested negative.

**B.** The situation in which the investment is financed 40% through grants and 60% bank loan (hypothetical situation No.2)

Table No. 9 The project

Financial Plan	Value eligible	Value ineligible	Total
Public aid grant	46446		46446
Private co-financing, of which:	69669	33102	102,771
- Self-financing		33102	33102
- Loans	69669		69669
<b>TOTAL PROJECT</b>	<b>116,115</b>	<b>33102</b>	<b>149,217</b>

As shown in the data table 9, where no.2 hypothetical situation, public aid for 46446 lei, representing a 40%, the loans from contracted bank of 69669 lei, representing a 60% of the eligible project .

Self-financing of 33102 lei, are not for eligible project expenses (VAT, etc.).

**Table no. 10 Pictures of bank loan repayment (hypothetical situation No.2)**

Payments to pay bank debt	Year Implementation	1 Forecast Year 1	Year 2 of the weather	3 year forecast	Year 4 forecast	5 year forecast
<b>Rate</b>	0	13934	13934	13934	13934	13934
<b>Interest and commissions</b>	5109	5063	3948	2,833	1,719	604
<b>Total Payments</b>	5109	18996	17882	16767	15652	14538

Table No.10 stands out rates and interest on those six years, the first year of implementation and 5 year forecast period that covers the loan in the amount of 69669 lei with an annual interest rate of 8% and the year of grace implementation project.

**Table. 11 Estimate the hypothetical situation No. 2**

13	Own contribution	LEI	33102
15	Other income (interest, etc.)	LEI	27289
17	Loans contracted	LEI	69669
18	Grant EAFRD	LEI	46446
<b>Total receipts</b>		<b>LEI</b>	<b>176.506</b>
19	Payments for debt repayment:	LEI	<b>5109</b>
20	- Loans taken from banks and interest (and interest rates	LEI	5109
31	Payments related to the project EAFRD:	<b>LEI</b>	<b>144.107</b>
32	-achiziții tangible fixed assets, including VAT	LEI	7741
33	-achiziții intangible fixed assets, including VAT	LEI	11655
34	-increasing investment being	LEI	124.712
<b>TOTAL PAYMENTS</b>		LEI	<b>149.217</b>
<b>SURPLUS / DEFICIT</b>		LEI	<b>27289</b>
<b>AVAILABLE CASH AT END OF PERIOD</b>		LEI	<b>27289</b>

In the hypothetical situation No.2 revenues is the sum of own contribution, grant loans and aid plus other income, and if the sum of payments for the payment of debt payments and payments linked to the proposed investment, resulting in late implementing a cash available of 27289 lei.

**Table 12 The estimate of receipts and payments over a period of 5 years from the investment**

Nr. Crt.	Category	UM	Year 1	AN 2	YEAR 3	YEAR 4	AN 5
	Proceeds from farming.	LEI	<b>52,000</b>	<b>52,000</b>	<b>52,000</b>	<b>52,000</b>	<b>52,000</b>
	Payments for debt repayment:	LEI	<b>18996</b>	<b>17882</b>	<b>16767</b>	<b>15652</b>	<b>14538</b>
	Payments for farming:	LEI	<b>26719</b>	<b>26719</b>	<b>26719</b>	<b>26719</b>	<b>26719</b>
One	- Payments for raw materials	LEI	5269	5269	5269	5269	5269
February	- Salaries and expenses for carrying agricultural	LEI	21,450	21,450	21,450	21,450	21,450
Three	Taxes	LEI	10170	10170	10170	10170	10170
<b>TOTAL PAYMENTS</b>		LEI	<b>55886</b>	<b>54771</b>	<b>53657</b>	<b>52542</b>	<b>51427</b>
<b>SURPLUS / DEFICIT</b>		LEI	<b>3886</b>	<b>2771</b>	<b>1657</b>	<b>-542</b>	<b>573</b>
<b>CASH AVAILABLE FROM THE PREVIOUS PERIOD</b>		LEI	<b>27289</b>	<b>23403</b>	<b>20632</b>	<b>18975</b>	<b>18433</b>
<b>AVAILABLE CASH AT END OF PERIOD</b>		LEI	<b>23403</b>	<b>20632</b>	<b>18975</b>	<b>18433</b>	<b>19006</b>

The data presented in Table 12 is distinguished receipts and payments for the 5-year forecast after the issuing of investment, resulting in:

- In the first year receipts are 52,000 lei and 55,888 lei payments, resulting in a deficit of -3886 lei, using the available cash at the end foregoing a cash available at the end of the first year of 23,403 lei.
- In the coming years using the available cash payments cover the previous period of agricultural activity and contrast the payments for loans, as in the past year to have a surplus of 573 lei and available cash at the end of 19006 lei.

## CONCLUSIONS

The first hypothetical situation analysis that is very difficult to sustain a bank loan only from the proceeds of agricultural activity carried out in a vegetable farms, it will risk that after the first years not to have cash to cover expenses necessary for agricultural activity and cover the loan. In this case, the own contribution should be much higher.

In the second hypothetical situation analyzed demonstrates that public support is very important. Together with revenues from agricultural activity available cash farmer provides necessary expenses for carrying out agricultural activities on the farm and cover payments for debt repayment.

Of the two hypothetical situations arise that implementation of the project by attracting grants resulting in a shorter recovery time than in the case of the first case in which the investment project was made entirely from own sources.

Through the investment and application of new technologies that will ensure the deployment of technological process for growing vegetables under optimum conditions will get increased production yields, high value-added products with higher quality and will meet the most important growth lens- income.

## REFERENCES

1. Adrian Turek Rahoveanu, (2008), Analysis chain fruits and vegetables sector in Romania, Bucharest, Romania, University Charter.
2. \*\*\*<http://www.proiectetip.iceadr.ro/home/proiecte-tip-legume-spatii-protejate>
3. \*\*\*<http://www.gazetadeagricultura.info/plante/legume/14461-model-de-proiect-pentru-2-hectare-de-legume-in-camp.html>
4. \*\*\*<http://irigatii-profesionale.ro/content/4-fertirigarea>

## USE PLANNING ANALYSIS ON AGRICULTURAL HOLDINGS ACCORDING TO THEIR PHYSICAL SIZE. CASE STUDIES

VLAD MIHAELA CRISTINA<sup>1</sup>

**Summary:** *The processes of planning of the production activity of agricultural holdings are, in fact, a number of activities to study the alternatives and choose the optimal Variant. It is conducted on the basis of the theory of planning by the manager/administrator and seeks to provide for a high efficiency of work, to develop and refine the tools, techniques and levers for the conduct of competition on the market, to reduce the uncertainty, to ensure management and control instruments in crisis situations, etc.*

**Keywords:** *the production plan, marketing plan, business plan*

### INTRODUCTION

Planning production activity is more than a mere theoretical concept, she's expressing a complex ensemble of action which aims to divert economic activity corresponding to the previously anticipated, the scientific determined under a plan.

The process of planning of the production activity of the agricultural holding is, in fact, a number of which are doing is studying alternatives and choose the optimal Variant. It is conducted on the basis of the theory of planning by the farmer and seeks to provide for a high efficiency of work, to develop and refine the tools, techniques and levers for the conduct of competition on the market, to reduce the uncertainty, to ensure management and control instruments in crisis situations, etc.

### MATERIAL AND METHOD

Analysis of the replies to the questionnaires applied in Microregion 4 (counties of Dolj, Gorj, Mehedinți, Olt and Vâlcea), Romania, depending on the type and size of holdings, it required the processing of data with SPSS program, through the Split-File so that it can generate summaries on the situation of separated 103 vegetable farms and livestock holdings 87. In this way, it was established how to use planning under the two types of holdings, but also depending on the selected physical size classes according to the classification of agricultural censuses in the counties self-realization taken as case studies. This article has been prepared for dissemination of the results of the thesis "Studies on the planning of agricultural holdings. Case studies", at the University of Agricultural Sciences and Veterinary Medicine of Bucharest.

### RESULTS AND DISCUSSION

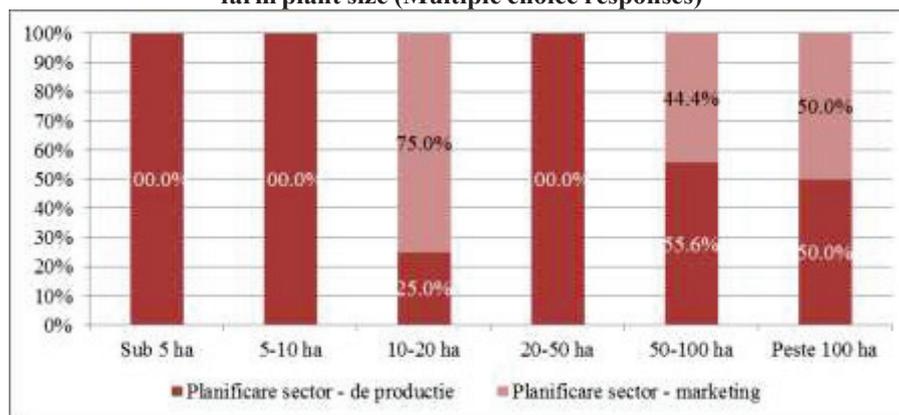
Within the farm production sector planning plant is a current activity regardless of their size. On the other hand, the planning of production activity is only used within the holdings of 10-20 hectares and over 50 hectares. Marketing sector planning is performed in about 50% of farms with more than 50 hectares, other opts for planning production sector (Figure 1).

Also, most farms produce action plans, with the exception of 20.7% of individual farms (table 1).

Implementation of the action plans in writing shall be performed by all of the holdings of more than 20 hectares, and 34.5 percent of individual holdings, 68% of those with 5-10 ha and 25% of those with 10 to 20 ha (table 2).

---

<sup>1</sup> PhD. Ec., Research Institute for Agricultural Economics and Rural Development, [cristina.vlad@iceadr.ro](mailto:cristina.vlad@iceadr.ro)

**Figure 1** Frequency of answers to the question "For that sector of the holding shall be determined targets?" on farm plant size (Multiple choice responses)

Source: own-SPSS processing, sample vegetable culture-103

**Table 1** Frequency of answers to the question "for the planned objectives shall draw up a plan of action?" on the vegetable farm

		Frequencies	Weights (Per Cent)
Under 5 ha	Yes	46	79.3
	Not	12	July 20th
	Total	58	100.0
5-10 ha	Yes	19	100.0
10-20 hectares	Yes	4	100.0
20-50 ha	Yes	9	100.0
50-100 ha	Yes	5	100.0
Over 100 ha	Yes	8	100.0

Source: own-SPSS processing Note: sample crop culture-103

**Table 2** frequency of answers to the question "will implement the action plan in written form? (business plans/budgets/etc) " on the vegetable farm

		Frequencies	Weights (Per Cent)
Under 5 ha	Yes	20	34.5
	Not	38	65.5
	Total	58	100.0
5-10 ha	Yes	13	68.4
	Not	6	31.6
	Total	19	100.0
10-20 hectares	Yes	1	25.0
	NS/NR	3	75.0
	Total	4	100.0
20-50 ha	Yes	9	100.0
50-100 ha	Yes	5	100.0
Over 100 ha	Yes	8	100.0

Source: own-SPSS processing Note: sample crop culture-103; respondent sample: 100

The above used holdings in particular planning through business plans, while only holdings of over 50 ha uses and marketing plans (table 3, Figure 2).

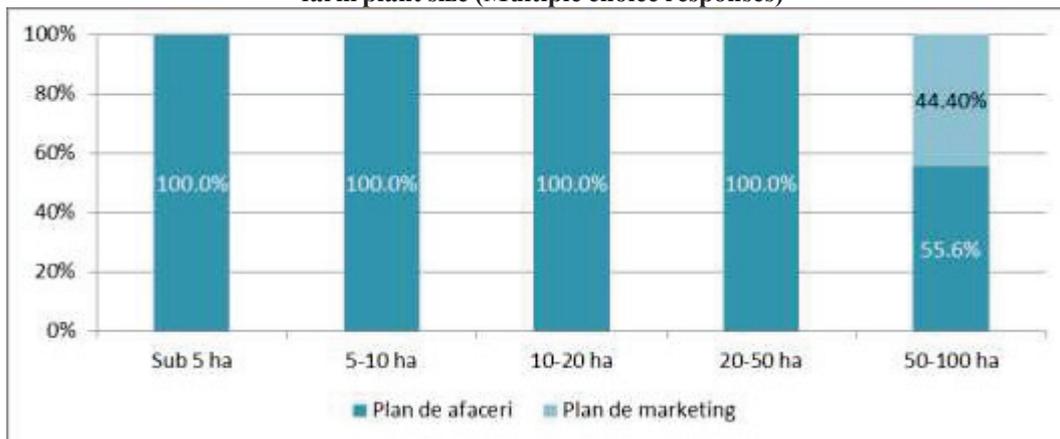
**Table 3** Frequency of answers to the question "which of the following documents for use in planning?" on the vegetable farm

		Business Plan		Marketing Plan	
		Frequencies	Weights (Per Cent)	Frequencies	Weights (Per Cent)
Under 5 ha	Yes	20	34.5	0	0,0
	Not	0	0,0	20	34,5
	NS/NR	38	65.5	38	65,5
	Total	58	100.0	58	100.0
5-10 ha	Yes	13	68.4	0	0,0
	Not	0	0,0	13	68,4
	NS/NR	6	31.6	6	31,6
	Total	19	100.0	19	100.0

		Business Plan		Marketing Plan	
		Frequencies	Weights (Per Cent)	Frequencies	Weights (Per Cent)
10-20 hectares	Yes	1	25.0	0	0,0
	Not	0	0,0	1	25.0
	NS/NR	3	75.0	3	75.0
	Total	4	100.0	4	100.0
20-50 ha	Yes	9	100.0	0	0,0
	Not	0	0,0	9	100.0
	Total	9	100.0	9	100.0
50-100 ha	Yes	5	100.0	4	80.0
	Not	0	0,0	1	20.0
	Total	5	100.0	5	100.0
Over 100 ha	Yes	8	100.0	8	100.0

Source: own-SPSS processing Note: sample crop culture-103; sample respondent: 56

**Figure 2 the frequency of answers to the question "which of the following documents for use in planning?" on farm plant size (Multiple choice responses)**



Source: own processing-SPSS

In most establishments, regardless of their size, the Manager/as is responsible for the implementation of the action plans and in only about 30-40% of the holding company and the team is involved (table 4).

Accumulation of positive responses allows us to observe (Figure 3) that the% of farms with 86,7 5-10 ha, in about 60-70% of those with over 50 hectares and in 50% of those under 5 ha, Manager/Manager is directly involved in the implementation of the action plans of the agricultural holding.

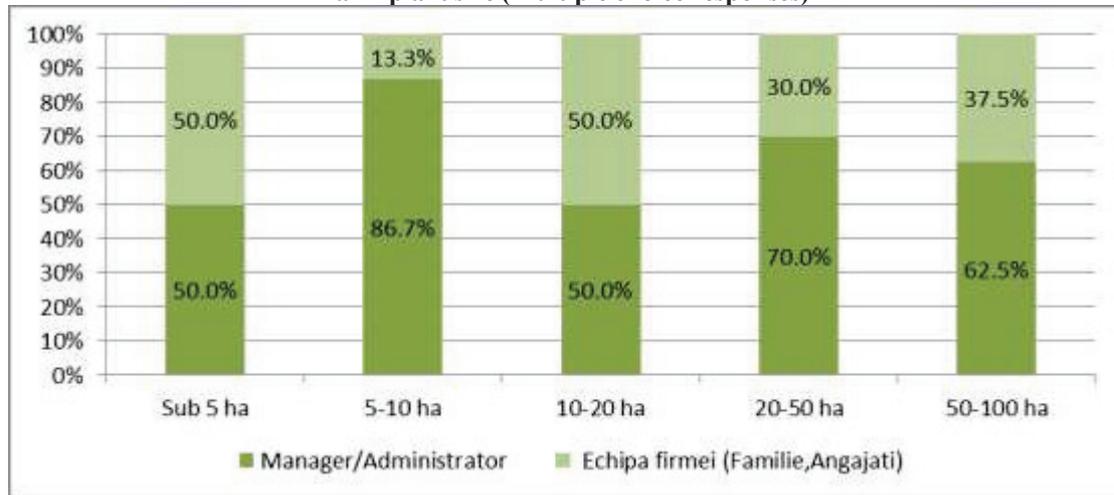
**Table 4 Frequency of answers to the question "in the implementation of the action plan who is involved?" on the vegetable farm**

		Manager/Administrator		Company team	
		Frequencies	Weights (Per Cent)	Frequencies	Weights (Per Cent)
Under 5 ha	Yes	20	34.5	20	34.5
	NS/NR	38	65.5	38	65.5
	Total	58	100,0	58	100,0
5-10 ha	Yes	13	68,4	2	10,5
	Not	0	0,0	11	57,9
	NS/NR	6	31.6	6	31.6
	Total	19	100,0	19	100,0
10-20 hectares	Yes	1	25,0	1	25,0
	NS/NR	3	75,0	3	75,0
	Total	4	100,0	4	100,0
20-50 ha	Yes	7	77.8	3	33.3
	Not	2	22.2	6	66,7
	Total	9	100,0	9	100,0
50-100 ha	Yes	5	100,0	3	60,0
	Not	0	0,0	2	40,0
	Total	5	100,0	5	100,0
Over 100 ha	Yes	8	100,0	3	37,5
	Not	0	0,0	5	62,5

	Manager/Administrator		Company team	
	Frequencies	Weights (Per Cent)	Frequencies	Weights (Per Cent)
Total	8	100,0	8	100,0

Source: own-SPSS processing Note: sample crop culture-103; sample respondent: 56

**Figure 3 frequency of answers to the question "in the implementation of the action plan who is involved?" on farm plant size (Multiple choice responses)**



Source: own processing-SPSS

Daily activity plan is not implemented in the holdings of less than 5 ha and the use of the holdings of 5-20 ha is very low, but in all other forms of organization this is standard practice (table 5).

**Table 5 frequency of answers to the question "do you have a calendar with daily planning of activities?" on the vegetable farm**

		Frequencies	Weights (Per Cent)
Under 5 ha	Not	58	100.0
5-10 ha	Yes	12	63.2
	Not	7	36.8
	Total	19	100.0
10-20 hectares	Yes	1	25.0
	Not	3	75.0
	Total	4	100.0
20-50 ha	Yes	9	100.0
50-100 ha	Yes	4	80.0
	Not	1	20.0
	Total	5	100.0
Over 100 ha	Yes	8	100.0

Source: own-SPSS processing Note: sample crop culture-103

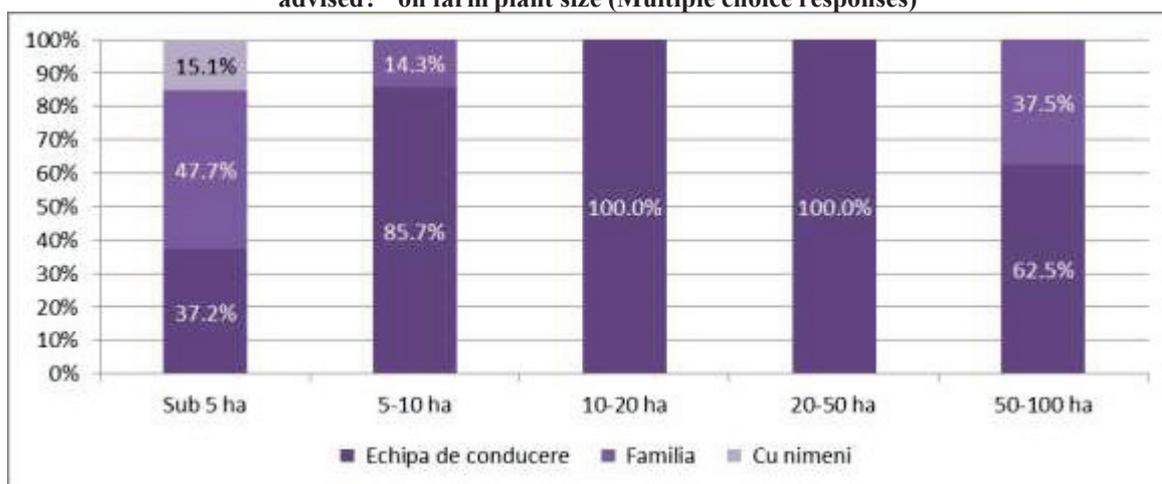
With regard to the involvement of third parties in the management of the farm, analyzed the replies questionnaires reveals the following: consulting leadership team is present in the majority holdings of more than 5 hectares and in about 55% of the holdings of 5ha; consulting with other family members in 70.7% of holdings below 5 hectares, in 60% of the farms of 50-100 hectares and 37.5 percent of the holdings of over 10 ha; about the holdings of managers 22,45 under 5 ha prefer to rely on their own experience (table 6).

Consultation with the family, which was a characteristic of family enterprises and associations, are reflected in the analysis on dimensions, observing that 47.7% of those under 5 hectares and 37.5% of those with 50-100 ha preferring this kind of advice (Figure 4).

**Table 6 Frequency of answers to the question "in the implementation of the action plan with who you advised?" on the vegetable farm**

		Leadership team		Family		With no one	
		Frequencies	Weights (Per Cent)	Frequencies	Weights (Per Cent)	Frequencies	Weights (Per Cent)
Under 5 ha	Yes	32	55.2	41	70.7	13	22.4
	Not	26	44.8	17	29.3	45	77.6
	Total	58	100,0	58	100,0	58	100,0
5-10 ha	Yes	18	94.7	3	15.8	0	0,0
	Not	1	5.3	16	84,2	19	100,0
	Total	19	100,0	19	100,0	19	100,0
10-20 hectares	Yes	4	100,0	0	0,0	0	0,0
	Not	0	0,0	4	100,0	4	100,0
	Total	4	100,0	4	100,0	4	100,0
20-50 ha	Yes	9	100,0	0	0,0	0	0,0
	Not	0	0,0	9	100,0	9	100,0
	Total	9	100,0	9	100,0	9	100,0
50-100 ha	Yes	5	100,0	3	60,0	0	0,0
	Not	0	0,0	2	40,0	5	100,0
	Total	5	100,0	5	100,0	5	100,0
Over 100 ha	Yes	8	100,0	3	37,5	0	0,0
	Not	0	0,0	5	62,5	8	100,0
	Total	8	100,0	8	100,0	8	100,0

Source: own-SPSS processing Note: sample crop culture-103

**Figure 4 the frequency of answers to the question "in the implementation of the action plan with who you advised?" on farm plant size (Multiple choice responses)**

Source: own processing-SPSS

## CONCLUSIONS

Long-term planning activity (by objectives and action plans) is carried by most managers / administrators of farms studied under the age of 55 years and generally have higher agricultural education.

Within the farm production sector planning plant is a current activity regardless of their size. Planning of production activity is only used within the holdings of 10-20 hectares and over 50 hectares.

In the breeding farms, the majority of farms with over 6 ends determine objectives for the production sector and only those with more than 50 head shall establish targets for marketing sector.

Planning documents in written form is used only for about 40% of managers, especially under the age of 25 years and with higher education or agriculture. Implementation of the action plans in writing shall be performed by all of the holdings of more than 20 hectares, and 34.5 percent of individual holdings, 68% of those with 5-10 ha and 25% of those with 10 to 20 hectares. In the livestock sector in 22.2% of farms with 20-49 ends, 40% of farms with 50-99 ends and most of those with over 100 heads

Business plans are the most used planning documents, translating marketing plans into written form only a small proportion of men (about 41-55 years) with high level of education. Just the holdings of more than 50 ha and those with more than 500 heads of livestock use marketing plans.

Implementation of action plans is done especially by managers / administrator teams being involved especially by women; people aged 26-55 years and the majority of people with high level of education.

Activity planning in the short term (daily diary) is used by the majority of managers/administrators of agricultural holdings, but particularly for people under 55 years of age, male gender, with superior and specialist training (higher education, agricultural training). Daily activity plan is implemented in particular in holdings of more than 20 hectares, in about 30% of holdings with 20 to 99 ends and all holdings with over 100 heads.

Leadership teams are consulted in the management activity of about 60-70% of the respondents, the majority of under 55 years of age, their percentage increased with education level. Given the small size of holdings, there is a family involvement in the management process, but a small percentage of young people under 25, people over 55 and people with secondary education. In the breeding farms, those with 10 to 500 heads of management process involves both the management team and the family, and those of over 500 heads high, owing to its dimensions and form of Organization (in particular of the units with legal personality), is based in particular on the management team.

## **BIBLIOGRAPHY**

[1] m. c. Van (2014). *Processing of the questionnaires applied in Hungary 4 (Gorj, Mehedinți, Dolj, Vâlcea, Olt), Romania.*

# COMPUTER MODEL FOR AGRICULTURAL HOLDINGS- USEFUL TOOL IN THE EVALUATION AND IMPLEMENTATION OF A HIGH PERFORMANCE MANAGEMENT

BEREVOIANU ROZI LILIANA<sup>1</sup>

**Summary:** *Development continuous information models in the agricultural sector, as the data collection methods and modern and efficient processing of the system of economic and financial indicators and assessing risks in agricultural holdings may have a positive impact on increasing the competitiveness of production processes, is a viable solution for streamlining activities in agriculture. From this point of view, at the level of an agricultural holding, the data model can become a real component in the process of management. The main aim is to improve the decision-making process from the farm and the provision of information management systems necessary to adapt to a society directed toward knowledge and access to information.*

**Keywords:** *computer model, agricultural management, economic and financial indicators, economic risk*

## INTRODUCTION

Management processes carried out in an agricultural holding can be improved by information in a real time of managers of economic and financial data with reliable, relevant, and useful. This is achieved through implementation of competitive computer models that lead to their profitability.

In a market economy, an agricultural holding have to resist in the face of intense competition, thus arriving at:

- strategic analysis for evaluation of the results of production, financial and economic results and,
- the definition of priority objectives that lead to optimal decision-making in the field of economic and technological systems management and thus to increase its competitiveness both on the domestic and foreign market.

The work is based on the results obtained in the framework of ADER 5.1.3-"Establish profitability and economic risk assessment in the vegetal and animal farm under the pedo-climatic conditions in the South of the country." The present study underlines the importance of using the computer model at the level of an agricultural holding for the identification of escape routes, the solutions and measures of organizational, technical and economical growth in profitability and economic risk assessment. Thus, the computer model comes in support businesses providing information necessary for the evaluation of the application of a high performance management for efficient organization of an agricultural holding.

## MATERIAL AND METHOD

The study was conducted in the South of the country, by suitably qualified research team for such actions. Thus, analyses were carried out at the level of studies and the farms of various sizes and shapes for the collection of data necessary for the application of the calculation methods scientific advice, economic, statistical, and processing information, etc.

The information has been obtained from both internal sources (annual financial statements, management accounting and budgeting analysis), as well as from external sources (other than the holding's accounts).

The project has involved, in fact, the use of methodologies, techniques and analytical study-specific equipment, processing and exploitation of data: analysis method and the conceptual and organizational structure-functional technical and economic elements; setting up your database

---

<sup>1</sup>Scientific researcher II – Research Institute for Agriculture Economy and Rural Development

using the technique of calculation and audit methodologies; technical and economic processing of the data, etc.

Theoretical and methodological support of the measurement of the characteristic phenomenal and economic processes determining breakeven and economic risk assessment for agricultural holdings consisted of a system of indicators classified in specific indicators, indicators of results and indicators of profitability (profit, intermediate management balances, rates of return, the threshold of profitability etc.).

From the technical point of view the computer model has been structured so as to use various types of information, each with a well-defined role for its functionality, aiming to database administration, business process management functionality queries, the access level of the applications developed within the framework of the model, the connection to the WEB service, the user interface (services: the generation of data to support decisions, rescuing and protection of data, etc.).

## RESULTS AND DISCUSSION

Information used for the application of the computer model on agricultural holdings of different sizes and shapes were intended primarily to maintain the competitiveness of their own activities and its products within it. This information allows the evaluation, selection and choosing the most effective decisions, imposing the need for use of methods and ways of working based on the systemic approach economic-mathematical modeling. Thus, there is the possibility of a thorough technical-economic analysis based on consideration of all technical possibilities, linking close to production targets with existing resources, concurrent analysis of all possible variants of action, establishing territorial priorities of satisfying the different needs, etc.

Through systematic on-line accessibility of data-processing model is a necessary information to beneficiaries, thereby contributing to the achievement of improved management through the identification of processes which can be made more efficient, profitable items highlighting the business, improving the Organization and reduce costs.

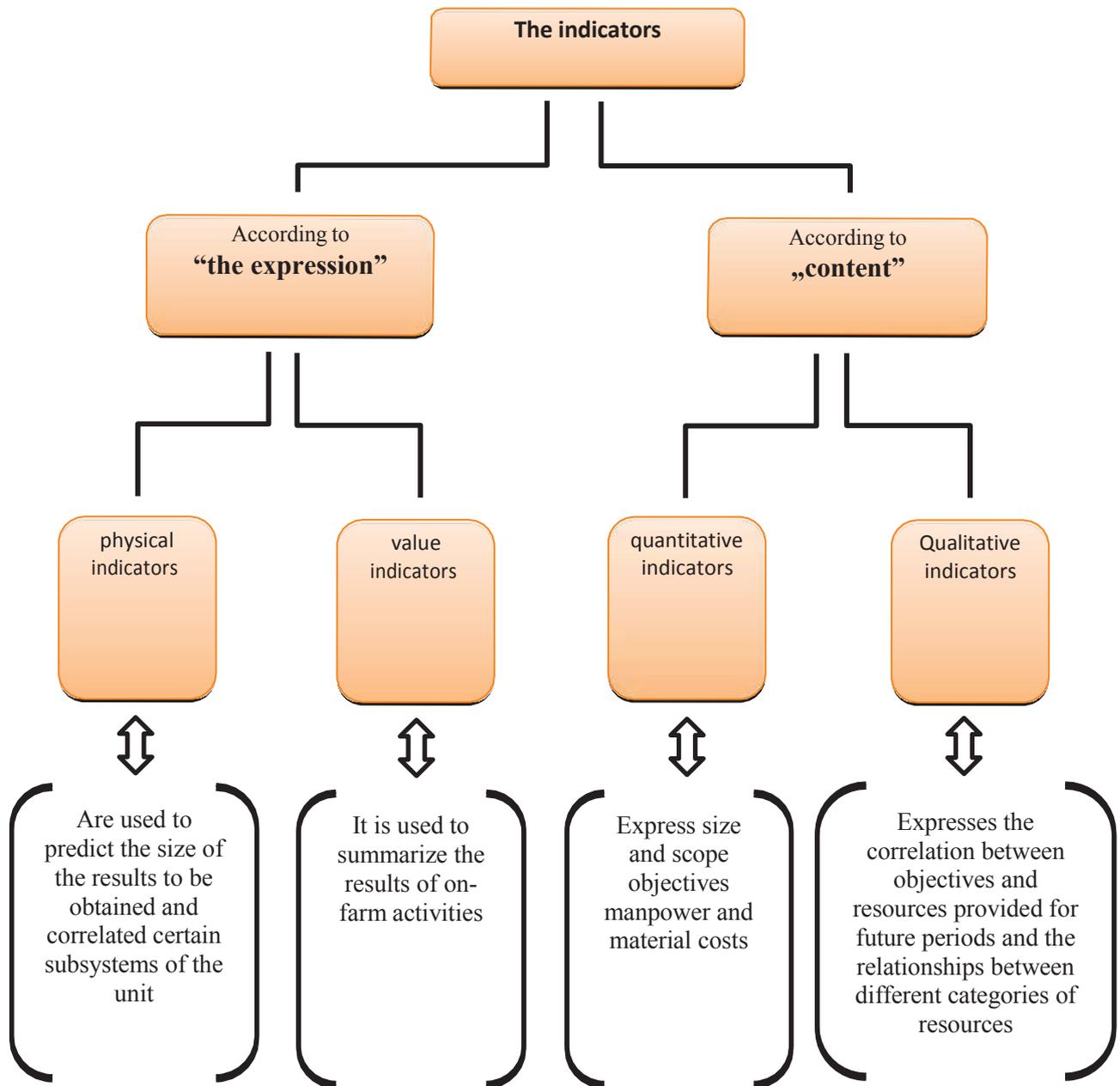
The demonstration of the usefulness of the computer model was based on the evaluation of scientific information and functionality ensuring compliance with the needs of potential users of the system (making the requirements model, communication with users, etc.).

In carrying out the evaluation of the function of the computer model were done the following analyses:

- control flow analysis, through monitoring the entrances and exits of the sheet (s) model;
- analysis of data by detecting the uninitialized variables, to repeated variables and variables declared but not used, etc.;
- analysis of the flow of information, through the identification of dependencies of the output variables;
- analysis of connection, to identify anomalies or repetitions.

Also, the test focused on functionality, and specimen conducted against a number of specifications, namely he measured how well run the operations you need to perform, such as: user commands, data manipulation, etc. In general, performance testing is performed for the model behavior in different conditions of performance: measurement of response time, data loading, data errors in the context of weaker hardware resources etc.

System of indicators can be considered as a basic tool of economic mechanism, because, through the information you provide helps the main justification of the decisions shall be taken by the farm manager. The number of indicators used for the justification of decisions at the management level involves a group of them and an interdependent mainly determined by interconnection issues involved, for their similar or complementary nature and calculation method.



In the process of assessment, development and implementation of management strategies have an important role and economic-financial indicators which measure the activity of volume means allocated and economic results have been or are to be obtained in relation to the existing funds. Economic evaluation of holding liquidity indicators are calculated, profitability, solvency and economic risk, through a related analysis, can determine a diagnosis and a forecast at the farm level.

Within the computer model, the economic-financial analysis of the holding for a period of three consecutive years is relevant because you can highlight and structure issues that include one or more strategic responses. This involves the use of means and methods of forecasting of the development of economic factors, social, ecological techniques, which can alter the economic size of the holding for the purposes of gain or a reduction in its financial evolution.

## CONCLUSIONS

Regardless of the economic size and profile of their form of ownership, any modern farm needs a management based on flexibility, dynamism, and foresight. This can not be conceived without operative information, complex and quality to increase the number of practice management, thus ensuring high quality products and competitive abilities at the level of agricultural holdings.

In order to enhance the competitiveness of agricultural holdings on the internal and external markets, it is necessary to improve the flow of information available to them through the use of information technology for innovation, in accordance with the strategies defined at European level.

Thus, the computer model developed for determining breakeven and economic risk assessment is a practical working tool for supporting the decision making process at the farm level, instrument characterized by flexibility and adaptability in the use of information and rapid response to user requirements. On the basis of physical and economic indicators, specific computer model provides useful information for the assessment and application of a high performance management in order to plan and effective allocation of resources at the level of holdings.

Also, the computer model can contribute directly to enhancing competitiveness because the information obtained can be used to increase profitability and penetration into new market segments (the model can process a large volume of data with the primary purpose of the application of new models and internal rules to the user that can be used in the decision-making process of management and marketing).

In terms of economic impact, the computer model may contribute to increasing the competitiveness of agricultural holdings, through:

- evaluation and application of decisions technical and economic-which have included increased productivity, lowering the price of products and investment cost, etc.
- financial effects with positive influence in the process of analysis and economic-financial forecasting and decision-making process necessary for an efficient management.

## BIBLIOGRAPHY

1. ADER 513, Project financing contract No. 513/14.11.2011-"Establish profitability and economic risk assessment in the vegetal and animal farm under the pedo-climatic conditions in the South of the country"
2. PS 622, Project financing contract No. 369/2006-"System for developing business plans, production strategies, feasibility studies and other analyses useful in the decision-making process of crop production".

# TECHNICAL-ECONOMIC ANALYSIS OF A FAMILY FARM CASE STUDY – GHERASENI PARISH , BUZAU COUNTY

TUREK-RAHOVEANU PETRUȚA<sup>1</sup>

## Summary

*In Romania, family farms strengthen agriculture stability wise through structural changes in multifunctional development, merchandising of vegetable products, making investments and depositing products.*

*The family farms production structure was formed under factors like: natural environment, market, financial capital, the risk and uncertainty related to selling products, consumption.*

*At the same time it's considered to be the central element of the agricultural structures and it's regarded in independence with the elements that contribute in obtaining agricultural products.*

**Key word:** production structure, agricultural production, work productivity

## INTRODUCTION

The farm's orientation towards these crops is given by the necessity of ensuring vegetable products for the family from their own production and of trading on the market of an important part of the acquired products. The manpower is represented, usually, by the family members and sometimes by the temporary staff in order to meet work requirements in optimal time.

## MATERIAL AND METHOD

The research methodology consisted in a documentation study accomplished with the help of a direct interview with questions regarding different aspects of economical activity of the farm. The internal records of the farm were the sources of information.

## RESULTS AND DISCUSSIONS

The farm has a mixed vegetable profile, characterised by the grain, oleaginous, leguminous crops. The household orientation towards these crops is given by the necessity of ensuring vegetable products for the family from their own production and trading on the market of an important part of the acquired products.

### How the land is used

Table 1

Specification	Hectare	Property	Rent	% arable form the agricultural area
Agricultural area	32	23	9	-
Arable	32	32	9	100

The agricultural area is represented by the arable (table 1), made by plots, located at 3 km distance from the holding office.

The region had a mild climate typical for the Sub Carpathians of Curvature. The local landscape of depression closed all around by high hills has created topoclimatic conditions for sheltering against the continental tinted climate from the Romanian Plain. From a geological point of view the soils are represented by brown chernozems, with pH 6,3-6,7. From a geotechnical point of view, the land consists of a clay or macropores sandy powder with a 2,5-3,0 m thickness, and the ground water is at a 6-7 m depth from the natural ground which increases during rainy seasons and decreases during drought. Regarding environmental quality, no negative aspects were reported.

The entire area belongs, with property title, to the head of the holding.

<sup>1</sup> Cercetator Stiintific, Turek-Rahoveanu Petruta, ICEADR, turek.petruta@iceadr.ro

**The main technical means****Table 2**

Facilities	2012	2013
Tractor	1	1
Plows	2	2
Disc harrow	2	2
Seeders for straw	1	1
Seeders for weeding	1	1
Transport trailers	1	1

Noted that the supplied machines are maintained in proper technical condition consisting, mainly of those that are necessary for the basic ground-work and for seeding the crops. Not found among the technical resurces, combines for harvesting grains and aoleaginous, which, in case of dysfunctions in the relation with the services providers, there can be delays in carrying out work (table 2).

**Income, expenses and financial results****Table 3**

Specification	2012	2013
Total income, from which:	30685	35177
-Operating income	27131	31660
-Other income	1066	1055
Total expenses, from which:	30385,8	32508,9
-Expenses from operation	30005,8	32101,9
-Financial expenses	380,0	407,0
Financial results, from which:	299,2	2668,1
-Gross profit	299,2	2668,1
-Net profit	251,3	2241,2
-Profit rate %	0,8	6,8

The economical results of the farm show that it pursued an activity that led to a relatively low profit, but allowed the resumption of the production process(table 3).

Generally, the vegetable production, does not generate high values of economic profitability, therefore, a measure would be to orient the producer toards intensive nature crops, such as vegetables or mushroom farm.

**The dynamic and structure of the production expenses**

In the production expenses structure the largest share is held by the operation expenses which show the effort made by the farm in order to obtaiion production.

**Structure of the production expenses****Table 4**

Specification	2012	2013
Material expenses, from which:		
-seed	7872,1	7718,2
-fertilizer	8684,2	10237,0
-materials	1088,7	1287,0
-fuel	6644,0	7321,0
-other expenses	113,8	121,7
Manpower expenses	5063,0	5417,0
-salary	3592,0	3851,0
Rent	1471	1566
Financial expenses	380	407
Total expenses	30385,8	32508,9

This makes analysing them, the share that they hold necessary and finding a solution in order to reduce their volume.

### Agricultural production

The cultivated area is divided by the farm manager in three groups of crops: grain, oleaginous and leguminous beans. The largest share is held by grain, given their extensive nature, which needs large areas, in order to obtain a certain level of total production (table 5).

#### Agricultural production

Table 5

Specification	2012		2013	
	ha	%	ha	%
Total grain, from which:	22,0	68,8	19,5	61,0
Wheat	10	31,3	9	28,2
Corn	12	37,5	10,5	32,8
Total oleaginous, from which:	8,7	27,2	11,2	35,0
Sunflower	5,7	17,8	7,2	22,5
Canola	3,0	9,4	4,0	12,5
Total leguminous beans, from which:	1,3	4,0	1,3	4,0
Beans	1,3	4,0	1,3	4,0
Total arable	32	100	32	100

### Average and total productions

Good average productions have been registered for all crops, but with variations within the last two years of analysis. There have been large oscillations for the sunflower and the canola crops due to the lack of irrigation, which led to the decrease of the production level. Therefore, production factors allocation is necessary so that it can stimulate production growth to a higher level.

#### Evolution of average and total productions

Table 6

Specification	2012		2013	
	Kg/ha	tons	Kg/ha	tons
Wheat	2320	23,2	3070	27,6
Corn	3100	37,2	3510	36,9
Sunflower	1090	6,2	1350	9,7
Canola	1210	3,6	1080	4,3
Beans	2060	2,68	2670	3,47

### Family farm staff

The manpower situation is typical to that of the family, the number of existing person being reduced and partially unqualified. They call day workers that contribute to making the harvest production.

The management is tentative, the decisions regarding the structure of the crops or production factors allocation belong to the operation manager.

### Work productivity

Operation income per employee are bigger than the salary expenses, within the two years of analysis.

**Corelations within work productivity and salary expenses**

Table 7

<b>Specifiction</b>	<b>UM</b>	<b>2012</b>	<b>2013</b>
Operation income	Lei	27131	31660
Salary expenses	Lei	3592	3851
Salary expenses share in the operation expenses	%	13	12
Staff	Nr.	6	7
Operating incoims	Lei/pers	4521,8	4522,9
Salary expenses	Lei/pers	598,7	550,1
Dymanic of income form operation per person	%	76,4	100,0
Dymanic of the salary expenses per person	%	83,9	91,9

Production and selling prices level have influenced income in a positive way. The increases were made on the aoleaginous products and regarding grain products, the income value was decreasing determined by the merchandise production and less by the prices which had a growing tendency. The wheat and the corn represented the rent, hence the differences compared to the other products from the structure.

**SWOT Analysis****Strenghts**

- The farm has an acceptable dimension that allows production activity;
- The owned surface belongs to the arable category which can be accessible to diversification of the production structure by joining some intensive natured crops, that are profitable, by introducing vegetable crops.
- Orientation toards imputs procurement, on which production system can be modernised and increase work productivity.

**Weaknesses**

- The low degree of profitability of some crops, which affects the financial state of the operation;
- The lack of irrigation generates malfunctions in production results (corn);
- Increasing the technical equipment degree is necessary, especially for harvesting and transport;
- Preparation of the manpower and using the knowledge in order to develop the farm;

**Opportunities**

- Targeting a wider market outlet;
- Buying performant technical equipment which reduces consumption and is adapted to the existing structure;
- Combining vegetable production with animal production, under the conditions of a land area for cultivation of fodder plants;

**Threats**

- Increasing competition in farms with similar activity;
- Increasing expenses due to production factors.

## **CONCLUSIONS**

Production structure defines the activity of a farm and has a different relevance for how to ensure enhancement of operating capital and the economic results they will achieve. Practical viability of a solution obtained by the use of modeling the structure of production depends on the veracity of " input " and the ability to identify environmental behavior.

## **BIBLIOGRAPHY**

1. M.Drăghici, M.Oancea, G.Pleșoianu, L.Zahiu,F.Scrieci, I.N.Alecu (2004): Farm Management Manual, Ed. Atlas Press

# THE PRICE TREND AND THEIR IMPACT ON PROFIT MARGIN AND SAFETY OF THE PROTEIN FOR FEED IN ROMANIA

ZUGRAVU GHEORGHE ADRIAN<sup>1</sup> TUREK RAHOVEANU MARIA  
MAGDALENA<sup>2</sup>

MOGA LILIANA MIHAELA<sup>3</sup> NECULITA MIHAELA<sup>4</sup>

**Abstract:** *Because modern sophistication in the trade, transport, handling, blending and distribution system that makes the feed to reach farmers in the formula "just in time" protein sources are now in difficulty. The paper follows two main objectives: to understand farmers' perception of safety and quality of protein for stockbreeding and to identify communication levers in order to improve the protein self-sufficiency for animal production. This paper conducted a questionnaire survey of Romanian farmers' perception toward safety and quality of protein for feed. The empirical study with brands indicated that farmers are different awareness to safety and quality of protein for feed.*

**Key words:** *safety perception, feed quality, protein self-sufficiency*

## INTRODUCTION

While there are various ways to produce animal feed, there are only three major production and delivery systems involved accepted fodder to help farmers producing livestock - cattle or dairy or meat, chickens, laying hens, pigs, rabbits, goats, and sheep or fish. These are:

- Commercial operations that produce food for sale;
- Integrated operations in which large pig and poultry producers produce their own feed;
- Operations cooperative farmers have in common feed factory or production facility that produces food they use.

What differentiates industries and why many plants are kept in different countries is the different cultures and skills that are brought in the production of feed. Currently, more than 3,800 feed mills for more than 80% of world production of animal feed. Despite current vertical integration and consolidation in the industry, the world's top 10 producers of feed accounts for more than 65 million tons per year - more than 11% of total production. As a result, global feed industry remains based on local and regional commercial companies, as well as specialized companies.

## MATERIAL AND METHODS

This paper purpose is to investigate and analyze farmers' protein for stockbreeding awareness, purchasing behaviour. The present challenges for protein for stockbreeding supply are:

- Provenience from 150 countries
- 80% from foreign sources
- Protein for stockbreeding safety problems common
- Protein for stockbreeding economic fraud is common
- Resources to address the problem have been limited
- Consumer perception not always factual
- The consumer demand for protein for stockbreeding continues to grow.
- Increasing protein for stockbreeding consumption and demand are exceeding capacity for inspection.
- Economic fraud in the nation's protein for stockbreeding supply is increasing.
- Consumer confidence in protein for stockbreeding safety is declining.

<sup>1</sup> Associate Professor Zugravu Gheorghe Adrian - „Dunarea de Jos” University of Galati, [azugravu@ugal.ro](mailto:azugravu@ugal.ro)

<sup>2</sup> Associate Professor Turek Rahoveanu Maria Magdalena - „Dunarea de Jos” University of Galati, [Magdalena.Turek@ugal.ro](mailto:Magdalena.Turek@ugal.ro)

<sup>3</sup> Professor Moga Liliana Mihaela - „Dunarea de Jos” University of Galati, [Liliana.Moga@ugal.ro](mailto:Liliana.Moga@ugal.ro)

<sup>4</sup> Professor Neculita Mihaela - Dunarea de Jos” University of Galati, [Mihaela.Neculita@ugal.ro](mailto:Mihaela.Neculita@ugal.ro)

- The human health benefits of protein for stockbreeding consumption are becoming increasingly apparent.
- Resources are inadequate to ensure safety and quality of feed products.
- Situation will probably worsen with increased production.
- Adequate inspections of imported protein for stockbreeding are not practical given the amount of resources available

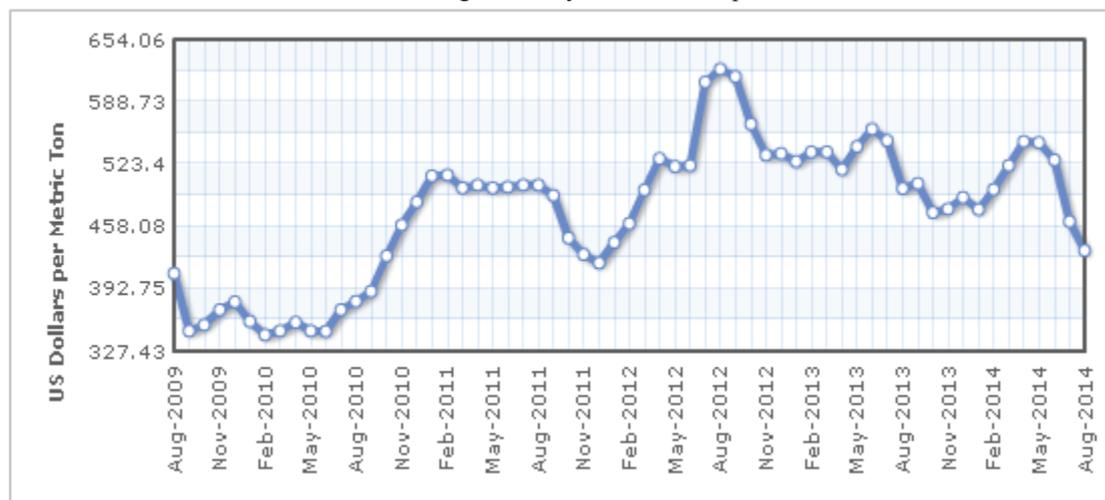
Statistical results show that globally, the EU is the largest importer of agricultural products and the second largest exporter. Annually imported about 21.8 million tons of soybean meal and 12.9 million tons of soybeans to serve growing sectors of pigs and poultry. Argentina, Brazil and the United States are the main suppliers to the European market. Ceasing such imports would bring an increase of 600% in prices of feed and relocation of production to third countries.

Soybean price delivery slumped to a daily low at the weakest level since July 2010. Soybean ending stocks will more than triple in the 2014-2015 marketing, the highest since the 2006-2007 season (Figure 1).

Figure 1: Soybean monthly price trend

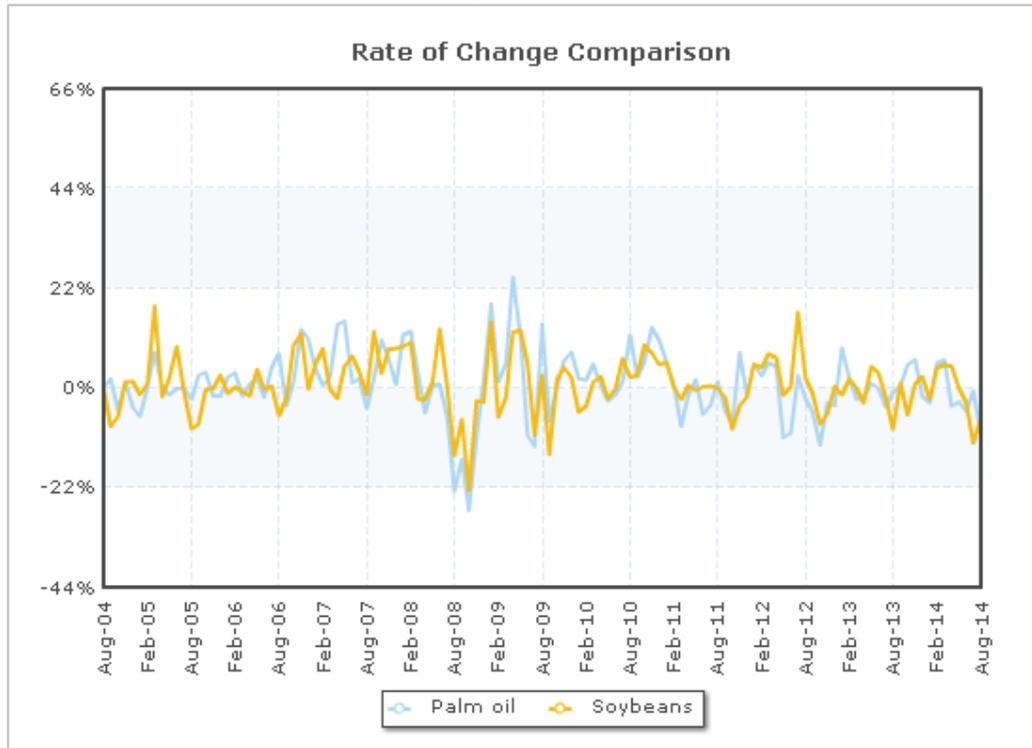


Figure 2: Soybean seasonal pattern



The soybean prices also follow seasonal pattern along with sizeable variation in prices across geographies as depicted in Figure 2. There is a high degree of correlation between soybean price and palm oil price with a correlation coefficient over 0.60 (Figure 3).

Figure 3: Monthly comparison between the rate of change in the price of Soybeans versus the rate of change in the price of Palm oil



The information system soybean margin calculator can help you determine your cost of production per acre and expected per tons soybean yield to determine your breakeven selling price. The improvement calculator can help determine how doing just a little better in cost control, yield or selling-price improvement to improve your bottom line.

If you are a soybean farmer, how will you be making enough money to survive a decade from now? That is a question for you and your family to ponder, based on profitability projections. The prediction calculated a significant squeeze on profitability for soybean production over the next 10 years. And when you get to 2020, everyone in a farm family will need several part time jobs to put enough food on the table.

The increase in soybean prices is more than enough to offset the drop in soybean yields, so per-ha market receipts are at record levels in 2012/2013. In 2013/2014, projected prices fall more than yields increase, causing per-ha revenues to decline. Soybean returns must remain strong for soybeans to be competitive with corn. As with other crops, soybean prices and returns are likely to be very volatile. When the economists looked at soybean numbers, they found planted ha would reach over 38 million this year, but stay in the 30 million ha range for the balance of the 10 year period. Net farm income depends on production levels and the prices of agricultural outputs and inputs, all of which are uncertain.

## RESULTS AND DISCUSSION

European Federation of Producers Feed (*FEFAC*) calculates that members of the European Union, producing about 120 million tons of concentrate feed per year, representing about a quarter of the feed consumed by animals in Western Europe. Calculating the production of animal feed, a base result is a value of approximately, 1000 tons per year.

However, estimating supported by the values of international magazines feed - suggests a concentrated feed production estimated at 600 million tons per year. Ten countries are more than 60% of annual world production of feed, while 50 countries produce over 90% of total. Feed for poultry products represent the largest amount. The following are the fodder for pigs, followed by cattle, represented especially those for dairy cows. Feed for fish and crustaceans are 14 million

tons and growing. In 1999, global consumption per person was 98 kg / person / year, culminating with 105 kg in 1995/1996. These values vary depending on the progress or decline in economic conditions.

Protein is key to creating systems feed. International Trade and proteins are the basis of success is realized production industry wherever. Without this trade industry would not have been able to make the correct formulas and would not be where it is today. Consequently, the corresponding populations had fewer choices and diets poor choice.

Trade agreements have become the core mechanism to expand and enforce food safety standards around the world. Since the 1980s and the Uruguay Round of GATT negotiations, which gave rise to the World Trade Organisation (WTO), agricultural markets have been profoundly liberalised, with tariffs and quotas coming down, particularly in developing countries. This has led to a boom in global food trade, with few countries free to impose tariffs or take similar measures to regulate the flow of imports and exports any more. As a result, governments and corporations have turned to other measures to manipulate market access and control.

Although there are many other sources of protein, from the point of view of industry, the "Big Three". Between oil products, soybeans dominate as a source of protein.

Table 1

Sources of protein	
Oilseed proteins	316 million tons
Animal products	10 million tons
Fish products	7 million tons

Feed from soybeans are 75% of the proteins used in animal diets worldwide. There is a discussion and a real campaign to reject GMOs in animal diet. Livestock sector will have to join if they want to continue the development of genetically modified which would improve production and bring nutritional benefits are supported by sophisticated consumers in Western Europe. Consumers in Western Europe is the winner attention of policy makers in Brussels and what the EU is trying to persuade others.

Meat and bones, a traditional ingredient, rich in amino acids used while worldwide, are rejected by the European Union. This is caused by the bovine spongiform encephalopathy crisis and contact Creutzfeldt - Jakob disease in humans.

Lack of current testing procedures to distinguish the various products of the above has led to led to the general prohibition of these products. It is also an ongoing concern over the level of dioxin in the fish products.

All three sources of proteins are key components in feed marketed in all countries, and all of these proteins are marketed worldwide. Raw materials are moving to areas where animals will eat them are increased. Feed mills generally are located near livestock farms and feed rarely crossing into the final or produced at great distances. Feed concentrates on the other hand - for protein content and ingredients are expensive and require compliance with strict recipe - can be imported or transported long distances, but the volume is insignificant compared to full feed.

However, the industry feels that governments sometimes do not see the importance of trade in raw materials as part of the food production system proteins battling weather crisis population to 9 billion by 2050; it is time to establish Consultation FAO as Expert.

There are two key reasons that the industry should pay particular interest protein sources:

1 are part of the food chain today. What consumers say what they think about the feed industry and about how it will affect the livelihood of all involved, and what happens in one country can have a dramatic impact on the feed industry in another country.

2 Population Growth - The population grows and as incomes increase, consumers will demand more animal products in feed current.

Encouraging people to eat more grains is little chance of success. It turned out that people prefer animal products in their diet - not only essential nutrients and for their good taste - and the developed world is not in a position to refuse the population in developed countries shift from

grain-based diet to the based on animal products given rising incomes. In addition, *the animals* are more effective in a wide range of plant transformation indigestible by man easily digestible protein.

Furthermore, in rural areas the scourges of hunger and under nutrition are present, eroding and concealing the intrinsic value of agricultural and stockbreeding activities. However, technological change in the region is insufficient to respond successfully to global trade liberalization and to exploit the opportunities this offers, assuming as a paradigm sustainable agricultural development founded on increasing production and export of agricultural products without concomitant effects for human health or damage to the environment. There is a lack of technological change in which nuclear technology could play a role in the fields of: genetic improvement of agricultural and livestock species, both traditional and non-traditional; development of good practices in the use and management of soil and water resources; prevention, suppression or eradication of transboundary agricultural and livestock pests; management of health and genetic limitations in the rearing of livestock species and captive aquatic organisms; post-harvest treatments as an alternative to the use of chemicals; prevention of residues posing a risk to human health in food; and strengthening of networks and capacity for supporting agricultural analysis services.

The breeding of legume varieties for grazing use can be defined as breeding for achieving a reasonable balance between persistence, quality, yield and animal safety (Sewell et al., 2011). The grazing use necessitates distinct plant type and selection work (Annicchiarico et al., 2010). The breeding process for these purposes is slow and expensive, because it requires a complete cycle of testing of perennial herbaceous species and it is conducted together with assessment of the effects of important ecological factors, such as grazing animals and companion herbaceous species in the pasture mixtures. Therefore, the test of the breeding materials requires large amounts and units of them.

Romania has grown in the past GM soy, but had to quit when they join the EU. Thus, after 2006 the area occupied by soybean tolerant to glyphosate herbicide reached almost 200000 hectares a year later areas under conventional soybeans were only 100 hectares and currently have around 60 hectares.

GM crops have emerged in the commercial in 1996 and has since been continuously developed, reaching to hold in 2010 a total of 148 million hectares. Currently, over 30 countries around the world have improved crop plants through biotechnology. The main growing countries are the United States (66.8 million ha), Brazil (25.4 million ha) and Argentina (22.9 million ha).

Genetically improved soybean represents 81% of global allocated to this crop (90 million ha), transgenic cotton covers 64% of the total area (33 million hectares) of biotech maize has an adoption rate of 29% (from a total of 158 million ha) and rapeseed oil (canola) GM occupies 23% (31 million ha). Other transgenic crops that have been authorized in the world are: sugar beet, alfalfa, papaya, squash, poplar, tomato, banana, sweet pepper, potato, rice and various varieties of ornamental flowers. Of the 1.5 billion hectares of arable land, 10% is cultivated with transgenic plants. As a result of biotechnological practices during 1996-2010 carbon dioxide emissions were reduced by 18 billion pounds, and the amount of pesticide (dry weight) decreased by about 393 million pounds.

In many cases it is assumed that pasture persistence of the species can be increased through a change in their system of reproduction from closed (such one with seeds) to open (with the opportunity also for vegetative reproduction in the sward) (Taylor, 2008). In this case, the type of pasture legume is considered to be the white clover, which has excellent grazing tolerance, as well as due to its open system of reproduction through stolons. In wild ecotypes of the seed-propagating species, ability of vegetative reproduction was also found.

In Romania, agriculture has a large number of farms participating in a number of markets for the production of food, fiber, energy and raw materials for industrial products. Their distribution according to the value of agricultural production is presented as follows: 73% fall in economic size class (<2000 Euro), 15.6% (2000-4000 Euro); 0.34% is held by large farms (over 50,000 Euros) (Source data processing, NIS 2013 - "typology and size of agricultural holdings in 2010").

Farm size has different implications, such as the ability to use certain technologies of culture, availability of labor, and the pressure to maximize yields per hectare. They can create a mixture of positive and negative forces on the practices adopted and environmental outcomes. Small farms have a number of attributes that could lead, in principle, the adoption of intensive management techniques. Even though the intensity of production on the farm is less than the average, a landscape of small farms is likely to provide a greater variety of management systems because of the large number of stakeholders and different perspectives.

In Romania Studies have contributed to the development of knowledge about the contribution of agriculture to provide more public goods soybean crop, particularly biodiversity, water, soil and landscape. Land consolidation involving the creation of large parcels, economically viable resulted in major changes in the landscape in several Member States, often involving removal of land unused.

European feed industry and in general animal production chains are strongly dependent on protein import, mainly soybean, since EU agriculture has been mainly addressed to the production of cereals. The safety and quality of protein for stockbreeding has been of particular concern in recent years (Brockman, 2006).

The quality of protein for stockbreeding has always been hard to define, and is typically based on the general perception of the consumer evaluating the product. The protein for stockbreeding represents a kind of important producer goods as it plays a significant part in agricultural production market. With the development of livestock and aquaculture, there are rapidly growing demands for protein for stockbreeding from consumer, so protein for stockbreeding farms will face increasing fierce competition in the market (Armstrong et al, 2000). In the modern market economy, farmers are the main body of protein for stockbreeding market, their attitude, perception and preference toward a brand will largely influence the sales volume of this kind of products, and even the survival and development of the fishery farm.

## CONCLUSIONS

Price, risks of contamination (microbiological and chemical), sustainability aspects such as environmental risks (damage of the ecosystem, animal cruelty, etc.) and are the main barriers in general for the farmers. Barriers vary a lot depending on the levels of processing.

When buying protein for stockbreeding, a quality and/or food safety label is the most important expectation of farmers in terms of information products. Nutritional information as well as information on the geographic origin of production is among the most important pieces of information farmers are looking for. Farmers are also interested in information relating to the production method and its environmental characteristics.

The research results show farmers have different perception of protein for stockbreeding products. The information channels of brand are mainly from friends, relatives and neighbours, so word of mouth spreading is very important for a brand. The higher perceptive price of foreign protein for stockbreeding brands may reduce farmers' perceptive value and purchase intention to them.

The research results show safety of protein for stockbreeding products has different perception. The information channels of brand are mainly from friends, relatives and neighbours, so word of mouth spreading is very important for a brand.

In conclusion, although this paper is an empirical study based on 104 valid samples, it provides a chance to understand farmers' awareness to different protein for stockbreeding brands in Romania. A further quantitative research with wider samples will be necessary in the future.

## ACKNOWLEDGEMENT

This research from this paper was funded from project ADER 513.

## BIBLIOGRAPHY

1. Annicchiarico P., Scotti C., Carelli M., Pecetti L. (2010): Questions and avenues for lucerne improvement. *Czech Journal of Genetics and Plant Breeding*, 46 (1), 1–13.
2. Armstrong J.S., Morwitz V. G. (2000). Sales forecasts for existing consumer products and services: Do purchase intentions contribute to accuracy? *International Journal of Forecasting*. 16:383–39.
3. Binfield, J. and P Westhoff, 2003. "FAPRI Analysis of the European Commission's Mid-Term Review proposals." In *Mid-Term Review of the Common Agricultural Policy July 2002 Proposals Impact Analysis*, European Commission Directorate-General for Agriculture, Brussels, January.
4. Brockman, D., L. Hufnagel, and T. Geisel [2006] „The scaling laws of human travel". *Nature, Letters*, vol. 439, no. 26, doi:10.1038/nature04292, 462–465.
5. Fishman, Charles. "The Anarchist's Cookbook." *Fast Company* 84 (2004): 70
6. McFadden, Steven. The History of Community Supported Agriculture, Part II CSA's World of Possibilities. 2003. 26 Nov. 2006
7. <<http://www.newfarm.org/features/0204/csa2/part2.shtml>>.
8. Sewell J., Hill R., Reich J. (2011): Persistence of Grazing Tolerant Lucernes under Australian. Conditions. *Pasture Persistence*. *Grassland Research and Practice Series*, 15, 187-190.
9. Taylor N. (2008): A century of clover breeding developments in the United States. *Crop Science*, 48, 1–13
10. Zeng Y. (2009). ZEPRO brand management study based on customer satisfaction. Lanzhou: Lanzhou University.
11. Zheng, X., Neculita, M., Moga, L.M., Zhang, X. (2010) Emp lo yee s " I T intentio n and u s a g e b ehav io r at agribusiness in China, *International Journal Of Food, Agriculture & Environment (JFAE)*, Vol. VIII, Nr.2, WFL Publisher, Helsinki.

## ENVIRONMENTAL MANAGEMENT IN NATURA 2000 SITES CASE STUDY: BRAILA COUNTY

ELISABETA ROȘU\*

**Abstract:** *Biodiversity is a huge variety of ecosystems, species and genes, which represent the natural capital. The biodiversity values make up the natural heritage that must be used by the present generations without jeopardizing the chance of the next generations to enjoy the same living conditions. The protected natural areas represent the most important method to preserve biodiversity and to provide development patterns in harmony with nature, in the context of the fast economic development in the last decades. Natura 2000 represents a protected areas network, designated at from European level. Its aim is the preservation of the wild habitats and of endangered vegetal and animal species, as the proper management of these areas.*

**Key words:** *biodiversity, Natura 2000 sites, management*

### INTRODUCTION

Natura 2000 represents the keystone of the EU policy in the field of biodiversity and it represents a network of protected natural areas designed in order to implement the directives: *Habitats* (Directive on the conservation of natural habitats, of wild flora and fauna 92/43/EC) and *Birds* (Directive on the conservation of wild birds 2009/147/EC). Thus, this network protects the natural habitats and the wild species of endangered plants and animals at EU level, consisting of the following categories of protected natural areas of community interest (Natura 2000 sites):

→ *Special preservation areas* that preserves habitats and species of plants and animals, except for birds, in conformity with the Habitat Directive; they are declared on the basis of the recognition of the Sites of Community Interest by the European Commission;

→ *Special avifaunistic protection areas* for the protection of all wild birds species, in conformity with the Birds Directive.

By joining the European Union, Romania has the obligation to include a certain percentage of its natural space into this network, so as to ensure the conservation of it, if the respective areas accommodate habitats and species of community interest.

### MATERIAL AND METHOD

The present study intends to make an assessment of Brăila county biodiversity and of the management of protected natural areas, of its preservation state, of the anthropic activities that have led or could lead to its degradation.

Characterization of the protected natural areas had two components: (i) the theoretical component: identification of the current national and international legislation, short description of protected natural areas; (ii) the practical component: the state protected natural areas from the point of view of management regime, the impact of anthropogenic activity and trends.

### RESULTS AND DISCUSSION

Brăila County included in the Southeast Region of Romania that is top of the list in terms of conservation of biodiversity: is the region with the largest area of protected areas of Romania (43.8% of the total of protected areas in Romania), as well as the region with the largest area of protected natural areas occupied (about 32% of the region's surface).

---

\* Scientific researcher, Institute of Agricultural Economics, Romanian Academy, Calea 13 Septembrie no.13, Sector 5, Bucharest, betty\_rosu@yahoo.com

On its territory is located 144 of protected natural areas of national interest, including a nature reserve of the biosphere, 1 national park and 3 natural parks, as well as 108 sites Natura 2000.

Table 1. The surface of natural protected areas\* in 2012

The counties of South East Region	Surface of natural protected areas (ha)
Brăila	60936.2
Buzău	49524.1
Constanța	140549.1
Galați	63465.5
Tulcea	618889.5
Vrancea	95842.2

Source: Annual report regarding the environmental state in South East Region in the year 2012, Regional Agency for Environmental Protection Galați, South East Region

\*They avoided duplication of various types of protected natural areas

The summary of these surface areas is approximately 1029206.6 hectares, protected areas are located in all counties. Due to the variety of geoclimatic conditions existing each county present specific features in relation to habitats and species of flora.

By the emergence of Ord.MMP 238/2011 for the modification of Ord. MMDD 1964/2007 concerning the declaring sites of Community importance as an integral part of the European ecological network Natura 2000 sites in Romania and HG 971/2011 which modify HG 1284/2007 concerning the declaring areas of special protection areas as an integral part of the European ecological network Natura 2000 sites in Romania, the number of sites of Community importance in the Southeast Region has reached to 67 and the number of the areas of special protection areas has risen to 41.

In conformity with the Romanian legislation on the regime of protected natural areas, the protected natural areas in Brăila county are the following:

**a) Protected natural areas of national interest:** in Brăila county there are 3 protected natural areas of national interest: one natural park and two natural reservations, the total area of which is of 23828.86 ha and represents 5% of the area of the county.

Table 2. The protected natural area of national interest in county Braila, in year 2012

Name	Category of protected area	Area at level of county - ha
Balta Mică a Brăilei	Natural Park	22989 <sup>*)</sup>
Lacul Jirlău Vișani	Natural Reservation	838.66
Pădurea Camnița	Natural Reservation	1.2

<sup>\*)</sup> In years 2006-2008, in conformity to Law 5/2000 the total area of Natural Park Balta Mică a Brăilei was of 17529 ha, in years 2009-2010 after an assessment made by the Office for Cadastre and real Estate Publicity Brăila the park area increased to 20460 ha, and in period 2011-2012, in conformity to GD 971/2011 area of PNBMB was established at 24123 ha, of which 22989 ha pertain to county Brăila, and the rest: 976 ha to county Ialomița and 158 ha to county Constanța.

Source: Annual report regarding the environmental state in county Brăila per year 2012, Agency for the Environmental Protection

#### **b) Protected natural areas of international interest in county**

In conformity with the Ramsar Convention through which the wetlands of international importance are protected as habitat for the aquatic birds, convention to which Romania is a signing party, in the year 2001 Balta Mică a Brăilei (the Small Brăila Swamp) was declared RAMSAR site (position 1074 on Ramsar list) under the name Insula Mică a Brăilei (the Small Island of Brăila), he has an area of 17586 ha and represents 3.7% of the area of the county. 207 species of birds were inventoried, representing half of the species of migratory birds characteristic for Romania, among which 169 are internationally protected species, through the *Conventions in Berne, Bonn and Ramsar*.

**c) Protected natural areas of community interest**

In conformity with *Government's Emergency Ordinance no. 57/2007 on the regime of protected natural areas, the preservation of natural habitats, of wild flora and fauna*, approved with modifications and completions by *Law no. 49/2011*, the protected natural areas of community interest (Natura 2000 sites) are represented by the special avifaunistic protection areas (the sites of community importance) and the special preservation areas.

The goal of the *special avifaunistic protection areas* is to preserve, maintain and where appropriate, to bring back into a favourable conservation state the birds species and the specific habitats, designated for the protection of the wild migratory birds of community interest, in conformity with the Birds Directive. Thus, on the territory of Brăila county, 9 special avifaunistic protection areas have been delimited, totalling an area of 59788.37 ha, which represents 12.5% of the county area.

Table 3. Special avifaunistic protection areas in Brăila county

Crt. no.	Name	Code	Area at county level (ha)
1.	Balta Albă-Amara-Jirlău	ROSPA0004	1213.8
2.	Balta Mică a Brăilei	ROSPA0005	24821.8
3.	Balta Tătaru	ROSPA0006	8583.6
4.	Dunărea Veche-Brațul Măcin	ROSPA0040	6228
5.	Ianca-Plopu-Sărat	ROSPA0048	1982.1
6.	Lunca Siretului Inferior	ROSPA0071	1824.6
7.	Măxineni	ROSPA0077	1504.3
8.	Berteștii de Sus – Gura Ialomiței	ROSPA0111	2962.7
9.	Valea Călmățuiului	ROSPA0145	10667.8

Source: Annual report regarding the environmental state in county Brăila per year 2012, Agency for the Environmental Protection

The sites of community importance represent those areas which significantly contribute to the maintaining or the restoration to a favorable preservation state of the natural habitats or the species of community interest and which could significantly contribute in this way to the existence of the "NATURA 2000" network and/or significantly contribute to maintaining the biological diversity. On the territory of Brăila county, sites of community importance have been declared, totaling an area of 43318.74 ha and representing 9% of the county area.

Table 4. Sites of community importance in Brăila county

Crt. no.	Name	Code	Site area at county level (ha)
1.	Balta Albă-Amara-Jirlău-Lacul Sărat Căineni	ROSCI0005	2835
2.	Balta Mică a Brăilei	ROSCI0006	20872
3.	Brațul Măcin	ROSCI0012	4503.4
4.	Lunca Buzăului	ROSCI0103	978.18
5.	Lunca Siretului Inferior	ROSCI0162	1755.67
6.	Valea Călmățuiului	ROSCI0259	8603.04
7.	Ianca - Plopu - Sărat - Comăneasca	ROSCI0305	3222
8.	Lacul Sărat - Brăila	ROSCI0307	377
9.	Sărăturile de la Gura Ialomiței - Mihai Bravu	ROSCI0389	172.45

Source: Annual report regarding the environmental state in county Brăila per year 2012, Agency for the Environmental Protection

**d) Protected natural areas of county interest**

By Brăila County Council Decision no. 20/1994 on the protected natural areas and the natural monuments on the territory of Brăila county, the following zones were declared as protected areas: Balta Mică a Brăilei, Lake Jirlău, Camnița and Viișoara Forests, as well as Popina Blasova. Subsequently, the first three obtained the protected natural area of national interest status, declared by Law 5/2000 for the approval of the national territory management plan, and Forest Viișoara and

Popina Blasova have the status of protected natural areas of county interest at present, both of them represents 0,4% of the Braila county.

Forestry Reserve Viișoara has an area of 1897.8 ha, being located in the southern part of Brăila county. The forest is a relict of the oak tree forests that used to populate the sands on the right bank of the river Călmățui. Being irrationally cut for hundreds of years, the forest was naturally regenerated. The forest consists of oak and acacia trees, and the reason of obtaining the protection status was the very existence of these oak trees, a rare species in Brăila forests. For the quantity and quality of the wood, an area of 39.4 ha of it is also a seminologic reserve, mentioned in the “National catalogue of resources for forest reproduction materials in Romania”.

Popina Blasova is located in the north-eastern part of Insula Mare a Brăilei, near Lake Blasova and was declared natural monument due to its singularity in the relief of Brăila county, with a height of 45 m and an area of 2.3 ha. Due to the soil conditions generated by the mineralogical composition of the area, the vegetal cover on the northern flank includes two endemic species: the blue bell and the milfoil with yellow flowers.

#### ***Environmental management in Natura 2000 sites***

Conservation of biological diversity, the sustainable utilization of the components and the equitable share of the benefits that result from the utilization of natural resources represents the primordial conditions of the management of protected natural areas, through which it seeks, first, to maintain the harmonious interaction of man with nature.

Declaring an area as a Natura 2000 site is the first evidence that the area has an outstanding natural value, and in the second that the area can generate revenue from ecotourism and other associated activities. The definition of these sites was not gone from the idea of strict protection, prohibiting human activity. The management of these zones must, however, take into account the fact that Natura 2000 is primarily a tool for biodiversity conservation. Management plans may include only economic activities that help to maintain and to protect nature and the environment.

In 2012 in Braila county there are 24 protected natural areas, out of which: 3 protected natural areas of national interest, 1 RAMSAR Site, 18 Natura 2000 sites (9 SPA and 9 SCI) and 2 protected natural areas of county interest.

Only 10 of the natural protected areas were awarded joint in administration or custody and had regulations and management plans in various stages of elaboration and approval

Table 5. Protected natural areas awarded in custody

<b>Crt. No.</b>	<b>Name</b>	<b>Category of protected area</b>	<b>Total surface area ha</b>	<b>The surface area of Braila county ha</b>	<b>Custody/ administrator</b>
1.	Balta Mică a Brăilei	Natural Park	24123	22989	The Administration of the Natural Park Balta Mică a Brăilei
2.		RAMSAR Site	17596	17596	
3.		Natura 2000 - SPA	25856	24821.8	
4.		Natura 2000 - SCI	20872	20872	
5.	Pădurea Camnița	Natural Reservation	1.2	1.2	Brăila Forestry Directorate
6.	Dunărea Veche-Brațul Măcin	Natura 2000 – SPA	18759	6228.05	County Fishermen's Association Athletes Galați
7.	Lunca Siretului Inferior	Natura 2000 – SPA	36492	1824.6	The Association for the Conservation of Biological Diversity
8.		Natura 2000 – SCI	25081	1755.67	
9.	Brațul Măcin	Natura 2000 – SCI		4503.4	County Fishermen's Association Athletes Galați
10.	Lunca Buzăului	Natura 2000 – SCI	6987	978.18	The Ecological University of Bucharest

Source: Annual report regarding the environmental state in county Brăila per year 2012, Agency for the Environmental Protection

The rest of the 14 protected natural areas had no administrator/custody and no regulations and management plans. In the absence of these there are not effective forms of protection for the environment in these protected natural areas.

## BIBLIOGRAPHY

1. Cogălniceanu, D., (1999), Managementul Capitalului Natural, Editura Ars Docendi, București
2. Leveque, C., Mououlou, J.C., (2001), Biodiversite: dynamique biologique et conservation, Masson sciences, Dunod, Paris
3. Vădineanu, A., (2004), Managementul dezvoltării – o abordare ecosistemică, Editura Ars Docendi, București
4. \*\*\* Agenția pentru protecția mediului Brăila, Raport privind starea factorilor de mediu în anul 2012
5. \*\*\* Agenția Regională pentru Protecția Mediului Galați, Raport privind starea mediului în Regiunea Sud Est pe anul 2012
6. \*\*\* Habitats Directive (Directive on the conservation of natural habitats and of wild flora and fauna 92/43/EC/)
7. \*\*\* Birds Directive (Directive on the conservation of wild birds 2009/147/EC).
8. \*\*\* Ordinul. MMP 2387/2011 pentru modificarea Ordinului MMDD nr. 1964/2007 privind declararea siturilor de importanță comunitară ca parte integrantă a rețelei ecologice europene Natura 2000 în România
9. \*\*\* H.G. nr. 1284/2007 privind declararea ariilor de protecție specială avifaunistică ca parte integrantă a rețelei ecologice europene Natura 2000 în România.
10. \*\*\* HG nr. 971/11.10.2011 pentru modificarea și completarea HG 1284/2007 privind declararea ariilor de protecție specială avifaunistică ca parte integrantă a rețelei ecologice europene Natura 2000 în România.
11. \*\*\* Legea nr. 5/2000 pentru aprobarea Planului de amenajare a teritoriului național – secțiunea a III-a – zone protejate
12. \*\*\* OUG. nr. 57/2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei și faunei sălbatice
13. \*\*\* H.C.J. Brăila nr. 20/1994 privind zonele naturale protejate și monumentele naturii de pe raza județului Brăila
14. \*\*\* \*\*\* [www.ramsar.org](http://www.ramsar.org)
15. \*\*\* <http://europa.eu/legislation>

# SOIL BIOTA AS A NATURAL RESOURCE FOR THE RESTORATION OF DEGRADED CHERNOZEMS

IRINA SENICOVSCAIA<sup>1</sup>

**Abstract:** *The role of biota as a natural resource for the restoration of degraded chernozems of the Republic of Moldova is under discussion till nowadays. The status of biota of old-arable chernozems in conditions of the green manure applications has been evaluated statistically. Two experimental sites located in the central and southern zone of the Republic of Moldova have been tested by soil biological indicators during 2010-2012. The application of vetch as a green manure had created conditions for the improvement of the biota's vital activity in chernozems which had been degraded as a result of a long-term arable use. The number of invertebrates increased from 48.1-55.0 to 71.6 - 78.0 ex m<sup>-2</sup>, the number of Lumbricidae family – from 25.6-38.0 to 43.3-68.0 ex m<sup>-2</sup>. The effect of green manure was manifested in the increase of share of Lumbricidae family in the total number of invertebrates by 12.1-20.8 %. The microbial biomass content in the arable layer of soils rose up in average by 1.4-1.5 times. The humification processes intensified as a result of the interaction between the fresh organic matter and the soil biota. Biological parameters did not reach the level of soils under natural vegetation. Management with the green manuring for the biota's restoration of degraded soils and for the improvement of soil quality and environment has been recommended.*

**Key-words:** *soil biota, green manure, degraded chernozem*

## INTRODUCTION

Biota, as an essential component of soils, participates in the processes of pedogenesis, water-stable structure formation, self-purification from contaminants, nutrient cycling, energy cycle, maintains the homeostasis [1, 2 and 15]. The main role of soil biota relates to organic matter mineralization and formation of humus. Indices of soil invertebrates and microorganisms are the global indicators of soil quality [4, 5 and 9].

Soil biota should be considered as a component of the integrated management of natural resources and a natural source for the restoration of degraded chernozems. The traditional sources of organic matter for the degraded soils are organic fertilizers (different types of animal manure) and plant residues, which serve as raw material for the formation of the humic substances [11]. These methods are oriented towards the creation of conditions for the activation of the natural biota of degraded soil [12]. The way to support the functioning of soil biota, to increase the level of biodiversity and resistance of soils used for a long time as arable is the cultivation of leguminous cultures as a green manure [13]. The specific properties of green manure organic matter are the high humidity of green plants (70-90%) and the high content of cellular proteins enriched by carbon and nitrogen with a ratio of C: N = 17, readily available to the microbial decomposition. Domsch [8] compares the rapid multiplication and increased activity of soil microorganisms after incorporation of green manure with glucose effects, which are metabolized easiest among all substances in the soil.

This method can be used for the improvement of soil quality of chernozems degraded as the result of the long-term agricultural utilization.

**The purpose of the research** was to determine the influence of the green manure application on the biota for the improvement of soil quality and environmental certifications of degraded chernozems.

## MATERIAL AND METHODS

**Experimental sites and soils.** Our comparative study has been performed in two zones of the Republic of Moldova. Land management practices with the application of green manuring

---

<sup>1</sup> Assistant of Professor, Ph.D, "Nicolae Dimo" Institute of Pedology, Agrochemistry and Soil Protection, Kishinev, Republic of Moldova, irina\_sen@mail.ru

(vetch) in the condition of long-term field experiments have been analyzed. Researches were carried out during the period between 2009 and 2012 years.

The first site was located in the center of the country, in the Ivanča village, Orhei region. The long-term arable soil with crop rotation without fertilizers (control) and green manure treatments was tested. Vetch was planted twice in 2009 and in 2010 and its green mass in the amount of 19 t ha<sup>-1</sup> was plowed under disc in 2010. The soils were the leached chernozem with humus content of 3.43 % and pH = 6.6 in the 0-25 cm layer.

The second site was located in the southern zone, in the Tartaul de Salchie village, Cahul region. There were the plots with long-term arable soil (control) and with green manure treatments. Vetch was used once as a green manure. Vetch was planted in the autumn of 2009 and its green mass in the amount of 28 t ha<sup>-1</sup> was plowed under disc in July 2010. The soil was the ordinary chernozem with humus content of 3.16 % and pH = 7.1 in the 0-25 cm layer [7].

Soil samples for the determination of microbiological and enzymatic properties were collected from the 0-25 cm layer of the experimental plots during 2010-2012.

**Status of invertebrates.** The state of invertebrates was identified from test cuts by manually sampling the soil layers to the depth of soil fauna occurrence applying Gilyarov and Striganova's method [10].

**Microbiological properties.** The microbial biomass carbon was measured by the rehydration method based on the difference between carbon extracted with 0.5 M K<sub>2</sub>SO<sub>4</sub> from fresh soil samples and from soil dried at 65-70°C for 24h, with K<sub>c</sub> coefficient of 0.25 [3]. K<sub>2</sub>SO<sub>4</sub>-extractable carbon concentrations in the dried and fresh soil samples were measured simultaneously by dichromate oxidation; K<sub>2</sub>SO<sub>4</sub>-extractable carbon was determined at 590 nm using a CΦ 46 spectrophotometer. Counts of microorganisms (heterotrophic bacteria, actinomycetes, fungi and polysaccharides-forming microorganisms) were obtained on agar plates [14].

Biological indices were evaluated statistically using the variation analysis. Statistical parameters of the state of soil invertebrates were calculated taking into account the depth of soil fauna occurrence, microorganisms – for the layer of 0-25 cm.

## RESULTS AND DISCUSSIONS

A favorable effect of the green manure management on invertebrates in the leached and ordinary chernozem has been noted both as the average values of indicators and as the confidence intervals. The number of invertebrates in the leached chernozem increased from 55.0 to 78.0 ex m<sup>-2</sup>, the number of earthworms – from 38.0 to 68.0 ex m<sup>-2</sup> in comparison with the control plot (Table 1).

Table 1. Status of invertebrates in the leached chernozem in conditions of the land management with green manure

Index	Unit	Mean value	Experimental value		S <sup>2</sup>	V, %	Confidence interval (P ≤ 0.05)	n
			min	max				
Control								
Number of invertebrates	ex m <sup>-2</sup>	55.0	8.0	120.0	966.2	56.5	35.2-74.8	12
Number of <i>Lumbricidae</i> family		38.0	8.0	112.0	781.1	73.6	20.2-55.8	12
Biomass of invertebrates	g m <sup>-2</sup>	13.3	1.6	48.8	235.4	115.4	3.5-23.1	12
Biomass of <i>Lumbricidae</i> family		8.3	0.8	48.0	197.3	169.3	0-17.2	12
Green manure (vetch)								
Number of invertebrates	ex m <sup>-2</sup>	78.0	48.0	128.0	1048.0	41.5	44.0-112.0	6
Number of <i>Lumbricidae</i> family		68.0	40.0	120.0	1171.2	50.3	32.1-103.9	6
Biomass of invertebrates	g m <sup>-2</sup>	9.0	4.0	14.4	30.1	60.9	3.2-14.8	6
Biomass of <i>Lumbricidae</i> family		8.3	3.2	13.6	31.2	67.3	2.4-14.2	6

The number of invertebrates in the ordinary chernozem rose from 48.1 to 71.6 ex m<sup>-2</sup>, the number of *Lumbricidae* family – from 25.6 to 43.3 ex m<sup>-2</sup> (Table 2).

The biomass of invertebrates and *Lumbricidae* family in the leached chernozem remained practically unchanged, while the biomass of invertebrates and earthworms in the ordinary chernozem increased by 1.3-1.4 times when the green manure was applied.

The dominant position in the complex of invertebrates occupies the *Lumbricidae* family. The share of *Lumbricidae* family in the total population increased from 69.1% to 87.2% in the leached chernozem and from 53.2% to 60.5% in the ordinary chernozem by the application of green manure.

A maximum number of invertebrates and earthworms in the soil was registered in spring, the minimum – in autumn. It is not only due to the reduction of the fresh organic matter in the soil but also to the decrease of moisture content in the root layer (0-40 cm) in autumn.

Table 2. Status of invertebrates in the ordinary chernozem in conditions of the land management with green manure

Index	Unit	Mean value	Experimental value		S <sup>2</sup>	V, %	Confidence interval (P ≤ 0.05)	n
			min	max				
Control								
Number of invertebrates	ex m <sup>-2</sup>	48.1	16.0	96.0	667.1	53.7	31.7-64.5	12
Number of <i>Lumbricidae</i> family		25.6	0	56.0	408.3	78.9	12.8-38.4	12
Biomass of invertebrates	g m <sup>-2</sup>	7.6	0.8	22.4	52.7	95.5	3.0-12.2	12
Biomass of <i>Lumbricidae</i> family		6.2	0	20.8	56.3	121.1	1.4-11.0	12
Green manure (vetch)								
Number of invertebrates	ex m <sup>-2</sup>	71.6	16.0	128.0	2518.9	70.1	35.7-107.5	10
Number of <i>Lumbricidae</i> family		43.3	0	104.0	1947.8	101.9	11.7-74.9	10
Biomass of invertebrates	g m <sup>-2</sup>	10.4	1.2	31.2	98.7	95.5	3.3-17.5	10
Biomass of <i>Lumbricidae</i> family		7.8	0	26.4	87.5	119.9	1.1-14.5	10

According to the statistical data, the use of green manure method lead to the increase of microbial biomass content on average from 275.8 to 384.6  $\mu\text{g C g}^{-1}\text{ sol}$  in the leached chernozem and from 216.2 to 313.5  $\mu\text{g C g}^{-1}\text{ sol}$  in the ordinary chernozem (Table 3).

Table 3. Statistical parameters of the microbial biomass in chernozems in conditions of the land management with green manure

Soil	Variant	Mean value	Experimental value		S <sup>2</sup>	V, %	Confidence interval (P ≤ 0.05)	n
			min	max				
Leached chernozem	Control	275.8	137.2	350.0	4793.9	25.1	213.8-319.8	12
	Green manure (vetch)	384.6	238.4	438.6	4930.1	18.3	330.5-438.7	9
Ordinary chernozem	Control	216.2	183.6	278.1	851.0	13.5	205.8-226.6	15
	Green manure (vetch)	313.5	216.3	388.5	3050.3	17.6	282.8-344.2	15

The stimulation of growth of bacteria and fungi has been observed under the application of green manure. Vetch contributed to growth of microorganisms forming polysaccharides in the chernozem leached, their number was greater than in control by 1.4 times.

The use of green fertilizers restores the biota's functioning to the zone of homeostasis and increases the resistance of soils to the degradation (stability of soils in terms of degradation). However, these methods do not lead the degraded soil to the level of natural standard [12]. The humus content level was higher on plots under green manure by 0.19 % in comparison with arable plots [6]. Thus, the farming system with the application of vetch improves the status of biota and fertility of arable soils.

## CONCLUSIONS

The application of vetch as a green manure had created conditions for the improvement of the biota's vital activity in chernozems which had been degraded as a result of a long-term arable use. The green manure application on degraded chernozems helps to prevent ecological violations in the state of soil biota, to restore species and populations of invertebrates and to enhance the total microbial biomass. Indices of the number of invertebrates and *Lumbricidae* family have risen in the green manures' chernozems by 1.4-1.8 times. The effect of green manure was manifested in the increase of share of *Lumbricidae* family in the total number of invertebrates by 12.1-20.8 %. The microbial carbon content in the arable layer of the leached and ordinary chernozem has grown by 1.4-1.5 times. These methods improve the resistance of soils to degradation, but biological parameters do not reach the level of soils under the natural vegetation. Management with the green manuring for the biota's restoration of degraded soils and for the improvement of soil quality and environment has been recommended.

## BIBLIOGRAPHY

- [1]. Barrios, E. (2007). *Soil biota, ecosystem services and land productivity*. *Ecological Economics*, 64 (2), 269-285.
- [2]. Beare, M., Vikram, Reddy M., Tian, G. & Srivastava S. (1997). *Agricultural intensification, soil biodiversity and agroecosystem function in the tropics: the role of decomposer biot*. *Applied Soil Ecology*, 6 (1), 87-108.
- [3]. Blagodatsky, S.A., Blagodatskaya, E.V., Gorbenko, A. J. & Panikov, N. S. (1987). *Rehydration method for the determining of the microbial biomass in the soil*. *Pochvovedenie*, 4, 64-71.
- [4]. Brussard, L. (1998). *Soil fauna, guilds, functional groups and ecosystem processes*. *Applied Soil Ecology*, 9, 123-135.
- [5]. Brussard, L., Kuyper, T.W., Didden, W.A.M., de Goede, R.G.M. & Bloem, J. (2002). *Biological soil quality*. Pages 6-13 in ASSSI national conference proceedings. FUTURE soils – managing soil resources to ensure access to markets for future generations. 2-6 December 2002 (eds. D. Williamson, C. Tang and A. Rate). ASSSI and UWA Perth.
- [6]. Cerbari, V., Scorpan, V., Tsaranu, M. & Bachean, I. (2014). *Phyto-amelioration of degraded chernozem*. In David Dent (Ed.), *Soil as World Heritage* (pp. 381-387). Dordrecht, Netherlands, Springer.
- [7]. Cerbari, V., Scorpan, V., Tsaranu, M. & Bachean, I. (2012). *Remediation of the quality status and production capacity in ordinary chernozems in the south of Moldova under the influence of phyto-measures*. *Mediul Ambient*, 1(61), 38-43.
- [8]. Domsch, K. (1963). *Bodenatmung: Sammelbericht über Methoden und Ergebnisse*, Zbt. Bakt. II.
- [9]. Filip, Z. (2002). *International approach to assessing soil quality by ecologically-related biological parameters*. *Agriculture, Ecosystems and Environment*, 88, 169-174.
- [10]. Gilyarov, M.S. & Striganova, B.R. (Ed.). (1987). *Quantitative Methods in Soil Zoology*. Moscow, Russia, Nauka.
- [11]. Rusu A., et al. (2012). *Guide of utilization of organic fertilizers*. Kishinev, Republic of Moldova, Pontos.
- [12]. Senicovscaia, I., Marinescu, C., Andrieș, S., Filipciuc, V., Boincean, B., Bulat, L., Burghelea, A., Botezatu, T. & Daniliuc, R. (2012). *Methodological instructions on the assessment and increase of the soil biota stability in conditions of the degradation processes intensification*. Kishinev, Republic of Moldova, Pontos.
- [13]. Senicovscaia, I. (2012). *Biota of Degraded Soils and Methods for its Restoration*. *AGROLIFE, Scientific journal, Bucharest, Romania*, 1, 78-83.
- [14]. Zvyagintsev, D.G. (Ed.). (1991). *Methods of soil microbiology and biochemistry*. Moscow, Russia, MSU.
- [15]. Zvyagintsev, D. G. (2003). *Structure and function of the complex of soil microorganisms*. In Dobrovolsky, G. V. (Ed.), *Structural and functional role of soils and soil biota in the biosphere* (pp. 102-114). Moscow, Russia, Nauka.

# ORGANIC FARMING, A VIABLE AND FEASIBLE COMPONENT OF THE ROMANIAN AGRICULTURE

ANGELESCU ANDA-IRINA<sup>1</sup>, ALECU IOAN-NICULAE<sup>2</sup>, BADEA ADRIANA<sup>3</sup>

**Summary:** *Taking into account the fact that organic farming is not a miracle, but a tangible reality of our days, a trend with more and more followers within the producers and consumers, this paper is included within those trying to demonstrate once more that for Romania also, the organic farming is a viable alternative to the traditional farming that leads in time to the degradation of soil and water resources, to air pollution, degradation of population health etc. By using as working method the direct observation without intervention and consulting specialized reference sources, we have tried to select the most important definitions for the Romanian organic farming. We have also specified the objectives and principles of the organic farming and we have made a selection of the most important legal regulations on which the environment-friendly production is based, both at Community level and at national level. The analysis of the organic farming in Romania also showed that a process of institutional strengthening and development is currently undergoing for the organic farming, as in all the other countries, and the Ministry of Agriculture and Rural Development, by its actions, puts the organic farming in the centre of the development of the Romanian agriculture. As such, the evolution of this sector from one year to another was dynamic, with a steady pace growth of the eco-cultivated areas and of the number of animals resulted from organic livestock breeding. The analysis performed entitles us to consider that the organic farming is an inadequately capitalized opportunity for Romania that could place the country as a front-runner on the European market.*

**Key words:** *Organic farming, conventional farming, resources, regulations, conversion.*

## INTRODUCTION

Although many authors consider that organic agriculture has emerged in Europe as an expression of the lack of faith of people in the food safety measures and as a result of the diseases related to the consumption of contaminated products, the many problems discovered in the last decades lead to the acceptance of the organic farming as the single viable alternative for the production of healthy food and for a sustainable environment protection.

The most important issues for the followers of organic farming and not only are the following:

- Contamination of groundwater and surface waters;
- Alteration of the biological balance by: the occurrence of new diseases, invasion of existent pests, climate heating, disappearance of some pollinating insects, impairment of the wild fauna;
- Air and soil pollution;
- Desertification,
- Decrease of genetic diversity of plants and animals;
- Decrease of the food product quality;
- Population health.
- Problems in the rural society.
- At international level, we can speak about the gap between the developed countries, with a high yield commercial agriculture and the underdeveloped countries with subsistence farming mainly with monocultures.

This is why the main purpose of the organic farming is to settle sustainable, diversified and balanced agricultural systems that protect the natural resources and the consumers' health, emphasizing the natural quality of the products, the quantitative and productivity issues taking a secondary place.

---

<sup>1</sup> Angelescu Anda-Irina, engineer, Ph.D student, U.S.A.M.V. Bucharest, anda\_irina@yahoo.com

<sup>2</sup> Alecu Ioan-Niculae, professor, Ph.D., U.S.A.M.V. Bucharest, alecuioannicolae@yahoo.com

<sup>3</sup> Badea Adriana, engineer, Ph.D student, U.S.A.M.V. Bucharest, badea\_adriana09@yahoo.com

## MATERIAL AND METHOD

Organic farming is an important component of a sustainable agriculture, contributing to the long-term evolution of the rural space. The effects of introducing this agricultural system are reflected in the sustainable development of the environment, in the rural economy and the society, in general. This article also represents an analysis of the evolution of the eco-cultivated areas, of the number of animals resulted from organic livestock breeding and of the number of operators operating in this field, from 2000 to 2013, based on the statistic data supplied by the Ministry of Agriculture and Rural Development (MARD).

## RESULTS AND DISCUSSIONS

Over time, several experts tried to define as exactly as possible the organic farming, and it may be defined as follows:

- “The system that promote the land cultivation by means capable to maintain a balance between the agro-ecosystems and the environment, generating specific agro-climaxes, in favour of preserving all the positive elements and processes included in the contemporary and future agricultural systems”;
- “Holistic production management system that favours the health of the agro-ecosystem, biodiversity, biological cycles and biological activity of the soil;
- “A rational, smart management using all the possibilities offered by the contemporary civilization of the national wealth, environment in favour of agriculture and people”;
- “The production management system that is aimed to the promotion and improvement of the system health, including the biological cycles and the biological activity of soil”;
- “A sum of agricultural techniques based on the natural interaction between the living organisms, soil and water conditions and human actions from which the use of chemical synthesis products is excluded”;

These definitions prove that most of the experts think that the *organic farming* is, on the one hand, a component of the sustainable agricultural system, and, on the other hand, it represents a fair alternative to the *intensive, industrial type conventional farming*. It is also unanimously accepted that the conventional farming proves with each day its limits and shortcomings regarding the quality of the products obtained and the negative effects on the environment, as a result of the use of some important quantities of chemical substances (chemical fertilizers and pesticides).

The organic farming system is based on crop rotation and biological plant protection measures, excluding the use of artificial fertilizers, pesticides, growth hormones and additives in the feeding stuff. Thus, the fundamental objective of the organic farming is to protect the consumer of agricultural goods and the environment. Some of the other objectives of the organic farming are as follows:

- Increase the biodiversity of the entire system;
- Stimulate the biological activity of the soil and preserve its fertility on long term;
- A better recycling of vegetal and animal origin waste with the aim of restoring the nutrients of the soil;
- Diminish, as much as possible, the use of exhaustible resources;
- Large scale use of renewable resources in the agricultural systems, at local level;
- Diminish all types of pollution resulted from growing plants and breeding animals, thus promoting the rational use of soil, water and air;
- Contribute to the animal welfare;
- Obtain healthy and high nutritional quality products;
- Highest respect for the consumer, environment and farmer;
- Optimize local resources and potential;

- Carefully handle agricultural products and use the most adequate processing methods with the aim of preserving in all stages the environmental integrity and the essential quality of the product.

The core principles of the organic agri-food production are:

- Eliminating pollutant technologies, genetically modified organisms and their derived products, except some medicinal products for veterinary use;
- Choosing some production structures and creating crop rotations that mainly use species, varieties and breeds with high resistance and adaptability;
- Using proper crop rotations and natural organic fertilizers with the aim of improving the natural soil fertility);
- Saving the conventional sources of energy and their replacement, at a larger scale, with the rational use of unconventional energy and of the by-products;
- Implementation of animal breeding technologies that satisfy the physiological and behavioural necessities of species and breeds and that ensure the animal welfare.

### **Legal regulations and methods to support the organic farming**

At international level, an important role has the International Federation for Organic Agriculture Movement (IFOAM) that prepared a standard for the biological production. It was translated in 19 languages and distributed globally. IFOAM has a magazine (*Ecology & Farming*) that appears four times per year and specialized working groups, being represented (for consultation) at UNO and FAO.

The organic farming represents the return to the values of the traditional farming, but not to its methods, and EU prepared production standards for the organic farming.

In the European Union, an important part in the development and promotion of organic farming plays the financial aid awarded by the governments for the promotion of this production system.

We can mention several regulations aimed especially to the awarding of financial aid for the promotion of organic farming, such as:

- Regulation (EC) No. 232/91 on the improvement of the efficiency of agricultural structures;
- Regulation (EC) No. 2078/92 on the agro-ecological measures;
- Regulation (EC) No. 3669/93 for the amendment of Regulation (EC) No. 886/90 on the improvement of agricultural produce processing and marketing conditions; organic farming is one of the priorities for eligible investments of the aids;
- Regulation (EC) No. 208/93 and No. 2085/93 favour the establishment of structural funds aimed to rural development by which the obtaining of high quality agricultural products, such as organic products, is supported.

Council Regulation (EEC) No. 2092/91 is supplemented by a proposal including a framework regarding organic zootechnics for the accomplishment of a balanced production, taking into account the environmental protection standards.

As regards the support, it is of several types:

a) **Direct support of the farms**, as reconversion aids, aimed to support this difficult stage from a technical, economic, and financial point of view.

b) **Technical assistance aids** are the most common means in the European countries for promoting and supporting this production system. They include specific popularisation services, subsidies granted by some professional associations to the experts etc.

c) **Education and training** as courses and specific training modules, adapted to the organic farming with different training stages.

d) **Research in the field, pilot projects for the improvement of agri-food product quality etc.**

Compared to what is happening at the European level, organic farming is a relatively new field for the farmers in our country, but of great perspective in the context of the Romanian efforts to align to the standards for agriculture in the European Union.

The potential of the Romanian agriculture to obtain organic products is, according to the experts' assessments, of minimum 15 % of the agricultural area of the country, because many agricultural lands have not been fertilized or chemical treated for years, and the natural conditions and the existent resources are in favour of using the organic farming.

In Romania, the legal basis for organizing the production and marketing of organic products is the Emergency Government Ordinance No. 34/2000, approved by Law No. 38/2001 and by the Government Decision 917/2001 establishing the Implementing rules for the enforcement of the provisions of EGO No. 34/2000.

The national legislative framework also includes the following regulations:

- Order No. 317/190 dated May 11, 2006 on the amendment and supplementation of Annex to the Order of the Minister of the Agriculture, Food and Forestry and of the President of the National Agency for the Consumer Protection No. 417/110/2002 for the approval of the Specific rules for the labelling of organic foodstuff
- Order No. 219/March 21, 2007 for the approval of the Rules for the registration of organic operators
- Order No. 35/February 9, 2009 for the amendment and supplementation of Order No. 219/2007 for the approval of the Rules for the registration of organic operators
- Order No. 407/June 23, 2009 on the amendment and supplementation of the Order of the Minister of the Agriculture, Forestry and Rural Development No. 219/2007 on the approval of the Rules for the registration of organic operators.
- Order No. 4/January 8, 2010 on the amendment and supplementation of the Order of the Minister of the Agriculture, Forestry and Rural Development No. 219/2007 on the approval of the Rules for the registration of organic operators.
- Decision No. 759/July 21, 2010 with the subsequent amendments and supplementations on the awarding of specific aids for the improvement of the quality of organic agricultural goods
- Order No. 252/2010 on the amendment of the Order of the Minister of Agriculture, Forestry and Rural Development No. 219/2007 for the approval of the Rules for the registration of organic operators.
- Decision No. 1095/2010 for the amendment of the Government Decision No. 755/2010 on the specific aid scheme for the cow's milk producers in the disadvantaged areas and of the Government Decision No. 759/2010 on the awarding of specific aids for the improvement of the quality of organic agricultural goods
- Decision No. 1095/2010 for the amendment of the Government Decision No. 755/2010 on the specific aid scheme for the cow's milk producers in the disadvantaged areas and of the Government Decision No. 759/2010 on the awarding of specific aids for the improvement of the quality of organic agricultural goods
- Decision No. 1303/December 15, 2010 for the amendment and supplementation of Government Decision No. 755/2010 on the specific aid scheme for the cow's milk producers in the disadvantaged areas and of the Government Decision No. 759/2010 on the awarding of specific aids for the improvement of the quality of organic agricultural goods.
- Order No. 17/January 20, 2011 on the approval of abatements and exclusions applicable to the payment claims related to the specific aid for improving the quality of organic agricultural goods.
- Decision No. 590/June 8, 2011 for the amendment and supplementation of Government Decision No. 759/2010 on the awarding of specific aids for improving the quality of organic agricultural goods.
- Order No. 147/June 16, 2011 for the amendment of Annex to the Order of the Minister of Agriculture and Rural Development No. 17/2011 on the approval of abatements and exclusions

applicable to the payment claims related to the specific aid for improving the quality of organic agricultural goods,

- Order No. 181/August 16, 2012 on the approval of the Rules for the establishment of the inspection and certification system for organic farming.
- Order No. 187/August 24, 2012 on the supplementation of the Order of the Minister of Agriculture, Forestry and Rural Development No. 219/2007 for the approval of the Rules for the registration of organic operators.
- Decision no. 911/September 5, 2012 for the amendment of the Government Decision No. 759/2010 on the awarding of specific aids for improving the quality of organic agricultural goods and for the amendment and supplementation of Government Decision No. 796/2012 on the specific aid scheme awarded to beef and cow's milk producers in disadvantaged areas
- Decision No. 131/March 27, 2013 on establishing the necessary measures and sanctions in view of observing the provisions of Council Regulation (EC) No. 834/2007 dated June 28, 2007 on the organic farming and the labelling of organic products, as well as for repealing Regulation (EEC) no. 2.092/91.
- Order No. 378/May 23, 2013 on the amendment and supplementation of the Order of the Minister of the Agriculture, Forestry and Rural Development No. 219/2007 on the approval of the Rules for the registration of organic operators.
- Order No. 383/May 23, 2013 on the amendment of Annex No. 8 to the Order of the Ministry of Agriculture and Rural Development No. 181/2012 on the approval of the rules for the establishment of inspection and certification system for the organic farming.
- Decision No. 418/June 26, 2013 for the supplementation of Government Decision No. 759/2010 on the awarding of specific aids for improving the quality of organic agricultural goods
- Order No. 1253/November 6, 2013 for the approval of the Rules for the registration of organic operators
- Order No. 987/2014 - on the amendment and supplementation of the Order of the Minister of Agriculture and Rural Development No. 1.253/2013 on the approval of the Rules for the registration of organic operators, published in the Official Gazette, Part I, No. 454 dated June 20, 2014.

According to the applicable laws, any farmer who wants to apply the organic farming and to be recognized as an organic producer has to observe rules and a legal system regarding inspection that takes into account the followings:

- Familiarity with and enforcement of organic production rules and principles;
- Registration of the organic farming activity at the level of the Ministry of Agriculture and Rural Development;
- A period of conversion from the conventional production to the organic production;
- Control by an inspection and certification body authorized by MARD (13 inspection and certification bodies, approved by MARD are currently operating, according to the national and Community laws for organic farming);
- Labelling of organic products;
- Marketing on the domestic or foreign markets only according to the laws.

The conversion from the conventional farming to the organic farming takes time, covering a transition period named "*conversion period*". This is the period the farmers have for adapting the farm management to the rules of organic farming.

The duration of the conversion period for crop, animal and apiculture production is:

- 2 years for annual field crops;
- 3 years for perennial crops and plantations;
- 2 years for grasslands and fodder crops;
- 12 months for beef cattle;
- 6 months for small ruminants and pigs;
- 6 months for dairy animals;
- 10 weeks for meat production poultry purchased at the age of 3 days;

- 6 weeks for egg production poultry;
- 1 year for bees, if the family was purchased from a conventional apiary.

For crop production, the conversion period is of at least 2 years, prior to seeding and planting, or, in case of perennial crops, except pastures, of at least 3 years prior to the first harvesting of products.

Any organic operator (producer, processor, and importer) has to promote his activity by filling in the Organic farming registration forms. They are available at the County Agricultural Directorate in the area where the producer operates, at the organic farming county officers. This organic farming registration procedure is regulated by the Order No. 219/2007 on the approval of the Rules for the registration of organic operators, with the subsequent amendments and supplementations. All these control and certification procedures are strictly applied in order to ensure the observance of the organic production methods.

### Evolution of organic farming in Romania

EU Organic farming has rapidly grown in the last decade, all the European Union countries showing a real *will to develop a field* that, according to the assessments, will have, on short term, more than 10 % of the crop area, approximately 20 % of the agri-food production system and more than 5 % of the system turnover.

In this context, the Romanian consumers are growingly acknowledging that the organic products have a higher nutritional value and quality than those obtained through conventional methods. Besides this important issue, taking into account its importance for the population health, we have to mention its major contribution to the sustainable development, by not using chemical synthesis substances and the observance of animal welfare standards.

Considering all these issues, we can indicate that organic farming had an extremely dynamic evolution in Romania, with a weighted average rate of annual increase of 23 %. In a period of 14 years, the eco-cultivated areas have increased by 19.3 times, from 17,388 ha in 2000 to 336,700 ha in 2013 (table no. 1). The areas certified for wild growing flora harvesting have grown spectacularly, from 50 ha in 2000, to 1,200,000 ha in 2013, meaning an increase by 24,000 times.

**Table no. 1 - Evolution of eco-cultivated areas (hectare)**

Year	2000	2001	2002	2003	2004	2005	2006
Total of eco-cultivated areas (ha)	17,388	28,700	43,550	56,800	73,300	92,770	104,494
Wild growing flora harvesting (ha)	50	100	300	400	500	17,360	38,700
Year	2007	2008	2009	2010	2011	2012	2013
Total of eco-cultivated areas (ha)	131,448.9	140,132.17	168,288.23	182,705.69	229,947.16	288,260	301,148
Wild growing flora harvesting (ha)	58,728	81,279	88,883.4	77,294.35	338,051	1,082,138	1,200,000

(data source: MARD)

As regards structure of crops in eco-cultivated area, it can be noticed that the areas with cereals have increased by 32 times, from 4,000 ha in 2000 to 129,493.6 ha in 2013 (table no. 2). The areas certified for fruit-bearing trees and vine have grown from 50 ha in 2002, to 18,068.8 ha in 2013, meaning an increase by 361 times (the biggest growth in structure of crops). Vegetables have grown from 38 ha in 2000, to 3,011.4 ha in 2013, meaning an increase by 79.2 times.

**Table no. 2 - Structure of crops in eco-cultivated area (hectare)**

Year	2000	2001	2002	2003	2004	2005	2006
Cereals	4,000	8,000	12,000	16,000	20,500	22,100	16,310
Grassland	9,300	14,000	20,000	24,000	31,300	42,300	51,200
Oleaginous and protein plants	4,000	6,300	10,000	15,600	20,100	22,614	23,872
Vegetables	38	100	700	200	300	440	720
Fruit-bearing trees and vine	-	-	50*	100*	200*	432*	294
Year	2007	2008	2009	2010	2011	2012	2013

Cereals	32,222	56,337	63,440	72,298	79,167	105,148.5	129,493.6
Grassland	57,600	46,006	39,233	31,579	78,198	105,835.5	81,309.9
Oleaginous and protein plants	27,713	25,391	40,295	53,375	51,028	47,552.7	69,294
Vegetables	310	259	344	734	914	2882.6	3,011.4
Fruit-bearing trees and vine	954	1,518	1,869.4	3,093	4,166.6	7,781.3	18,068.8

\* Without vine (data source: MARD)

As regards the organic livestock production, it can be noticed that the number of animals resulted from ecological livestock breeding has increased, in general, in the analysed period, but with some fluctuations: in the period 2008-2009 for dairy cows, in the period 2009-2010 for sheep and goats and in the period 2005-2006 for laying hens (table no. 3). For the entire period, the increase of number of dairy cows was by 28.5 times, from 2100 in 2000 to 60,000 in 2012. For sheep and goats, the number has increased by 94.1 times, from 1700 in 2000, to 160,000 in 2012. For laying hens, 2003 is the first year for which M.A.R.D. offers data, when the number of animals resulted from ecological livestock breeding was of 2000. The trend was ascending for this species also, with an increase by 42.5 times, with a total number of 85,000 animals at the end of 2012. In 2013 we have an incomplete data, without animals in conversion.

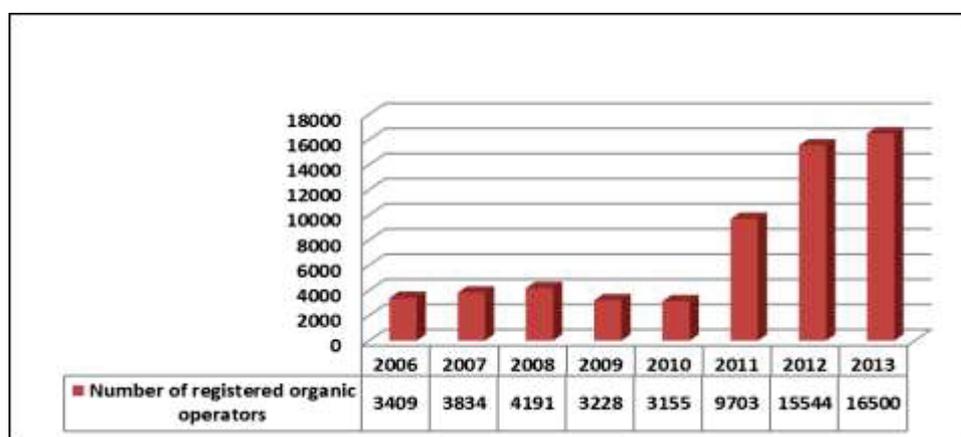
**Table no. 3 - Evolution of the number of animals resulted from organic livestock breeding (animals)**

Year	2000	2001	2002	2003	2004	2005	2006
Dairy cows	2,100	5,300	6,500	7,200	7,200	8,100	9,900
Sheep and goats	1,700	3,700	3,000	3,200	3,200	40,500	86,180
Laying hens	-	-	-	2,000	2,700	7,000	4,300
Year	2007	2008	2009	2010	2011	2012	2013*
Dairy cows	6,265	4,297	10,821	12,761	19,487	60,000	10,488
Sheep and goats	78,076	125,471	26,674	57,678	130,015	160,000	83,341
Laying hens	4,720	6,080	7,500	23,740	58,203	85,000	74,220

\*organic certified, without animals in conversion (data source: MARD)

As regards the number of operators (producers, processors and dealers, importers and exporters) which are certified for organic farming, the figure 1 indicates that in 2012, 15,544 operators notified the Country Agricultural Directorates regarding their activity within the field of organic farming. According to the data supplied by M.A.R.D., in 2013, on September 30, 2013, the number of operators registered in the organic farming system was of approximately 16,500. The largest increase was registered in 2011, when their number increased by 3.07 times compared to 2010. In 2012, their number increased by 1.6 times compared to 2011 and by 4.92 times compared to 2010.

M.A.R.D. considers that the ascending trend of the number of operators notifying their activity starting with 2010 was due especially to the existent support measures for the conversion period, awarded based on Art. 68 of Regulation (EC) No. 73/2009 on establishing some common standards for the direct support systems for farmers within the Common Agricultural Policy and for establishing some support systems for farmers.



**Figure 1 - Evolution of the number of organic operators**

## CONCLUSIONS

The matters covered in this document lead us to the following conclusions:

1. By its objectives and principles, organic farming represents a component of the sustainable agriculture that is an “*agriculture that is economically viable, environmentally sound and socially just*” aimed to satisfy human needs without destroying the natural resources. Economically viable means that it has to supply the market with the necessary products and to offer the producers a decent standard of living. Environmentally sound means that it produces healthy food products, it does not pollute water and it does not lead to soil degradation. Socially just means that it maintains jobs and develops the area through a better allocation of lands and governmental aids.”
2. The problems occurred at global level in the last decades (ecological imbalances, pollution, increased occurrence of some diseases) led to the acceptance of organic farming as a much healthier alternative to the conventional farming, and a genuine trend of using organic products was created
3. In the European Union, an extremely important role in promoting the organic farming system was played by the regulations for the awarding of financial aids by the governments. These financial aids also led to the increase of the number of organic farming operators in Romania, especially starting with 2010.
4. Although, for Romania, the organic farming is relatively new, its trend in the last years entitle us to state that the importance of using this agricultural system was acknowledged, being assimilated as a solution to the sustainable revitalization of rural area
5. Because Romania has a special potential for continuing the development of this field, it is extremely important to support it by allocating financial support for the organic production and processing.

## BIBLIOGRAPHY

1. Boboc V., *Managementul fermelor avicole ecologice*, Cartea Universitară, București, 2005;
2. Chițea M., *Agricultura organică – trecut, prezent și viitor*, articol publicat in *Economie Agrară și Dezvoltare Rurală*, anul 1, nr. 1-2, Editura “Terra Nostra”, Iași, 2004
3. Ion V., Bucata L.I., Diaconescu S., J. Gieraths, W. Weiller, *Agricultura ecologică*, Editura Leonardo da Vinci, 2005
4. Ionescu A., *Agricultura ecologică*, Editura Ceres, București, 1982
5. Puia I., Soran V., *Agroecosistemele și alimentatia omenirii*, Editura Ceres, București, 1981
6. Sima E., *Produsele ecologice - oportunități și avantaje pentru sectorul agricol românesc* - INCE, Institutul de Economie Agrară, 2004;
7. Toncea I., *Ghid practic de agricultură ecologică*, Editura Academic Press, Cluj-Napoca, 2002
8. “Planul National de Dezvoltare Rurala 2007-2013”, Government of Romania
9. “Codex Alimentarius”, Food and Agriculture Organisation
10. Regulation (EC) No. 232/91
11. Regulation (EC) No. 2078/92
12. Regulation (EC) No. 3669/93
13. Regulation (EC) No. 208/93
14. Regulation (EC) No. 2092/91
15. Order No. 317/190/May 11, 2006
16. Order No. 4/January 8, 2010
17. Order No. 181/August 16, 2012
18. Order No. 383/May 23, 2013
19. Order No. 378/May 23, 2013
20. Order No. 987/2014
21. [www.madr.ro](http://www.madr.ro)
22. [www.organic-world.net/yearbook-html](http://www.organic-world.net/yearbook-html).

# THE ECOLOGICAL CONTROL OF PESTS AT CABBAGE USING ARISTOLOCHIA CLEMATITIS PLANTS FROM SPONTANEOUS FLORA

OLIMPIA PANDIA<sup>1</sup>, ION SĂRĂCIN<sup>2</sup>, ION BOZGĂ<sup>1</sup>

**Abstract:** *In the modern society of today, consuming natural products is not a hobby anymore and it is a necessity for us regarding health. The first factors of disease are owed to unhealthy food and we cannot have a healthy food and a healthy organism if we do not remove from our food system the negative effects possessed by unhealthy food, even if it is not the cheapest option. From the products consumed by people, a very important role for producing the necessary energy for the organism is given to vegetables. Thus, we aimed the study of using decoctions obtained from the Aristolochia Clematitidis plants which can be found in the spontaneous flora of Romania, unpretentious regarding the soil and which can combat one of the most frequent pests met in cabbage cultures: cabbage aphid (Brevicoryne brassicae L.), cabbage fly (Delia brassicae), cabbage butterfly (Pieris brassicae). The elimination of contact insecticides and chemical substances and obtaining healthier products are several purposes by using these methods. The obtained decoctions were made by combining three types of plant mixes in order to identify which component part is richer in aristolochic acid and which decoction gives better results for the combat of insects and to make a better comparison between them related to obtained results. There were taken soil samples from the six cultivars between planting cabbage seedlings for a better documentation. After the observations made on the whole period, the best results were obtained at cultivars 1, 3, 5, 6 where cabbage plants were treated with decoction obtained from the roots and where the whole plant combined with soap solution was used, followed by cultivars 2 and 4 where there was not used Aristolochia Clematitidis plants. Because the results obtained were satisfied without using contact insecticides, a larger investigation of these decoctions follows using only Aristolochia Clematitidis plants or in combinations with other plants which have very good results for ecological control of diseases and pests from vegetable cultures.*

**Keywords:** *physiological balance, ecological products, decoction, aristolochic acid*

## INTRODUCTION

There are cultivated approximately 250.000 species of vegetables worldwide and over 60 species in Romania. Even if these cultures cover relatively limited areas (approximately 2% from the arable land) and the made production workflow exceeds 10% from the vegetable production, vegetable growing represents an important segment of national wealth which must be kept and continually extended. The cultivated range shows that, in 2000, the first places in matter of production are occupied by tomatoes (100, 8 mil. t), cabbage (52,3 mil. t), followed by onion and carrots (information from FAO) [6, 7].

By vegetable protection we can understand the attainment of healthy superior-quality products using more and more ecological technologies. All the plants whose physiological balance is disturbed are affected by various modifications when biological phenomena develop, producing various changes, so we have an “ill” cultures.

Every plant disease has a determined aspect with pathogen clear symptoms which can manifest different related to the soil, weather, water and age.

The qualitative and quantitative increase of vegetable production is conditioned by phytosanitary protection measurement.

The insufficient knowledge of vegetables lifestyle, especially those from the cabbage group, of pathogen agents, of diseases and pests which can provoke considerable damages, leads to damages in production. It is very important to mention that every plant in this class has a different sensibility which is treated differently.

Aristolochia Clematitidis is one of the very disputed plants in the past and in the future because of the beneficial effects that can have on the organism in treating various diseases, but

---

<sup>1</sup>Sl.univ.dr.ing. Olimpia Pandia: University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania, e-mail: olimpia\_pandia@yahoo.com; <sup>1</sup>Conf.univ.dr. Ion Bozga: e-mail Ion Bozga: veterinar\_serv@yahoo.com,

<sup>2</sup>Prof.univ.dr.ing. Ion Sărăcin: University of Craiova, Faculty of Agriculture, Romania, e-mail: ion\_saracin@yahoo.com

being very toxic because of the high content of aristolochic acid which is toxic possibly leading to death. [5].

Aristolochia Clematitis contains a complex acid, especially aristolochic acid which, if used with a correct concentration stimulates the activity of white cells in the blood, while helping to heal wounds. It is safe to use this plant externally. (A. Hostage, M. Staiger, K. Haag, W. Gerok, Klin Wochenschr "concentrations have been suggested in order to provide a simple guide to the level of severity in an illness") [4].

These plants can assure their own defence against diseases and pests because of the bio-synthesis of active ingredients (volatile oils, flavonoids) contained and the sharp odour sensed from the distance. The treatments or the preparations from these plants (decoctions or macera) lead to combat of insects [1, 2, 3].

## MATERIAL AND METHOD

The reaction of cabbage cultures at applying different decoction mixes and the reaction of soil type (cambic chernozem) is looked up regarding the quantity and quality of obtained production, the reminisce in the soil and the impact on the environment.

The researches were made in Ianca Village from Olt County in a private household in 2013 and biological material from local populations was used. Six cultivars with cabbage was used, every cultivar with 30 cabbage seedlings using randomized blocks method. The cabbage seedlings have 46-48 days, 12-14 cm height and 5-6 formed leaves before planting. There were planted Aristolochia Clematitis plants around them. Care operations, gaps filling, manual breeding and differentiate treatments with Aristolochia Clematitis were made to obtain better results.

The next characters were looked up:

- the physical-chemical proprieties of the cabbage culture;
- the biometric data of the cabbage culture;
- the occurrence of pests in these cultivars;
- the phased application of treatments with Aristolochia Clematitis;
- the quality and the quantity of the obtained production at cabbage culture.

## RESULTS AND DISCUSSIONS

The soil where the cultivars were made is a cambic chernozem and the soil samples were taken from a deepness of 0-20 cm in order to make the agrochemical analyses.

Table 1

Determining chemical properties of cambic cernoziom harvested from the vineyard 20 cm deep

No sample.	pH	Nt	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Ah	SB	Hummus
1.	7,5	0,235	4,2	14,9	2,82	19,3	2,23
2.	7,35	0,226	5,5	15,5	2,81	18,6	2,18
3.	7,67	0,242	5,3	14,9	2,90	19,8	2,35
4.	7,6	0,240	4,3	16,9	2,88	19,9	2,32
5.	7,8	0,248	3,9	18,6	2,98	19,9	2,41
6.	7,71	0,241	5,6	21,7	2,92	19,7	2,38

The seedlings were planted in the six cultivars at 3<sup>rd</sup> and 4<sup>th</sup> of April 2013 when the soil temperature was 8°C. In the following period (the grip period) the gaps appeared at cultivation were looked up and filled from the same seedlings used at cultivars establishment.

Plantation and completion of gaps from the cabbage cultivars

Cabbage cultivar	Time of plantation	Dried plants after 5 days from plantation	Gaps filling
1	03-04-2013	5	5
2	08-04-2013	1	1
3	06-04-2013	2	2
4	04-04-2013	4	4
5	05-04-2013	3	3
6	07-04-2013	2	2

Biometric determinations regarding plant grow and development, the moment of terminal bud apparition, cabbages formation and determination of cabbage diameter after harvesting were made during vegetation period. Different support methods were applied during observation period: three manual hoes, the maintenance of humidity at an optimum level at all the six cultivars, weed hoeing, treatments based on decoction from *Aristolochia Clematidis* plants, as well as the reduction of chemical and ecological treatments in order to recommend these for usage in production.

Because all the chemical treatments were eliminated, *Aristolochia Clematidis* seedlings were planted around cultivars 1, 3, 5 and 6 and the cultivars 2 and 4 were not enclosed by these plants for protection.

The first apparitions of *Brevicoryne brassicae* infestations appeared immediately cultivars 2 and 4, where *Brevicoryne brassicae* started to attack cabbage roots. *Delia brassicae* also starts to appear.

The preparation of the three decoctions:

To reduce the pest attacks the first decoction started to be prepared and it was formed from: *Aristolochia Clematidis* fresh roots which were washed before being grinded and mixed with hot water for 30 minutes. After cooling, this preparation was pulverized on the infested cultivars.

The second preparation was made from *Aristolochia Clematidis* stems which were boiled for 30 minutes after grinding and let in order to cool.

The third preparation was made by mixing all parts of the plant (roots, leaves and stems) which were mixed with soft soap after boiling and cooling to obtain an immediate effect for sucking and soft-skinned insects. This solution can be pulverized or spread over the plant in a concentration of 1 liter at 10 liters of water.

The fast growing of *Aristolochia Clematidis* plants as well as their flowering slowed the apparition of cabbage butterfly (*Pieris brassicae*) which did not produced damages in these cabbage cultivars because of the strong odour released by these plants, obtaining a biological rejection of it.



Figure 1. Harvesting and preparation of the three decoctions from *Aristolochia Clematitis* plants

Table 3

The decoction appliance at the apparition of *Brevicoryne brassicae* L (cabbage aphis)

Observations	Cabbage cultivar I	Cabbage cultivar II	Cabbage cultivar III	Cabbage cultivar IV	Cabbage cultivar V	Cabbage cultivar VI
The first decoction applied at:	14.04.2013 Low infestation. 10 attacked plants	18.04.2013 The first signs of ill plants appear. 20 attacked plants.	16.04.2013 Low infestation. 9 attacked plants.	14.04.2013 The first signs of ill plants appear. 18 attacked plants.	15.04.2013 Low infestation. 11 attacked plants.	17.04.2013 Low infestation. 8 attacked plants
The second decoction applied at:	28.04.2013 5 attacked plants	27.04.2013 16 attacked plants	26.04.2013 6 attacked plants	29.04.2013 14 attacked plants	26.04.2013 7 attacked plants	30.04.2013 4 attacked plants
The third decoction applied at:	10.05.2013 2 attacked plants	15.05.2013 8 attacked plants	17.05.2013 3 attacked plants	11.05.2013 6 attacked plants	13.05.2013 3 attacked plants	14.05.2013 2 attacked plants

The decoction appliance at the apparition of *Pieris brassicae* (cabbage butterfly)

Observations	Cabbage cultivar I	Cabbage cultivar II	Cabbage cultivar III	Cabbage cultivar IV	Cabbage cultivar V	Cabbage cultivar VI
The first decoction applied at:	-	28.05.2013	-	27.05.2013	-	-
The second decoction applied at:	-	05.06.2013	-	06.06.2013	-	-
The third decoction applied at:	-	-	-	-	-	-

## CONCLUSIONS AND RECOMMENDATIONS

We can affirm that the decoction 3 had the best results on the three pests.

The cabbage cultivars behaved different, thus the cultivars 1, 3, 5 and 6 which were enclosed with *Aristolochia Clematitidis* plants too behaved very well, obtaining very good results at infestation with *Pieris brassicae*, which avoided these cultivars because of the strong odour released by *Aristolochia Clematitidis* plants.

The cultivars 2 and 4 were the most hard to be maintained healthy because the pest attack was not eliminated totally with these decoctions.

The manual maintain work was important because we obtained cultures with good productivity and good results regarding quality.

Each plant disease has a determined aspect with pathogen clear symptoms which can manifest different related to the soil, weather, water and age.

Each plant from this class has a different sensibility and is treated differently.

The decoctions 1 and 3 gave the best results after the researches and they are in view for recommendation for usage in production for vegetable obtaining.

## BIBLIOGRAPHY

1. Boguleanu Gh. Bobarnac B. si colab. (1980). *Entomologie agricola*. Edit. Did. si Ped. Bucuresti.
2. Ciochia V. (1986). *Combaterea biologica a daunatorilor veriga esentiala a protectiei ecosistemelor*. Brasov.
3. Ciochia, V, Isac, Gr., Stan Gh., (1993) *Tehnologii de crestere industriala a catorva specii de insecte auxiliare folosite in combaterea biologica a daunatorilor*. Bucuresti, Edit. Ceres., *Combaterea integrata a bolilor, buruienilor si daunatorilor culturilor agricole*. Ed. Didactica si Pedagogica, Bucuresti.
4. Hostage A., Staiger M., Haag K., Gerok W. (1989). *Klin Wochenschr.* 67:6-15.
5. Matoșă E., (2003). *Caracterizarea agronomică a unor populații locale de legume colectate în vestul țării*. Simpozion privind managementul resurselor vegetale. Szeged.
6. Pandia O., Saracin I., Bozga I. (2012). *Proposals on technology of moving *Aristolochia clematitidis* L. (Birthwort) from the spontaneous system of growth in the cultivated system*. Scientific papers series A Agronomy. vol. LVI. București. p. 402-405.
7. Poșta Gh. (2008). *Legumicultură*. Editura Mirton. Timișoara.

## GREEN ENERGY

OLTEANU VICTOR<sup>1</sup>

**Summary:** *Strategic plans in the energy sector have the overall objective of the use of renewable energy, especially wind power, hydroelectricity, biomass intending a considerable increase in the share it has in total energy production. Thus, chase is moving towards an economy based on low carbon consumption and improve performance standards for the production, distribution and use of energy, helping to reduce greenhouse gas emissions, increase the use of renewable resources for energy production, to lower consumutilor. The aim of the study is to describe a few of production and technologies to reduce the consumption of energy in classical sources other than wind power and photovoltaic's.*

**Keywords:** *renewable energy, pollution, ecological technologies.*

### INTRODUCTION

This article attempts to describe in a few words the concept of green energy. "Green energy" is a concept that refers to renewable energy sources and environmentally sound, but most importantly is how effective enforcement. I'll try to describe some of the production technologies and the reduction in the consumption of energy in classical sources other than wind energy and photovoltaic and in so doing, achieve the most important goal of the concept of ' pollution '.

Taking into account the European directive in 2005, known as the phrase "20/20/20" which establishes that by 2020, the EU must reduce by 20% the emissions of particulate matter and produce 20% of total energy from renewable sources. Also, the European Union States must gradually blend traditional fuel used in transport bio fuels, so that, by 2020, bio diesel to represent 5.75% of the diesel market, although, in 2020, the share increased to 20%.

#### Global Indicators Of Energy From Renewable Sources

	2008	2009	2010	2011	2012	2013
Investment in new capacity of renewable resources (annual; \$ mil.)	130	160	211	257	244	214
Energy power capacity from renewable resources (GWe)	1,140	1,23	1,32	1,36	1,40	1,56
Hydro-power capacity (GWe)	885	915	945	970	990	1,00
Wind power capacity (GWe)	121	159	198	238	283	318
Solar/photovoltaic capacity (GWe)	16	23	40	70	100	139
Solar hot water capacity (GWth)	130	160	185	232	255	326
Countries with policy objectives for the use of energy from renewable sources	79	89	98	118	138	144

At a first glance I be tempted to believe that investments in renewable energy have begun to decline starting in 2011, actually decreasing the amounts invested are due to lowering prices of equipment, a fact which demonstrates that green energy can be profitable in the not so distant future.

<sup>1</sup> CsIII. Olteanu Victor: Research Institute for Agricultural Economics and Rural Development

## MATERIALS AND METHOD

Green technologies

### Tubular Skylight (solar Tubes) with embedded LEDs

Tubular Skylight allows you to bring natural light into the interior space and allows control over the amount of light that it distributes. The skylight can be closed if you want to rest during the day or to watch your favorite shows on television. Built-in illuminator with LED technology gives night-time up to 4 hours of warm light, subtle while the sun sets. Captured light in the room is enough to light an area up to 150 sqm.



#### Advantages:

- Tubular illuminator brings natural light into the interior space and reduces energy costs;
- Acrylic diffuser can be removed for easy cleaning;
- Illuminates an area of up to 150 sqm.
- Feature LED watch is designed for intermittent use and provides up to 4 hours of warm light;
- Easy to install, maintain;
- Technology incorporated with LEDs comes with a solar panel and 4 debate League with an autonomy of up to 4 hours of warm light.
- The total length of the plant can be up to 40 m.

This technology can be used easily in animal stables, warehouses, halls, access staircases, etc.

### Replacing conventional lighting with LED



#### Benefits of using LED lighting vs. conventional lighting

Surely you have heard of the benefits of led lighting as compared to traditional lighting. When compared to traditional methods of lighting you'll notice that the LED illumination is the most intelligent and efficient in economically and environmentally, coming up with lots of benefits.

#### Benefits:

##### Long service life

The life of the LED backlighting is a major benefit. LED light bulbs with an average lifespan of up to 100,000 hours, meaning about 11 years of continuous operation.

##### Increased energy efficiency

LED lighting is currently has an 80% efficient compared with conventional lighting, that means that 80% of the electricity used is converted into light, and only 20% of the energy is lost through transformation in heat.

##### Environmentally Sound

The materials used for LED lighting are non toxic and are 100% recyclable.

### **Durability in use**

The materials used gives an increased resistance to shock and vibration, this making it ideal for outdoor lighting, operating conditions, such as: moisture, heavy dust, very low temperatures.

### **Design Flexible**

Thanks to material and manufacturing technology of LED lighting bodies can take a variety of forms, from the classic form of the incandescent light bulb up to flexible tapes.

### **Low power consumption**

LED lighting technology requires little energy consumption, the use of ideal lighting with solar panels.

## **THERMAL INSULATION FOR WALLS AND WINDOWS**

As the energy is becoming more expensive, makes us more careful with the way in which we consume. The materials and techniques of thermal isolation had not received a very great attention until recently, due to the increase in cost per meter built. But the increase in the prices of energy, put an increasing pressure on the adoption and implementation of such solutions. The most important reason for improving heat of a building, is to reduce the exchange of heat between the inside and outside, thus reducing the cost of heating and cooling that building.

### **Windows with insulating glass Lowe**

Insulating glass or glazing in the popular name is a sandwich consisting of two sheets of glass bonded through a perimeter aluminum rods and rubbery membrane-type sealant. The result is a lens with high thermal insulation features that keep the transparent windowed spaces required.

Lowe glass is a special case of heat-what is joinery requires increasingly more on the market thanks to the excellent thermal insulation qualities. The name of Lowe, translates into reduced emission, i.e. the transfer of heat through a glazed surface greatly reduced, and is produced by treating a sheet of glass with a special silver solution.

To improve thermal insulation but especially for the noise between the glass sheets can be inserted an inert gas, such as argon, low mobility of the molecules that compose this gas provides a special noise reduction taken into the House through the Windows.

#### **Advantages:**

- conserve the warmth in the House in winter and keep cool, summer;
- provides good sound insulation;
- the glass is treated, so that filter the heat and allow the passage of light inside, without producing "greenhouse effect".
- are resistant to tampering and there is a risk of accidents;
- cold air that penetrates from the outside, through the holes in the lower part of the window heat in rooms inside carpentry, climbing up to the top, so that it enters the room warm;

## The walls and roof

Insulate the walls and roof are times what material or technique used to reduce the exchange of heat between the inside-outside. In 2008, a year in which he started the great process of the thermal rehabilitation of housing blocks, Romania has developed an affinity for thermal insulation-based foam plates, maybe also because of the lowest price per sqm built surface. At its core is not a bad thing, because something is done in terms of thermal insulation of the walls. But long-term polystyrene has a lifespan shorter than other materials I used in thermal insulation, does not allow the wall to breathe which helps in the formation of condensation and mildew, thickness of plates in order to reach the same yield as a result of other materials for thermal insulation.



In recent years the materials for thermal insulation industry has developed new techniques and materials with more performance and a longer service life than having so a report much better cost-efficiency. We can mention: mineral wool, metal or PVC panels sandwich filled with mineral wool or polyurethane rigid foam, rigid polyurethane foam applied directly to registered buildings and with many curved surfaces where installing the plates is impossible or very costly, Multipor plates being rigid mineral products, which enable the transfer of vapors and which can be used both on the exterior and heat insulation to the inside. But the essential criterion in Romania is the lowest price regardless of quality or performance, so remains and will remain classic plating polystyrene plates.

## UNDERFLOOR HEATING AND COOLING

The energy exchange between the man and a cold surface is done through the exchange of energy. In this sense, the cooling systems and floor heating ensures optimum comfort. Air-conditioning systems of floor surfaces, heated or cooled using low amounts of energy due to uniform distribution over the whole surface.



Benefits of under floor heating

- The heat is evenly distributed on the entire surface of the floor, causing a high thermal comfort and, most importantly, constant.
- The heat travels from the bottom up, first by heating your feet, which are the parts most exposed to the heat sensitive;
- Low power consumption-thus, because the air in the room to reach the 20-23 c, the floor must be heated to 25 c, which is more than enough (because of cold or warm feeling comes primarily from the extremities);
- Flexibility in the arrangement of spaces-by eliminating radiators is a more efficient allocation of storage space of a room.

## GENERATORS WITH PERMANENT MAGNETS

Presents the following advantages:

- Reduction of torque (cogging) starting (breaking) to values below 0.8 Nm which means that it can generate current to the weakest waft (at under 2 m/s);
- The electrical power generated grows exponentially with speed, increasing the ratio feature

power generated/outline;

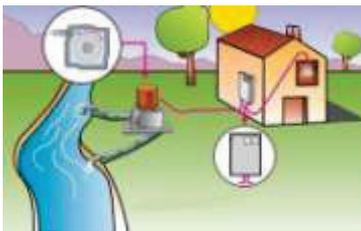
- Drive torque (resistant) to the shaft has a Gaussian evolution in relation to the growth of electric charge and is lower for the same power charged, compared to other synchronous generators with excitation by permanent magnets; In the short and in the minimum values;
- Generator shortage to overload and short current due to elastic deflection;

#### **Which it recommends for:**

- Battery charging the rechargeable batteries in the systems of autonomous RENEWABLE in any configuration of voltage (up to 90% of the  $U_0$ ) without further limitation devices and adaptation;
- Vertical shaft wind turbines or Hydro turbine-horizontal or without the use of reducers or speed hub;

### **HYDRO GENERATORS**

Have the highest efficiency in the production of alternative energy because it theoretically works round-the-clock. If you have a small Brook, or a bad, around the farm, which can provide at least 5 liters/sec at an elevation of at least 3 m. You will have free and eco-friendly energy unlimited.



A Creek behind the farm and several thousand euro is pretty much everything you need to make your own electricity provider. In this situation, the cheapest and effective it is to produce electricity using a power small hydroelectric power plants. The energy produced from such a hydroelectric generator, beyond the fact that it can be free, if you



don't buy from the neighbor who rushed to secure energy independence, has the great advantage of not polluting.

- Permanent magnets turbine 3000w (3 kwh)/220V-500 euro
- Turbine 55 kwh/380V-14,300 euro

Investment can vary between 3000-40000 euro.

### **CONCLUSIONS**

Changing the current mentality of the green energy: green energy is not a trendy concept with which you can brag about social networks or between friends at a party. The main purpose of the use of renewable energy is to reduce the extent of pollution by reducing energy consumption in the classical sources. As an example: it is not enough to mount a solar heating plant to produce hot water and heat, if the premises where it is used is not properly insulated. Unfortunately the examples of this kind may continue.

The granting of subsidies for the implementation of ecological solutions for the production and conservation of energy, on the basis of sustainable projects. For example: wouldn't it be appropriate to install on home photovoltaic panels to produce electricity, but to destroy the trees around the House that you may not make shade panels. Can these examples are pushed to the extreme, but the little that I want to emphasize that although the concept of green energy is not something new, however are applied in a fairly chaotic.

In addition to the current legislation and trends in the European Union on the concept of green energy should be developed in Romania and an infrastructure to support and develop the concept of green energy. For example: the ability to resend in the network the amount of energy produced by the ecological methods when it is not used to use it when needed; the granting of tax cuts for companies that implement buildings, sustainable green energy concepts;

## **BIBLIOGRAPHY**

1. \*\*\* <http://www.alternativepureenergy.ro/>
2. \*\*\* [www.inventatori.ro](http://www.inventatori.ro)
3. \*\*\* <http://www.termopol.ro/>
4. \*\*\* <http://atreiaforta.wordpress.com/>
5. \*\*\* <http://www.nltubular.com/>

# THE IMPACT OF THE SOLAR ENERGY COLLECTING SYSTEMS ON AN INDIVIDUAL AGRICULTURAL HOUSEHOLD

TUREK-RAHOVEANU PETRUȚA<sup>1</sup>

## Summary

*Using solar energy through photovoltaic systems implementation in an agricultural household leads to the increasing of its efficiency, to optimizing energy balance thus implying the decreasing of the primary energy costs.*

*The solar energy refers to a renewable energy source that is produced directly by light and solar radiation. It can be used to generate electricity through solar cells (photovoltaic); to generate electricity through thermal power plants; to generate electricity through solar towers, etc.*

*The introduction and development of new technologies and processes through the use of energy from renewable sources leads to production costs reduction and implicitly to the increase of economic profitability of the agricultural holding.*

**Key words:** *renewable energy, solar energy, photovoltaic panels*

## INTRODUCTION

The implementation of an energy strategy for harnessing the renewable energy sources potential (RES) falls within Romania's coordinates of energy development in the medium and long term, offers the adequate framework in adopting decisions regarding energy alternatives and registering in the Community acquis in the field.

### Renewable energy types

In the specific conditions in Romania, the following types of renewable energy sources are taken under consideration regarding the energy balance:

- solar energy – used in the production of heating through methods of passive and active conversion or in the electrical energy supply through photovoltaic systems;
- wind power - used in the production of electrical energy with wind generators;
- hydropower – hydroelectric power plants with an installed power that is less or equal to 10 MW ("small hydropower"), or hydro power plants with an installed power that is bigger than 10 MW ("big hydropower");
- biomass – comes from the residues from forestry and agricultural holdings, wood processing wastes and other products; the biogas is the result of animal manure fermentation under anaerobic or from the city treatment plants;
- geothermal energy – the energy that is stored in underground hydrogeothermal blankets and deposits, operated with special drilling and extraction technologies.

### The renewable energy resources that are at Romania's disposal

Romania can develop production systems for all the types of renewable sources, depending on the specifics of each geographical region in the country. Following the studies that were made in our country, the green energy production potential is of 65% biomass, 17% wind power, 12 % solar energy, 4% micro hydro power plants și 2% voltaic and geothermal.

Far more important, in terms of solar energy collecting capacity, is the technology that is used for the solar collectors's building (photovoltaic systems).

**The main applications of the solar energy in Romania are:**

---

<sup>1</sup> Cercetator Stiintific, Turek-Rahoveanu Petruta, ICEADR, turek.petruta@iceadr.ro

- Wastewater heating systems in public and residential institutions
- In agriculture for drying agricultural products;
- In greenhouses heating
- In drying of medicinal plants
- In agricultural and holding households irrigation

## OUTCOME AND DISCUSSIONS

The solar energy conversion into electrical energy technology is made with the help of the photovoltaic systems by photovoltaic effect. The photovoltaic effect is the effect of an electromotive tension under solar energy.

The use of renewable energy sources and the improvement of efficiency in using them by installing photovoltaic panels that will generate the necessary energy for the irrigation and fertirrigation in the agricultural household.

The dropwise irrigation and fertirrigation system has a main water delivery pipe, 10 lines of hoses with dropper (tube) with a 16 mm diameter, the droppers are placed at a 30 cm distance / flow of 2,0 l/hour/dropper and a dosing pump (dosatron type) fitted on the main water column that is connected to the water source and to a fertilizer container.

The irrigation water pumping system is made up of: 280 W photovoltaic panels, controller, PS1200 submersible pump, insures a water flow between 5,2 and 8,5 cbm/day, 4 cbm water collecting tank, drilling shaft.

Given the rigging with these appliances we estimated a calculation of the water intake that is necessary for the irrigation of a 1000 sqm agricultural individual household (table nr.1).

Estimation of the irrigation use by furrow compared to the dropwise irrigation

Table nr.1

Crop	Surface (m <sup>2</sup> )	Irrigation water use (m <sup>3</sup> )	Dropwise system water use (m <sup>3</sup> )	Difference between Irrigation by furrow/dropwise system use	
				mc	%
<b>Spring crop from which:</b>	<b>1000</b>	<b>45</b>	<b>18,5</b>	<b>26,5</b>	<b>58</b>
Spinach	600	18	9,5	8,5	47
Salad	200	12	4	8	66
Green onion	200	15	5	10	66
<b>Summer-autumn crop from which:</b>	<b>1000</b>	<b>192,5</b>	<b>24,83</b>	<b>167,67</b>	<b>87,1</b>
Tomatoes	300	45	20,28	24,72	55
Cucumbers	200	60	12,5	47,5	79
Peppers	250	87,5	17	70,5	80,5
Eggplant	250	75	16	59	78
<b>Autumn crop</b>	<b>1000</b>	<b>300</b>	<b>62</b>	<b>238</b>	<b>79</b>
Cabbage	1000	300	62	238	79

Source: Own calculations

By analysing the data from the table above for the spring crops on a 1000 sqm surface, in the irrigation by furrows system it's estimated a total water use of 45 cbm and in the dropwise irrigation the total water use is 18,5 cbm, the difference being of 26,5 cbm. The reduction of use is of 58% due to the use of the dropwise system.

Given the compliance with the technological estimates for the vegetable crops, the percentage is reduced to 87,1%, by determining the water rate for each plot at the summer – autumn crops. For the autumn cabbage crop the water use difference is of 238 cbm, representing 79%.

## SWOT Analysis

### Advantages:

- The solar energy is available in huge quantities and it's ecological;
- The photovoltaic panels are not polluting and don't have harmful effects on the environment;
- The pay off will happen in a short time, because the systems are very reliable and can function 10-25 years without big maintaining costs;
- In the hot periods when the water need is high, the photovoltaic panels are at maximum yield.

### *The advantages of a dropwise system:*

- Big watering power in a relatively short time
- Water economy
- Watering reduced time
- Minimum effort in watering plants
- Avoids the presence of water on the leaves, reducing disease attacks that way
- Together with the water can be administered: fertilizers, insecticides and fungicides.

### Disadvantages:

- The very limited spread of the use of solar energy collecting technology.
- The solar energy is dependent on sunlight, in other words, on the quantity of solar radiations that reach the Earth
- The price for the production of electricity through photovoltaic systems is bigger than it's production in the steam power plants
- Variation depending on atmospheric conditions.

### Opportunities

- An economic analysis using different orientations for the photovoltaic panels
- An analysis of the impact upon the net of the different combinations of renewable sources of energy using optimizing techniques and comparing to classical solutions.
- The existance of some surfaces of degraded land on which energetic plants can be grown, suitable for polluted soil conditions;
- Using renewable energies can reduce atmosphere pollution significantly and it can contribute in time to reducing greenhouse gas emissions (especially by using biofuels);
- The existence of mountain areas that are isolated, without electricity as well as touristical mountain areas of interest for the development of some applications in renewable energy systems;
- The usage of degraded or uncultivated surfaces for energetical plants and oleaginous crops;

### Threats

- The lack of strategies or plans for the placing of installations/equipments can harm the landscape;
- The lack of some integrated strategies can lead to the growth of the surfaces that are cultivated with energetical plants at the expence of those cultivated with food crops.

## CONCLUSIONS

Using a dropwise irrigation and fertirrigation system, the water pumping system that is powered with renewable sourced energy will ensure the optimum unfolding of the technological flow, an increased work productivity and obtaining quality products.

The quality and quantity of water is very important for an agricultural household, which becomes a key factor in the development of this activity through the use of photovoltaic systems.

The crop irrigation represents a domain in which the new practices can significantly facilitate the more efficient water use.

The setup for the agricultural lands is very expensive, which leads to a very high price for the water that is used for watering, price to which, of course, adds up the farmer's direct expenses for the water.

### Dripwise irrigation

The irrigation systems execution solutions have to keep in mind that the demand is not constant over the year. The maximum demand in the irrigation period is in general two times higher than the annual average and during this period the groundwater level is lower which makes the system oversized over the year.

## BIBLIOGRAPHY

- \*[http://www.energy-consultancy.eu/energy\\_consultancy/\\_rowind.htm](http://www.energy-consultancy.eu/energy_consultancy/_rowind.htm)
- \*<http://www.revista-informare.ro/showart.php?id=221&rev=8>
- \*<http://www.greensource.ro/avantaje&dezavantaje.html>
- \*<http://em.ucv.ro/elee/ro/realisations/EnergiesRenouvelables/FiliereEolienne/Generalites/Generalites/GeneralitesEolien2.htm>
- \*[http://ro.wikipedia.org/wiki/Energie\\_eolian%C4%83](http://ro.wikipedia.org/wiki/Energie_eolian%C4%83)

### **SECTION 3**

## **RURAL DEVELOPMENT AND AGRICULTURAL POLICY**

## THE RIGHT OF FOREIGNERS TO PURCHASE AGRICULTURAL LANDS IN ROMANIA. CROSS-BORDER CONFLICT MEDIATION

ALECU IOAN NICULAE<sup>1</sup>, CIOCAN FELIX-DIMITRIE<sup>2</sup>, BADEA ADRIANA<sup>3</sup>, MIHUȚ  
GABRIELA GYONGY<sup>4</sup>

**Summary:** Ever since becoming a member state of the European Union, Romania had to adapt its internal laws so that the citizens of other EU member states, or those of other entities for which this right is acknowledged by Law 17/2014, stateless persons residing in these states and legal persons established in accordance with the internal laws of these states can benefit from a regulatory framework in virtue of which they can acquire the right of private property over Romanian agricultural fields, under the same conditions as Romanian citizens, stateless persons based in Romania or Romanian legal persons. Outsourcing the civil circuit over the Romanian agricultural fields raises a serious question over the reaction of the society, which is still vibrant to anything that concerns the preservation of property over the ancestral land.

**Keywords:** foreigners, mediation, conflict, land, alienation

### INTRODUCTION

The right to property is the most important, thorough and full real property and it benefits from a distinct regulation in our civil law system, within the New Civil Code (Law 287/2009), in the contents of Book III. About Goods.

The concept of property goes way back to the neo-roman antiquity, where individual property existed only for immovable goods (for instance, land belonged to the tribe, the family or no one). Once fertilizer or crop rotation practices started to be used on the same plots and by the same group of persons, those crops naturally became an object of family property and, later, of individual property. In Roman law, in the time of the XII Tables (*Lex Duodecim Tabularum*), the right to property initially appeared as an exclusive right to use and usufruct, meaning that the crops from the cultivated land were collected by a person, after which the mentioned crop became mutual property again. With the passing of time, the cultivated plot stayed with the person cultivating it, with the latter even being able to build a house on that land. Under these conditions, individual and perpetual property has surfaced, having only one owner, which was the *pater familias*<sup>5</sup>[5], descending directly from *dominium* and which awarded the owner with an exclusive, sovereign and perpetual right based on three attributes: possession (*ius possidendi*), use (*ius utendi* and *ius fruendi*) and disposition (*ius abutendi*). In the Middle Ages, property became more complex, but only as to what concerns real-estate property, which was divided in accordance with the existing vassalage relationships. Therefore, *dominium eminens*, which belonged to the feudal owner, and *dominium utile*, which belonged to the vassal<sup>6</sup>[1], had surfaced.

### MATERIALS AND WORK METHODS

In order to accomplish this study, the existing regulatory documents at the level of the European Union were used: regulations, directives, recommendations, Romania and Bulgaria's Treaty of Accession to the European Union, as well as other constitutive and changing treaties; national regulatory documents: laws, ordinances, decisions, codes; jurisprudence and legal doctrine. The interpretation of law concerning mediation and property is accomplished through logical-rational operations that seek to clarify and explain the contents and meaning of norms, for the

<sup>1</sup> Prof.Univ.Dr. - The University of Agronomic Sciences and Veterinary Medicine Bucharest

<sup>2</sup> Ph. D. candidate - The University of Agronomic Sciences and Veterinary Medicine Bucharest

<sup>3</sup> Ph. D. candidate - The University of Agronomic Sciences and Veterinary Medicine Bucharest

<sup>4</sup> Ph. D. candidate - The Timișoara Vest University

<sup>5</sup> Marilena Uliescu, Noul Cod Civil Studii și Comentarii, Volumul II, Cartea a III-a și Cartea a IV-a (art.535-1163).

<sup>6</sup> Bîrsan Corneliu, Drept Civil. Drepturi reale principale, Ediția a III-a, revăzută și adăugită.

purpose of their just application, through the accurate classifying of various practical situations. Among these there are methods such as literary or declarative, extensive, restrictive interpretation, logical, grammatical, systematic interpretation - by correlation to other legal provisions or the historical-teleological interpretation - by determining the practical purpose and utility considered by the lawmaker at the time of issuing the legal norms concerning mediation and property.

## RESULTS AND DISCUSSIONS

The Constitution of Romania, adopted during the meeting of the Constituent Assembly of November 21, 1991, and revised by Law 429/2003, law approved by way of a national referendum in the same year, provides, within the contents of Chapter II. Fundamental rights and liberties, art. 44 par. 1, that "The right to property and receivables from the state are guaranteed"<sup>7</sup>. Furthermore, the contents of paragraph 2 of the same article provide that "Private property is guaranteed and protected equally by the law, regardless of who the owner is. Foreign citizens and stateless persons can acquire the right to private property over lands only under the conditions resulted from Romania's accession to the European Union and from other international treaties to which Romania is a party, based on reciprocity, under the conditions provided through organic law, as well as through legal inheritance"[6]. It is observed that the cited constitutional provision, issued in 2003, was meant to prepare the society for January 1, 2007, when Romania became a member state of the European Union, with all the rights and obligations deriving from this event, a well known fact being that the European trail of our country started with signing Romania's European Union Association Agreement, on February 1, 1993.

The possibility for a citizen of an EU member state to obtain the right of property over a real-estate located in another member states finds its origins in the Treaty of Founding the European Economic Community (EEC), signed in Rome, in 1957. Even though, at that time, the name of European Union didn't exist yet, with the member states being only 6, while the framework over which the European Union was built hasn't surfaced yet, the establishment of a common market through EEC, based on the famous four liberties (free movement of people, capital, goods and services), represents the act of free will of the signatory states. Through this, the signatory states have laid down the outline for the future European structure concerning the possibility of purchasing land (immovable good and economic capital), overcoming the barrier of exclusively national property, this being determined by the profoundly nationalist considerations of the thinking between the early XX century and the beginning of the post-war era of the same century. The contents of this document formally introduce a series of common policies, of which we identify the common agricultural policy (art. 38-47) and the common commercial policy (art. 110-116)<sup>8</sup> [11], precursory to the existing common policies, today, in the European Union.

Through the obligations undertaken by Romania through the Treaty of Accession to the European Union, during the first 7 years of the EU membership, until January 1, 2014, the citizens of other EU member states, the citizens of the Swiss Confederation, citizens of the states that are part of the Agreement on the European Economic Area (AEEA), as well as the stateless persons residing in these countries and legal persons bearing the nationality of these countries had a series of restrictions concerning the right to purchase agricultural land in Romania, meaning that they were not allowed to purchase land as natural persons, but rather through certain commercial companies of Romanian nationality or by way of association with Romanian natural and legal persons. Starting with January 1, 2012, the aforementioned persons have gained the right to purchase land within the built-up areas, yards, houses, and vacation homes in Romania, other than unincorporated agricultural lands, forests or hayfields.

Since the start of 2014, the need to comply with the obligations undertaken through Romania's and Bulgaria's Treaty of Accession to the European Union, signed on April 25, 2005 and

<sup>7</sup> The Constitution of Romania, revised and republished.

<sup>8</sup> the Treaty of Founding the European Economic Community (EEC).

ratified by the Parliament of Romania through Law no. 157/May 24, 2005<sup>9</sup>[9] has materialized through the emergence of Law 17/2014 concerning the sale-purchase of agricultural lands.

Law 17/2014 lists, within the contents of art. 1, the three legitimate purposes: ensuring food security, protecting national interests and exploiting natural resources in accordance with the national interest; regulating sale-purchase of agricultural lands outside of the built-up areas; massing the agricultural lands in order to increase the size of farms and to streamline the economic activities. The latter purpose represents the expression of the legal protection of current owners of the agricultural funds, recorded *ope legis*, through the provisions of art. 4-12, concerning the right of pre-emption (preference) in favor of the co-owners<sup>10</sup>, tenants, neighboring owners, as well in favor of the Romanian State, through the State Domains Agency, in this order, at equal prices and conditions. Under the conditions of the law and of the common law in matters of pre-emption, the holders of the right are preferred when sale purchase over the agricultural land from outside the built-up areas is perfected, as we have earlier mentioned, a vision introduced by one of the purposes for issuing this law itself, which is to mass up the agricultural fields in view of increasing the size of the farms and to streamline their economic activity.

Within the contents of art. 3, the subjects over which the legal provisions are applicable are listed, thus, the provisions of the law are applied to “Romanian citizens, to the citizens of an European Union member state, to those of the states that are party to the Agreement on the European Economic Area (AEEA) or those of the Swiss Confederation, as well as to the stateless persons residing in Romania, in one of the European Union member states, in a state that is a party to AEEA or in the Swiss Confederation, as well as to legal persons with a Romanian nationality, the nationality of one of the European Union member states, of the states which are a party to AEEA or of the Swiss Confederation”. According to the provisions of the same paragraph, the aforementioned legal and natural persons can acquire agricultural land outside of the built-up areas of Romania only under **conditions of reciprocity**, their right, therefore, being subject to the suspensive condition of ensuring an identical legal framework by the states of which they are citizens of or of which they are nationals of (legal persons) for the Romanian citizens, stateless persons residing in Romania and legal persons that are nationals of Romania, in view of purchasing land in the aforementioned states. Moreover, the provisions of the law mean that, in the given conditions, they cannot have an agricultural land from the built-up areas<sup>11</sup>, as an object of a sale-purchase, nor those located outside of the built-up areas, but which contain archeological sites, lands for which the procedure of sale-purchase is governed by the special law for matters of protecting historical monuments, Law 422/2001, republished.

The provisions of art. 2, par. 3 from Law 17/2014 reinforce the spirit of the constitutional norm provided in art. 44 par. 2 of the Romanian Constitution, amended and republished, and make reference to the international treaties to which Romania is a party, treaties ratified through the internal law mechanism and to the rule of reciprocity in order to operate the sale-purchase of agricultural land outside the built-up areas of Romania with citizens of third party countries, stateless persons and non-citizens residing in these states. In the event that these conditions exist

<sup>9</sup> Law no. 157/2005 of May 24, 2005 for the ratification of the Treaty between the Kingdom of Belgium, the Czech Republic, the Kingdom of Denmark, the Federal Republic of Germany, the Republic of Estonia, the Hellenic Republic, the Kingdom of Spain, the French Republic, Ireland, the Italian Republic, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Grand Duchy of Luxembourg, the Republic of Hungary, the Republic of Malta, the Netherlands, the Republic of Austria, the Republic of Poland, the Portuguese Republic, the Republic of Slovenia, the Slovak Republic, the Republic of Finland, the Kingdom of Sweden, the United Kingdom of Great Britain and Northern Ireland (member states of the European Union) and the Republic of Bulgaria and Romania concerning the accession of the Republic of Bulgaria and Romania to the European Union, signed by Romania in Luxembourg on April 25, 2005, published in the Official Gazette of Romania no. 465 of June 1, 2005.

<sup>10</sup> Common property, as a type of the right of property, showcases the following forms: standard co-property (by shares), forced co-property; property in condominium; periodical property, according to the New Civil Code, Law 287/2009.

<sup>11</sup> Within the built up areas means the territory located under the administrative authority of municipalities, cities, towns and villages.

outside the will of the contracting parties, the sale-purchase of agricultural land outside the built-up areas, by the aforementioned, is also regulated by the provisions of Law 17/2014.

Chapter II of Law 17/2014 comprises a series of special provisions relating to the sale-purchase of lands from outside the built-up areas, on the establishment of certain special conditions which are required to be fulfilled, meaning a series of permits that need to be requested and obtained, in case of agricultural lands from outside the built-up areas which are located within a distance of 30 km. from the state borders of Romania and from the shore of the Black Sea, a condition which is not applied to preceptors and neither to agricultural lands located outside the built up areas which contain archeological sites.

Chapters III and IV from the contents of Law 17/2014 contain the material and procedural law provisions concerning the application of the right to preemption in relation to the persons mentioned within the contents of provision art.4 par. 1, the non-fulfillment of which brings the sanction of absolute invalidity to the translative document of property, according to the provision included in art. 16 of Law 17/2014. The existence of the sanction of absolute invalidity to the translative document of property, over a land located outside the built-up areas, concluded by disregarding the legal provisions concerning the right to preemption, together with the other sanctions operating in the event of breaching the other imperatives of the law, provided in the contents of the final and transitory provisions of Law 17/2014, operates within the logic of the same purpose of the law, being that of the necessity to accomplish a massing of the lands and to increase and streamline the agricultural farm, a stringent need of the Romanian agriculture.

## CONCLUSIONS

In the event of purchasing agricultural land outside of the built-up areas in Romania, by citizens of the EU member states, citizens of the Swiss Confederation, citizens of the states which are parties to the Agreement on the European Economic Area, citizens of third party states, parties to the international treaties signed with Romania under conditions of reciprocity or by stateless persons residing in these states or legal persons that are nationals of these states, or in case of purchasing land in other member or third party states, by the Romanian citizens, by stateless persons residing in Romania or legal persons that are nationals of Romania, based on reciprocity or in the event of existing state-level treaties, all conflicts which may arise between the subjects of the legal relationship of sale-purchase<sup>12</sup>, we consider to be legal relationships that contain elements of extraneity, such as: citizenship or residence – for natural persons, and nationality for legal persons<sup>13</sup>[4]. In such cases, the provisions of Directive 52/CE/2008 of the European Parliament and Council operate in regards to certain aspects of mediations in civil and commercial matters, including cross-border mediation. According to the provisions of art. 2 par. 1 of Directive 52/CE/2008, published in the Official Journal of the European Union, “within the meaning of this directive, a cross-border dispute is that in which at least one of the parties is headquartered or resides in another member state than that of any other party at the date on which: (a) the parties decide to resort to mediation after the dispute arises; (b) mediation is imposed by court; (c) there is an obligation to resort to mediation due to a national right, (d) an invitation is addressed to the parties, within the meaning of article 5.”

According to the provisions of art. 1 par. 2 from the aforementioned directive, this is applied to civil and commercial disputes, with an exception being the cases in which there are rights and obligations that the parties cannot apply in accordance with the applicable law. Furthermore, Directive 52/CE/2008 is not applied to tax, customs or administrative matters or in the event of the state's liability towards the deeds and omissions arising from exercising the role of public authority.

---

<sup>12</sup> Conflicts can be generated, in these cases, by factors of civil nature, as well as matters related to the delimitation of boundaries, real estate matters, avulsion, servitudes or other factors of such nature, or factors of criminal nature, such as disturbance of possession, violation of domicile, wrecking etc.

<sup>13</sup> Lupașcu Dan, Diana Ungureanu, Drept internațional privat.

We accept the conclusions of the directive concerning the utility of mediation in cross-border matters and we conclude by introducing the institution of mediation as an important pillar of social peace-making, with matters arising from the practice of selling-purchasing agricultural lands from outside the built-up areas being a complex source of study for the theory of alternative means of dispute resolution. Since it is still early days for the application of Law 17/2014, without a practice and jurisprudence of the courts for this topic yet to exist, we consider that the attempt to settle various conflicts, arising from the legal relationship to alienate agricultural lands from the built-up areas, as well as other legal operations where the parties are able to undertake their rights and obligations, can be subjected to mediation *a priori*, as well as to other Alternative Dispute Resolution procedures and, only in the event of disagreement, to the judicial procedure.

## REFERENCES

1. Bîrsan Corneliu, 2008, Drept Civil. Drepturi reale principale Ediția a III-a, revăzută și adăugită, București, România, Editura Hamangiu,;
2. Boroș Gabriel, Liviu Stănciulescu, 2012, Instituții de drept civil în reglementarea Noului Cod Civil, București, România, Editura Hamangiu;
3. Fuerea Augustin, Manualul Uniunii Europene, Ediția a V-a revăzută și adăugită după Tratatul de la Lisabona (2007/2009), București, România, Editura Universul Juridic;
4. Lupașcu Dan, Diana Ungureanu, 2011, Drept internațional privat, București, România, Editura Universul Juridic, 2012;
5. Uliescu Marilena (coordonator) 2013, Noul Cod Civil Studii și Comentarii Cartea a III-A și Cartea a IV-a (art.535-1163) București, România, Editura Universul Juridic;
6. \*\*\* The Constitution of Romania, revised and republished in 2003,
7. \*\*\* Directive 52/CE/2008 of the European Parliament and Council, published in the Official Journal of the European Union, on May 28, 2008.
8. \*\*\* <http://www.cmediere.ro/legislatie/7/>
9. \*\*\* Law no. 157/2005 of May 24, 2005, published in the Official Gazette of Romania, Part I, no. 465 of June 1, 2005.
10. \*\*\* Law no.17/2014, published in the Official Gazette, Part I, no. 178 of March 12, 2014
11. \*\*\* The Treaty of Founding the European Economic Communities;

# SUBSISTENCE AND SEMI SUBSISTENCE AGRICULTURE IN ROMANIA

MIHAELA CRISTINA VLAD<sup>1</sup>

**Summary:** *The paper aims to analyze the main question that arises in the context of current agricultural policies: are households farms really? Viewed from the perspective of sustainable development of rural areas, the answer becomes very important, especially given that the actual shortcomings rural employment opportunities and business development. Research is needed, especially given the new Common Agricultural Policy for the period 2014-2020 still provides annual grants (between 500-1000 euros), especially given that you want to implement a policy of restructuring. In order to eliminate the sector subsistence farmers producing for own consumption only occasionally provides a scheme for granting annuities 2020 for owners who will give lands on lease or be sold to commercial farms and co financing up to 15,000 euros for starting a business.*

**Keywords:** *individual households, subsidies, sustainability*

## INTRODUCTION

In last twenty years, the semi-subsistence farms and subsistence major because of its size, has been the target of numerous policy measures seeking to restructure, but these measures have had the desired effect: achieving better productivity and higher efficiency.

This is due to various reasons, such as reluctance of owners to associative phenomenon; continuously changing legal and tax systems have created an environment of distrust and uncertainty, lack of capital necessary to ensure good development, low level of domestic agricultural subsidies, the creation of functional problems of rural distribution channels, etc.

## MATERIAL AND METHOD

Material underlying this work consists of an extensive bibliography, literature. The method used consists of data collection, processing, analyzing and synthesizing them. This article was developed to disseminate the results of the thesis "Research in farm planning. Case Studies "at the University of Agricultural Sciences and Veterinary Medicine in Bucharest.

## RESULTS AND DISCUSSION

If you look subsistence farms in terms of physical size, it appears that in 2010, they represented 92.9% of total holdings and operated 29.7% of UAA.

Class 2-5 ha farms represent 21% of all farms cultivate subsistence and 56.5% of UAA (Table 1).

**Table 1 Subsistence farms with crop production in 2010 in the SAU class**

	Total	Arable land	Family gardens	Pastures and meadow	Permanent crops
<b>Farms - thousands</b>					
Total	3721.9	2750.1	2479.2	1512.2	1123.5
Less than 5 ha	3457.0	2505.5	2308.6	1339.3	1037.2
%	92.9	91.1	93.1	88.6	92.3
Under 0.1 ha	384.1	54.7	296.6	40.3	50.7
%	11.1	2.2	12.8	3.0	4.9
0.1-0.3 ha	661.7	337.3	434.3	135.8	188.2
%	19.1	13.5	18.8	10.1	18.1
0.3-0.5 ha	354.5	276.9	225.2	111.9	102.0

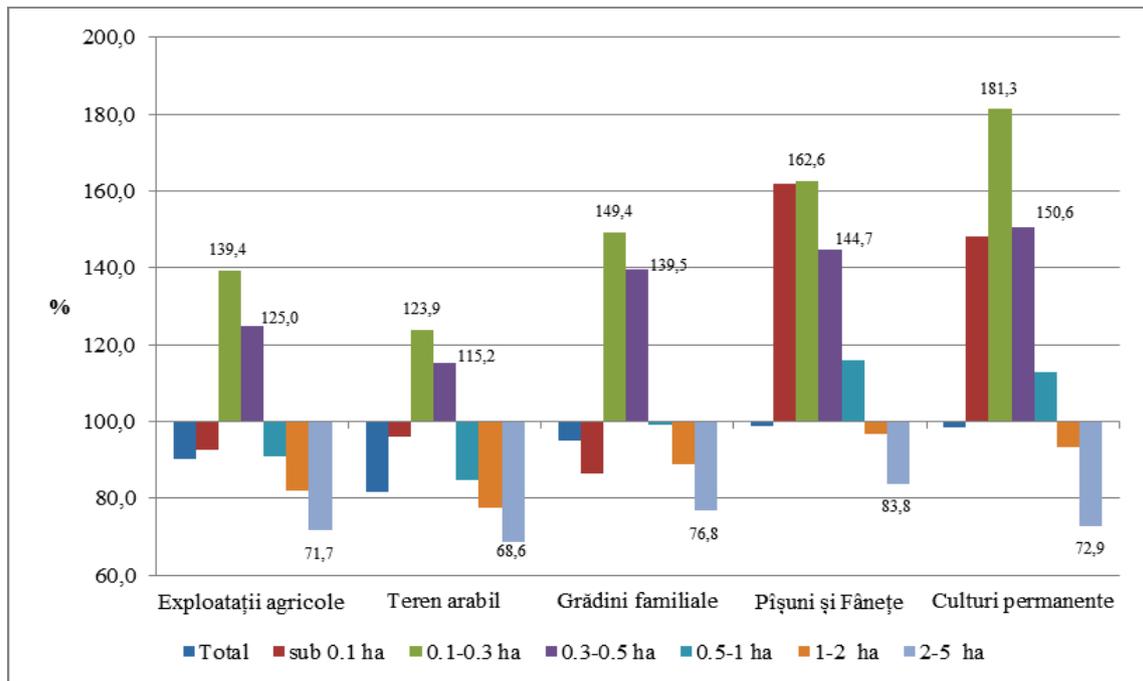
<sup>1</sup> PhD. Ec., Research Institute for Agricultural Economics and Rural Development, cristina.vlad@iceadr.ro

	Total	Arable land	Family gardens	Pastures and meadow	Permanent crops
%	10.3	11.1	9.8	8.4	9.8
0.5-1 ha	617.3	521.7	379.8	247.2	177.8
%	17.9	20.8	16.5	18.5	17.1
2.1 ha	712.2	637.3	467.2	360.2	240.0
%	20.6	25.4	20.2	26.9	23.1
2.5 ha	727.2	677.5	505.4	443.9	278.4
%	21.0	27.0	21.9	33.1	26.8
<b>OR - thousand ha</b>					
Total	13298.2	8305.5	181.6	4493.9	317.2
Less than 5 ha	3946.9	2437.4	166.5	1164.3	178.6
%	29.7	29.3	91.7	25.9	56.3
Under 0.1 ha	19.5	2.7	12.6	2.0	2.1
%	0.5	0.1	7.6	0.2	1.2
0.1-0.3 ha	120.4	48.1	36.0	19.3	17.1
%	3.1	2.0	21.6	1.7	9.5
0.3-0.5 ha	136.0	76.7	17.4	29.0	12.9
%	3.4	3.1	10.5	2.5	7.2
0.5-1 ha	431.5	268.6	27.0	109.2	26.6
%	10.9	11.0	16.2	9.4	14.9
2.1 ha	1010.5	643.4	33.9	287.2	46.1
%	25.6	26.4	20.4	24.7	25.8
2.5 ha	2229.0	1397.9	39.6	717.7	73.9
%	56.5	57.4	23.8	61.6	41.4

Source: Based on INS data

Compared to 2005, we can see from the chart below, the number of subsistence vegetable cultivating 0.1 - 0.3 ha, increased by 39.4%, and 81.3% in the category of permanent crops farms (Figure 1).

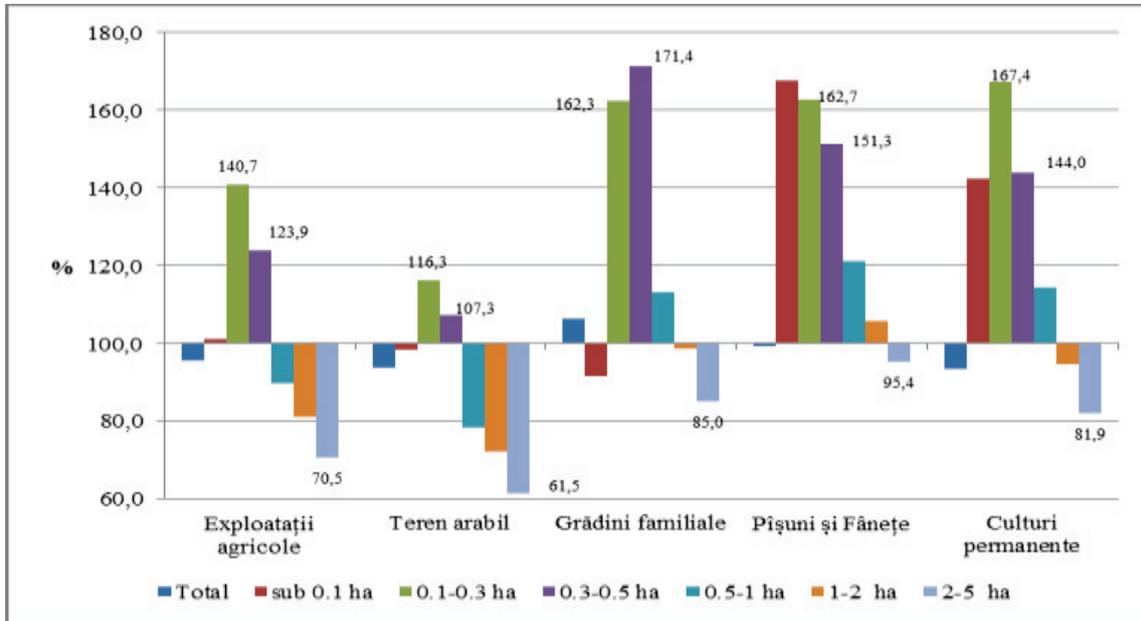
**Figure 1 Evolution of subsistence farms with crop production in 2005-2010**



Source: Based on INS data

We also observe an increase in the number of farms in Class 0.3 - 0.5 ha. Number of farms with 2-5 ha decreased by approximately 30% in each category. Number of farms with pastures and meadows and permanent crops that have or below 0.5 ha increased by over 50% during 2005-2010, while the number of farms with 2-5 ha decreased in each category (Figure 2).

Figure 2 Evolution or by subsistence farms in 2005-2010



Source: Based on INS data

Regarding the animal is observed (Table 2):

- In category increasing cattle farms, farms with less than 5 ha is 83% and 61.5% of the actual holding. Farms of 2-5 ha category hold 49.7% of herds.
- In the category of sheep farms, farms with less than 5 ha is 78.1% and 44.4% of the actual holding. Farms of 2-5 ha category hold 46.5% of the actual.
- In the category of goat farms, farms with less than 5 ha is 87.4% and 64.3% of the actual holding. Farms of 2-5 ha category hold 38.5% of the sheep, and farms have 19.9% category 1-2 hectares.
- The category of pig farms, farms with less than 5 ha is 90.8% and 64.8% of the actual holding. Farms of 2-5 ha category hold 31.4% of pig herds and farms ranging from 1.2 ha holding 18.8%.
- In the category of poultry holdings, farms with less than 5 ha is 93.0% and 79.8% of the actual holding. Farms of 2-5 ha category hold 23.9% of sheep and farms below 0.1 ha category hold 33.0%.
- In the category of bee farms, farms with less than 5 ha is 84.2% and 85.2% of families have bee. Most families of bees are found on farms with 2-5 ha and in those under 0.1 ha.

Table 2 Subsistence farms with animal production in 2010 on SAU classes

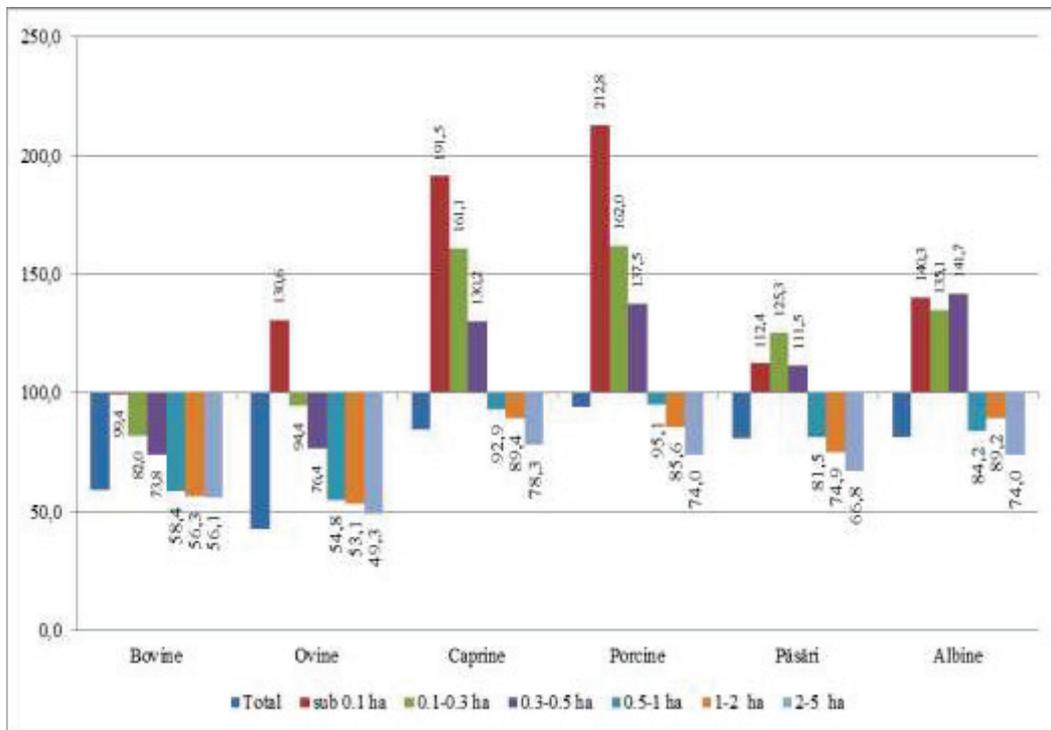
	Cattle	Sheep	Goats	Swine	Birds	Bees
Farms - thousands						
Total	726.1	271.3	176.4	1649.5	2660.4	42.6
Less than 5 ha	607.0	211.9	154.1	1497.7	2473.5	35.9
%	83.6	78.1	87.4	90.8	93.0	84.2
Under 0.1 ha	28.6	13.9	15.2	221.0	397.1	6.4
%	4.7	6.6	9.9	14.8	16.1	17.9
0.1-0.3 ha	38.6	18.3	20.6	197.9	397.8	5.5
%	6.4	8.6	13.4	13.2	16.1	15.4
0.3-0.5 ha	29.2	11.5	12.0	109.0	214.1	2.6

	Cattle	Sheep	Goats	Swine	Birds	Bees
%	4.8	5.4	7.8	7.3	8.7	7.3
0.5-1 ha	79.8	26.4	23.7	229.1	397.0	4.4
%	13.1	12.5	15.4	15.3	16.0	12.4
2.1 ha	163.4	50.2	34.6	331.6	508.3	6.4
%	26.9	23.7	22.5	22.1	20.5	17.8
2.5 ha	267.4	91.6	47.9	409.0	559.2	10.5
%	44.1	43.2	31.1	27.3	22.6	29.3
<b>Animals - thousands</b>						
Total	1985.2	8385.7	1236.9	5387.4	78866.8	1283.2
Less than 5 ha	1221.5	3721.4	795.0	3492.7	62965.1	1093.3
%	61.5	44.4	64.3	64.8	79.8	85.2
Under 0.1 ha	77.1	403.8	84.9	833.5	20809.1	233.8
%	6.3	10.9	10.7	23.9	33.0	21.4
0.1-0.3 ha	68.8	346.6	96.9	331.4	6858.3	207.1
%	5.6	9.3	12.2	9.5	10.9	18.9
0.3-0.5 ha	49.1	176.4	51.5	181.6	3546.5	88.3
%	4.0	4.7	6.5	5.2	5.6	8.1
0.5-1 ha	129.8	360.5	97.2	394.8	7035.1	134.0
%	10.6	9.7	12.2	11.3	11.2	12.3
2.1 ha	289.9	703.1	158.4	655.8	9658.0	166.9
%	23.7	18.9	19.9	18.8	15.3	15.3
2.5 ha	606.6	1731.0	306.1	1095.6	15058.0	263.2
%	49.7	46.5	38.5	31.4	23.9	24.1

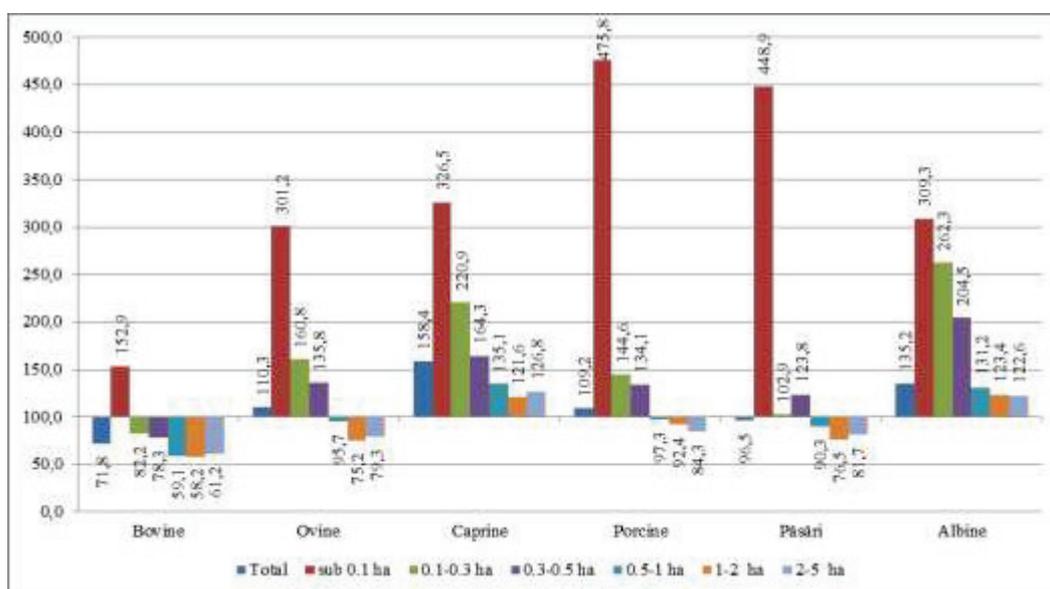
Source: Based on INS data

In the period 2005-2010, analysis of percentage change in the structure of livestock farms show a significant decrease in the share holdings of 2-5 ha category and a significant increase in the share of farms below 0.3 ha (Figure 3). Regarding the development of livestock, we see a major increase in the share of farms with 0.5-1 ha and 2-5 ha farms decrease (Figure 4).

**Figure 3 Evolution of subsistence farms with livestock production 2005-2010**



Source: Based on INS data

**Figure 4 Evolution of the number of animals in subsistence farms 2005-2010**

Source: Based on INS data

Considering the classification unit economic size by Eurostat based on data from the period 2005-2007 RICA (Eurostat, 2012), our analysis shows that in 2005 and 2007, over 99% of farms had less than 8 ESU. Thus, of all farms, 91% in 2005 and 84% in 2007 were subsistence farms (under 2 ESU) (Table 3). The firm exploited about 60% of the UAA. In 2005-2007 the number of subsistence farms decreased by 4.6% and the OR increased by 7.1%. Number of semi-subsistence farms decreased by 39.9% and the utilized agricultural area by 18.3%.

Due to the large number of small farms, real restructuring possibilities are quite low, especially considering that the number of farms considered in recent years support to transform their commercial farms, subsistence farms included only between 2 and 8 ESU (approximately 350,000 farms over 5 hectares - about 9% of the total) and the fact that only about 1.1 million farms were eligible for support from SAPS scheme (direct payments). Ineligibility of nearly 2 million farms support measures, changes in the structure of the rural population (aging), lack of agricultural infrastructure, technical jobs, etc., remain real problems that require structural changes in all economic, legislative and social Romanian countryside.

**Table 3 Subsistence and semi-subsistence agricultural holdings in 2005 and 2007 on ESU classes**

	TOTAL	Subsistence farms			Semi-subsistence farms		
		<1	1-1.9	Total	2-3.9	4-7.9	Total
2005							
Farms (thousands)	4256.2	3020.2	851.1	3871.3	289.3	65.1	354.4
%	100	71	20	91	6.8	1.5	8.3
OR (ha)	13906.7	3569.6	2721.9	6291.5	1588.8	649	2237.8
%	100	25.7	19.6	45.3	11.4	4.7	16.1
2007							
Agricultural Holdings (Thousands)	3931.4	3064.7	629.8	3694.5	169.6	43.3	212.9
%	100	78	16	94	4.3	1.1	5.4
OR (ha)	13753.1	4254.9	2480.2	6735.1	1204.5	624.6	1829.1
%	One hundred	30.9	18	48.9	8.8	4.5	13.3

2007/2005							
Agricultural holdings -%	92.4	101.5	74	95.4	58.6	66.6	60.1
OR -%	98.9	119.2	91.1	107.1	75.8	96.2	81.7

Source: Based on INS data

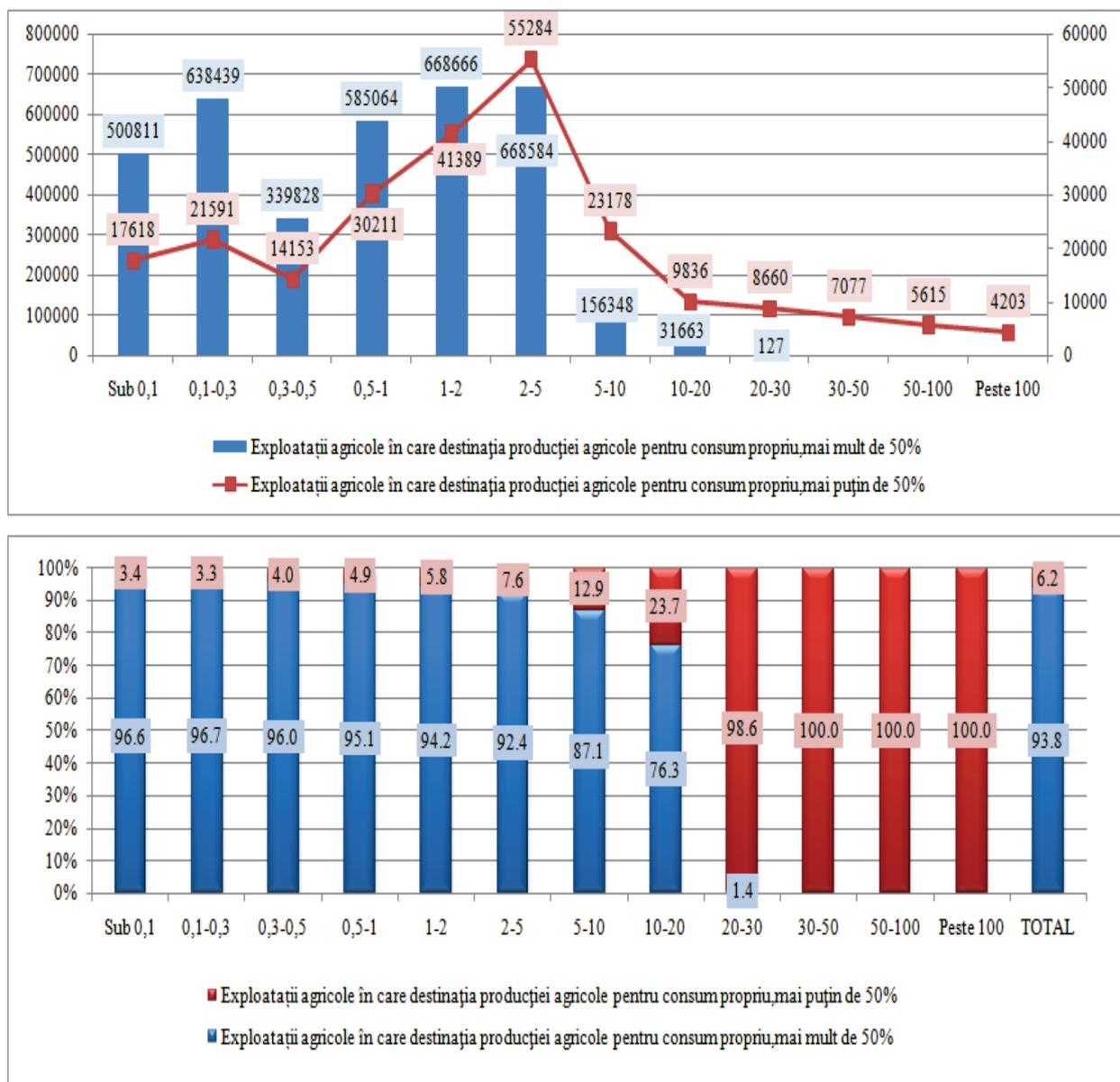
To this is added the negative aspects that we see in terms of holdings analyzing market orientation. Thus, in 2010, about 3.6 million holdings over 50% of agricultural production is for own consumption, while only 239,000 were market-oriented farms. As shown, the majority of holdings under 5 ha have high self-consumption (Figure 5).

There are three reasons that could explain the lack of market participation:

- transaction costs
- unable to comply with agricultural standards
- non-pecuniary benefits of food consumption from own production.

In the context of Romania's fourth argument is that households do not sell their own production as dependent on it for their food consumption needs, not only from lack of money, but because there are few alternative sources of fresh produce in communities isolated rural.

Figure 5 Situation depending on the destination farm agricultural production

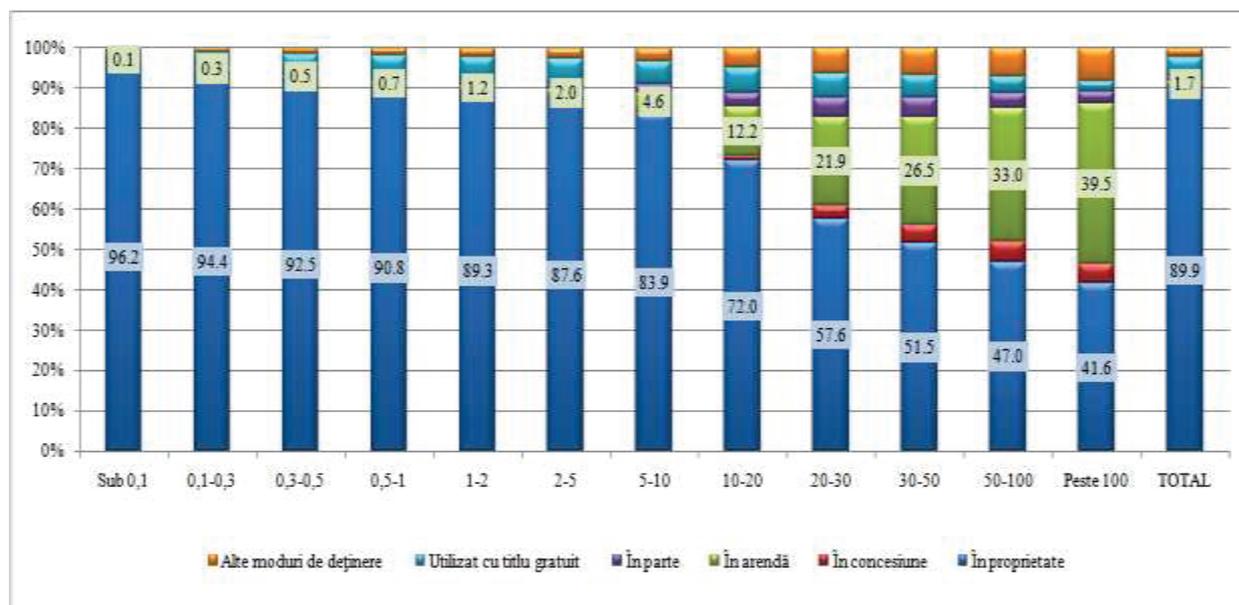


Source: Based on INS data

Another reason explaining the low level of participation in the market is that producers prefer the cultivation and consumption of food from own production. The presence of small farms influence environmental benefits because their goals are more oriented lifestyle than the economic side. While some FSS are already well integrated into the market, others are not integrated, and while many of them still practice agriculture out of necessity, others seem to simply enjoy this way of life (Davidova et al. 2009).

If correlated market orientation of forms of ownership and use of land, is observed first that the holdings of up to 5 ha (as in all farms with up to 50 hectares) UAA is mostly owned by individual household members (Figure 6). With the development of agricultural production for the market is an increase in holdings by lease, concession, etc., but the majority ownership by the rural population and use this property for their own use are difficult attempts to restructure the Romanian agriculture.

**Figure 6 Statement of farm land ownership categories**



Source: Based on INS data

Also, we should mention that these working farms averaged about 1.53 to 2.41 persons (excluding people who work temporarily or employed), which is dedicated to the holding between 12 and 40% of days worked into a year. These people remain in poverty because:

- Standard output on a farm that has less than 5 ha is under 3000 euro / year (about 250 euro / month)
- Income per person for a farmer is about 142,5 euro / month<sup>2</sup>, Of which 25.5% (about 36 euro / month) 4% value their own consumption and income from agricultural products sold (food markets). If we refer only to subsistence farms, estimates show that the household (income in kind) to constitute and 58.5%.

## CONCLUSIONS

In conclusion, in terms of subsistence and semi-subsistence sector in Romania, should be considered first that the current situation of Romanian agriculture is the direct result of a specific rural lifestyle that requires intervention not so Common Agricultural Policy, as by economic, fiscal, social policy, etc.

<sup>2</sup> Compared to about 240 euro / month - average monthly income per employee, 1 euro = 4.2379

As highlighted above, changes in the sector in the period 2005-2010 were insignificant, especially considering all the support measures in the past twenty years to create a modern commercial agriculture. Even today over 99% of farms are subsistence and semi-subsistence farms (about 94% less than 2 ESU). With the support of the RDP measures to increase competitiveness and diversification are primarily directed towards farms with 2-8 ESU, the big problem is that Romanian agriculture over 3.6 million farms are less than 2 ESU (91 % of total holdings), and of these only about 1 million receive support through the SAPS (Single Area Payment Scheme) and PNDC (complementary national direct payments). To quantify the real impact of the support but CAP subsistence agriculture and implications for sector restructuring, research in this work requires a revision on the next agricultural census. This will allow us to quantify, even if not directly impact agricultural policy measures in the period 2007-2013. Only in this way, through a post accession, we see real change in the sector.

We believe, however, that agricultural policy measures must be supported by ongoing counseling and information activities of small producers in the sector of opportunities, and the benefits they can get by, association, organization of producer groups or orientation towards the production of traditional quality to distribute peasant markets or tourism networks.

## REFERENCES

- [1] Davidova, S., Fredriksson, L., Bailey, A. (2009). Subsistence and Semi-Subsistence Farming in Selected EU New Member States, *Agricultural Economics*, 40 (s1), p. 733-744;  
\*\*\* National Institute of Statistics, 2005-2010.

# STUDY ON THE IMPORTANCE OF CREDIT AS FINANCIAL LEVERAGE IN AGRICULTURAL DEVELOPMENT

DARIUS STAN<sup>1</sup>

**Abstract:** *Romanian agriculture is closely related to Romanian village life and is defined as the creatures and the whole of eternity. To think that there is little work to invest in land fertility, agricultural durability invest without having in mind that in Romania the whole eternity of mankind was born in the country. I forget a fundamental truth, proven time and space. Under state law defining Roman in all investments are taken into account the principle of Corpus en Animo where body is the earth that is more stable investment. The study examined a mistake exercised due modernism and of which we Romans have come to praise and idolism mess. It is said that we Romans did not have the capacity, nor the call to use and to modernize agricultural structures. At the beginning of the sixteenth century, Thomas More was a descriptive statement of England considering it as "country where sheep outnumber people." Somewhere in England in 1901 when industrial explosion occur only 9% of the farming population has chosen to respond to migration of rural population to urban areas. It is true that later happened industrial expansion and depopulation of villages in England, but the agricultural sector did not happen to be neglected and fall in disuse time. Structural changes in the agricultural sector have been made with specific consequences, but the same sector at a time proved to be a key ally of England leading the way to becoming the most powerful industrial countries. Romanian agriculture required to adapt perpetual metamorphoses upgrades, misuse, dismantling disuse and writing his own history as the volume and whole chapters*

**Keywords:** *Romanian agriculture, investments, Roman law, principle.*

## INTRODUCTION

Before 1989, the policy on agriculture in Romania has common characteristics with that of all the states with centralized economy.

Prices of most agricultural products not by the market but administrative centrally and support farmers' incomes did not cover agriculture, but increase yields in food products considered basic and keeping consumer prices. By issuing the decree No. 141/1968 Agricultural Bank establishing the Romanian Communist Party to lead to improvement of economic management and planning within a framework established and the establishment of specialized banks. The allocation of credit units required for the development of agriculture and trade was centrally directed and performed by a limited number of state enterprises

After 1989 agricultural reform measures were deficient and accompanied by the beginning of a financing system to be provided technical and technological modernization and the formation of cooperative-based marketing channels or private property system.

Agricultural reform delayed and took place without a legislative basis to facilitate the formation of market structures.

## MATERIAL AND METHOD

Scientific truth can be revealed only by assessing concrete realities of Romanian agriculture outdated stages throughout history. Ally undisputed to conduct objective scientific approach, is the numbers. In this regard, information sources are generous, considering yearbooks report of the National Bank of Romania National Bank and Financial Authority ASF directories that have information on indicators stringent lending credited sectors and the proportion of investments made during the next in some sectors. Were taken in this way, data on agricultural loaning 4 years and there have been studies collected data to highlight developments in agricultural investments.

The main method of investigation and data processing was the index method.

Evolution of the credit system has been carefully studied by comparative analysis of centralized communist era and during the recent post-Ceausescu.

---

<sup>1</sup> Dr. law science, economical; Research Institute of Agricultural Economics and Rural Development - ASAS; [darius.stan@iceadr.ro](mailto:darius.stan@iceadr.ro)

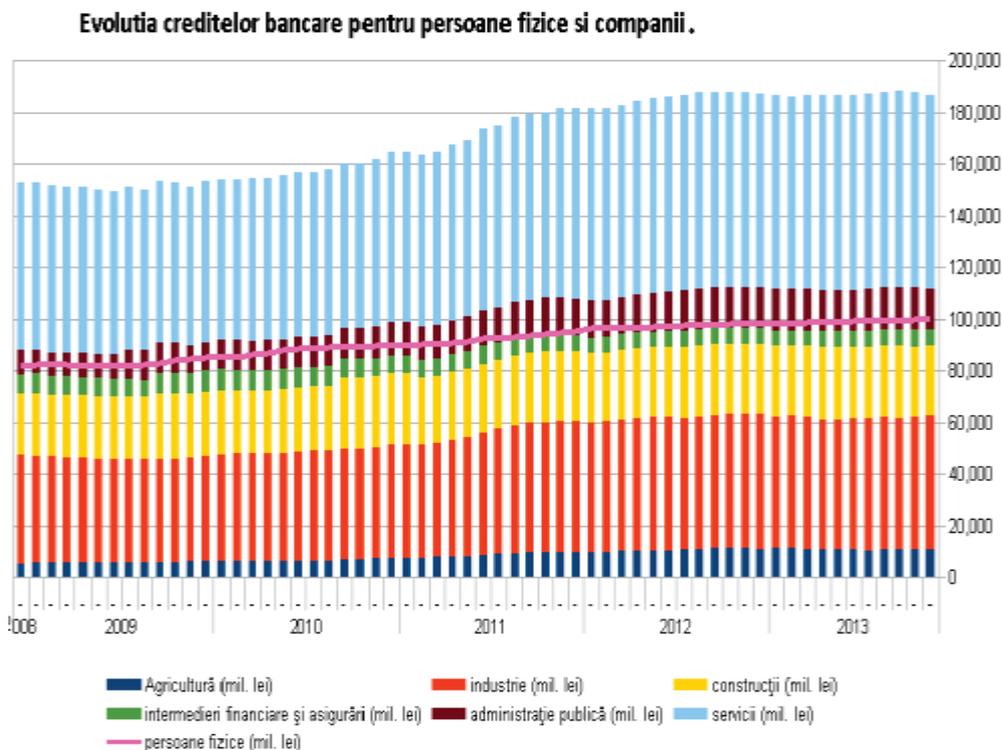
## RESULTS AND DISCUSSION

Statistical analysis on the two periods mentioned, undoubtedly prove some feedback about resource utilization degradation in agricultural investment plan. True, Romanian agriculture is still treated poorly lacking basic safeguards that can be transformed immediately in liquidity is far from ensuring a decent living, but this disability has very deep historical roots.

### 1. Potential agricultural credit

Agriculture, the third branch of the national economy in terms of gross value added share in GDP by services and industry, are experiencing reduced access to loans from commercial banks, as they perceive agriculture as one risky high compared to other areas to which the bank oriented financial resources.

This phenomenon is due to the factors related to the environment and economic stability at the national level and specific factors that influence the demand and supply of credit to agriculture, detailed in the following chart:



In the mentioned period it was found that the volume of agricultural loans by these banks had a constant evolution in the sense that they were marked by a reduction of approximately 5% compared to the same period of 2012 and in December 2013 they increased by 1.6% compared to December of 2012.

The main factors that contributed to the reduction of agricultural loans granted year 2012 were mainly reduced efficiency and productivity of agriculture, involving poor state unfavorable economic circumstances. A negative impact on the evolution of agricultural loans and to repeal legislation had under which farmers been receiving state subsidized interest loans. Giving to grant facilities by the state is reflected in the higher volume of loans outstanding / doubtful recorded.

Overall, between 2012 - 2014 agricultural loans increased by 11.9%., This type of loan volume is directly related to specific agricultural domain, the period in which agricultural activity is marked by the completion of the harvest and preparation land in order to obtain future crops.

In table. Use one or the destination is observed agricultural loans

Table no. 1

Financial institution	Loan name	Destination	Maximum amount
CEC Bank	For stocks	Stocks start	-
CEC Bank	Loan line	Current activities	-
Transilvania Bank	Multiannual farms	Work capital	-
Transilvania Bank	Crops maintenance	Crops	75%
Transilvania Bank	Machinery buying	Machinery	80%
Carpatica Bank	Agriculture	Current activities	-
Carpatica Bank	Rural development projects	Rural development	500.000 USD
BCR	Investments needs	Investments	85%
Intesa Sanpaolo Bank	Agriculture umbrella	Crops expenses	80%

Source: Statistics National Institute

Overall, the share of credit to agriculture in total credit portfolio of banks has remained at a low level, since, as outlined above, the high risk that it involves placing cash in this sector, because of the action of factors presented in detail.

## 2. Factors with positive influence on the demand and supply of agricultural credit

High agricultural potential in all areas of the country, Romania with natural pedo-climatic conditions most favorable in Europe.

Convention with more flexible conditions, meaning that FGCR warranty for any type of loan that you can get the farmers from banks, not only for long-term loans bound for making investments.

## 3. Factors with negative influence on supply and demand of agricultural loans

- Delays in the privatization and sectorial restructuring;
- Market malfunction earth with a negative structural features combined with land ownership, such as fragmentation, incomplete restitution of property titles, the registration of their improperly make the earth be too risky collateralized;
- High prices charged by storage agencies (state owned) discourages farmers to call on the services.

## 4. The behavior of market participants

Bank-client partnership suffers because:

- Lack of transparency of the real situation of heritage undertakings, which enables "correct" performance indicators for their activity in the analysis of creditworthiness for grant funding requested. In this context it should be mentioned and "dressing" made due to cancellation / rescheduling debts of state enterprises, without regard to principles of competitiveness objectives;
- Failing the principles of corporate governance;
- Poor use of specific tools of risk management.

Last but not least, low education level and economic, especially banking, actual and potential consumers of banking products / services and professional training still deficient, thus, on the one hand, many economic agents do not appeal funding needs banks than the last court, and, on the other hand, there are still banks that do not give enough importance to include aspects of their offer consulting services for clients.

## 5. Proposal / estimates for encouraging and stimulating agricultural credit to agricultural investments

Based on the reasons hampering the development of products / banking services subject to study, and considering the trends recorded in the international financial market, we identified possible measures to boost banking activity in general, and the products analyzed, in particular, presented in detail in each product description.

Therefore, the purpose of the study is to establish the administrative measures to boost growth product markets analyzed, but only to identify possible measures to facilitate stakeholder efforts to remove barriers which hinder the development of these markets.

In this context, we emphasize the importance that is close cooperation between the competent institutions in different fields affecting product markets analyzed.

Last but not least it should be mentioned that under the National Bank of Romania supports the need to develop banking products analyzed, the direct intervention of the central bank in these markets will follow only the objectives of monetary policy and currency and maintaining balance in the banking sector.

### **5.1 General Measures**

1. Increase the legal and institutional stability and avoiding legislative inconsistency regarding foreign investment regime.

2. Simplification of administrative procedures required to start a new business.

3. Provide tax incentives to beneficiaries of mortgages in the income tax or the tax deductibility of the interest rate and repayment mortgage paid in the first phase to a certain percentage or to a certain absolute level of the amount monthly payment; such facilities should receive a greater extent newlyweds or credit applicants is the first purchase of a property.

4. Insurance legal framework needed to create mortgage bond market.

5. Create the conditions necessary to ensure market liquidity of mortgage debts by enacting legislation allowing their securitization and the establishment of a fund mortgage to purchase mortgages and privileged debts held by banks and to issue securities based on them.

### **5.2 Specific measures types of agricultural loans**

1. Accelerate competition undertakings storage industry, the state sector still dominates, so that the quality of services and prices to encourage farmers to seek their services.

2. Scroll with support from the state information of a share of the rural population on the necessity of concluding insurance contracts agricultural production.

3. Provide government support to stimulate involvement of private banks in financing the rural sector.

4. Attractiveness growing for bank guarantees provided by the National Credit Guarantee Fund for Small and Medium or extending guarantees and the interest, the existence of an explicit guarantee from the state and changes the current procedure of recovery of such guarantees.

5. Accelerate completion of structural reforms to strengthen private property by releasing all titles of ownership of agricultural land restitution to former owners of agricultural land and forestry and the privatization of agricultural enterprises owned by the state;

- Issuing regulations to provide that, to the formation of new agricultural farms, land to be sold to people with specialized training preference and experience farm; be supported farmers to purchase agricultural land by allowing them to pay in installments agricultural land question;

- Stimulate competition undertakings storage industry, state sector still dominates, so that the quality of services and prices to stimulate farmers to seek their services;

## **REFERENCES**

1. Alexandri, C. Davidovich, I., Gavrilescu, D. (2003) - Changes in the structure of agriculture in terms of performance increase EU Institute of Agricultural Economics, Bucharest, p. 663-664.
2. Axenciuc, V. (1997) - Introduction to the history of economic development. Modern era; Ed. Foundation "Romania of tomorrow", Bucharest
3. Belli, N. Dumitru, D., Smith, M., Toderoiu, F. (1995) - Evolution of the prospective farming. Sustainable agriculture training and competitive by market forces; CIDE, Bucharest
4. Bold, I., Christmas, A. (1995) - the holding, organization, development, exploitation; Ed. Mirton, Timisoara
5. Constantine, nn (Eds.) (2000) - Romania's economic history; Ed. Economic, Bucharest
6. Gavrilescu Dinu (eds.) (2000) - agricultural economy; Ed. Expert, Bucharest
7. Muresan, Maria (eds.) (2004) - Romanian economy from traditionalism to postmodernism. Education; Ed. Economic, Bucharest
8. Olaru, Cornelius (1999) - History economy. Lectures; Ed. ASE, Bucharest
9. Radulescu, Carmen Valentina; John Idiko (2006) - sustainable farm organization, Ed. ASE
10. Zahiu, Letitia (eds.) (2003) - agrarian structures and future agricultural policies; Ed. Economic, Bucharest

11. \*\*\* NBR reports on financial stability
12. Report \*\*\* NBR lending and public non-financial corporations
13. ASF \*\*\* Annual Report - 2013
14. *Annual Report on performance* \*\*\*
15. \*\*\* Report on the work of Deposit Guarantee Fund in the Banking System in 2012.
16. Annual Report 2006 \*\*\*

# EVOLUTION OF AGRICULTURAL COOPERATIVES IN ROMANIA IN 2014

FLORENTIN BERCU<sup>1</sup>

**Abstract:** *This paper analyses the recent evolution of Romanian modern agricultural cooperatives. The purpose is to present a synthesis of the current study to have a real starting point and lay the foundations according to which appropriate measures may be taken for the organisation of food producers into agricultural cooperatives and for making efficient the Romanian food sector. Although in our country, there is still a reticence about the cooperatives due to the history, especially among those who are over 45 years old the mentality of farmers has started to change, becoming aware of the importance of association. In the agricultural cooperatives in Romania, there have been considerable evolutions in comparison with the financial years 2011 and 2012. The number of agricultural cooperatives has increased in only one year by 26%, the turnover has increased by 59%, reaching lei 292,092,239, and the number of employees has increased by 50%. Unfortunately, in the top of Romanian agricultural cooperatives, there are only agricultural cooperatives and cooperative companies which carry out input purchase and obtained raw material sale services (cereals, industrial crops, livestock, etc.) by the members, unlike the Occidental ones where the collection/storage/processing and common marketing services are predominant due to which they obtain high value added products. The small and average producers in the Romanian food sector must understand that without a reform aiming at making efficient the professional organisations with economic purpose and their merger into efficient agricultural cooperatives, our agriculture shall continue to live from its past glory.*

**Key words:** *agricultural cooperatives, Romanian agricultural sector, agricultural policies, evolution.*

## INTRODUCTION

Agriculture is primordial in every country and Romania, in order to become a solid economic country, must increase its own productivity. The fertile land is the most important resource of Romania. Facing the increase of global population, the need for food products shall be increased and now it is the most favourable and useful moment for an intense, systematic, structural reform.

To be able to achieve it, we should base on agricultural cooperatives to include the entire county and on a central cooperative connecting all national and international tasks such as the legislative, financial and organisational framework. (Stanzeleit D., 2013)

The agricultural cooperatives play a key role in the rural economy. They support the farmers to better market their products, obtaining better prices in their exchange, promoting the economic growth and creation of new jobs in the green economy, an essential aspect in the context of the current economic conditions. Also, they strictly observe the principle according to which "The cooperatives contribute to the sustainable development of their communities through the policies approved by their members." In addition, the cooperatives have intensified the support granted for the materialization of this principle, adapting their economic development strategies to strengthen their long-term economic sustainability and to develop rural communities."

To maximize its potential and improve the access to food, more investments are required for a better integration within the food chain. The position of farmers in the food chain must be strengthened for a proper operation of markets and the fight against disloyal commercial practices. This objective may be reached by encouraging the farmers to organize themselves into cooperatives, which would allow them to obtain better income on the market and a larger percent of the added value of their products (Peas C., 2014).

Although in Romania, the cooperative society has made its mark since 1889, as a founding member of the International Alliance of Cooperatives, they reached a beneficial effect in the economic evolution of agriculture, which reached the upper limit of the evolutionary potential before the 1989 revolution, and did not have many elements in common with the principles of Occidental cooperative society.

---

<sup>1</sup> Dr.ing. BERCU, National Federation of Producers in Agriculture, Food Industry and Related Services in Romania – PRO AGRO; E-mail: [florentin\\_bercu@yahoo.com](mailto:florentin_bercu@yahoo.com)

After 1989, the agricultural production cooperatives were automatically divided, directly or indirectly destroying (by non-usage and non-maintenance) the local or regional investments, including the agricultural infrastructure (grain silos, irrigation systems, etc.). One of the fundamental deficiencies of 1989 events was the inexistence as fundamental motivation of the triggering of the events, a new conception, a new strategic program to manage and develop the economy in general and especially for the agriculture. (Lăpușan A., 2010)

Until 2004, when Law 566 emerged, no progress was made in this regard. The cooperatives in our country are still at the beginning, in comparison with the European ones, which operate according to the same principles for decades. In Romania, during the last 10 years, everything was made from scratch, small steps were taken but they must be rebuilt according to solid principles, with patience and capable and right-minded people.

## **MATERIAL AND METHODS**

To have a starting point and lay the foundations from which appropriate measures may be taken for the organization of farmers and for making efficient the Romanian agriculture, I have developed a study in the agricultural cooperatives in Romania, benefiting from the support of the National Trade Register Office and Ministry of Agriculture and Rural Development. By this, a real assessment of the Romanian agricultural cooperatives' situation is aimed at, analysing their activity and establishing the development paths to make it compatible with the European systems of agricultural cooperatives.

The information was centralized and processed to fill in a questionnaire of the General Committee of Agricultural Cooperatives in European Union to make a study regarding the evolution of agricultural cooperatives in Europe, which is to be published by COGECA in December, 2014.

The main objective of this study is that, after the result interpretation, we will be able to provide support, solutions and recommendations for the promotion of successful entrepreneurial development in the EU cooperatives.

## **RESULTS AND DISCUSSIONS**

The Romanian cooperative society included 2,338 cooperatives in mid 2012. Of which 1003 are consumption cooperatives, 824 craft cooperatives and 511 cooperatives or agricultural cooperative companies. The existing cooperatives in Romania were established under the Law 566/2004 and Law 1/2005. The consumption and craft cooperatives operating before this period were subject to those laws.

The economic efficiency of cooperatives for the financial year 2011 is justified by their total turnover representing RON 1,056,682,109. Depending on branches of activity, the turnover is divided as follows: the agricultural cooperatives had a turnover of 120,186,958, consumption cooperatives RON 453,203,138 and craft cooperatives RON 483,292,013. (Bercu F., 2012).

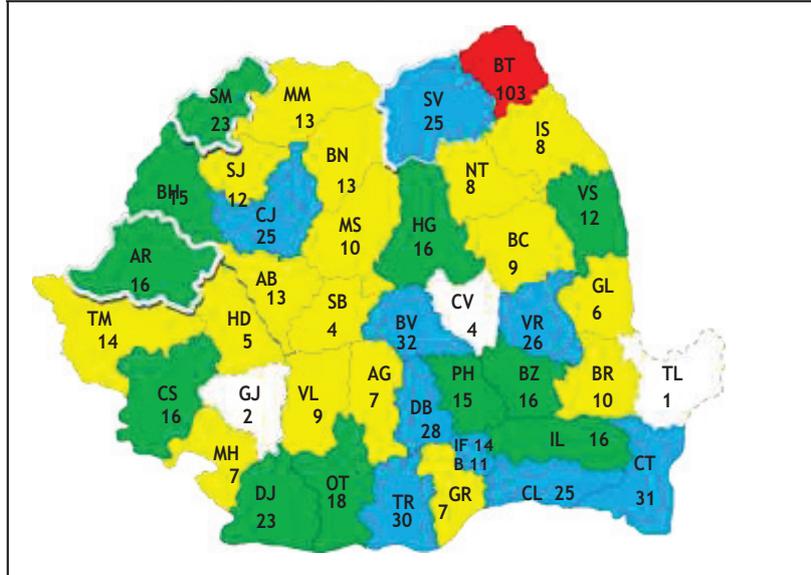
The economic operations registered only 24% of the agricultural cooperatives, 77% of consumption cooperatives and 81% of craft cooperatives. Although a relatively low percentage of the agricultural cooperatives registered economic activities with an average turnover per agricultural cooperative, it reached RON 993,281, exceeding the consumption cooperative which had RON 583,273 and the craft cooperative which reached RON 723,491. They were calculated considering only the cooperatives registering a turnover for the financial year 2011. The cooperatives with no activity in 2011 are: 376 agricultural, 226 consumption and 156 craft.

Using this study, I wanted and managed to obtain an X-ray image of Romanian agricultural cooperatives allowing us to identify solutions to improve their current condition (Bercy F., Botanoiu D., Tudor V., Alecu E., 2014)

As a result of the analysis of public data, centralizing the results of the county, 691 agricultural cooperatives and cooperative companies operating in Romania were identified in 2014

(Fig. 1).

Figure 1. Number of agricultural cooperatives in Romania according to counties



Source: Data processed by NTRO (National Trade Register Office), June 2014

Only 162 had a turnover in 2012 tax year, totalizing LEI 292,092,239. (Bercu. F, 2014 (COGECA)). The agricultural cooperatives and agricultural cooperative companies in Romania have 55 main activities carried out according to the NACE Code, the turnover and the sector of activity, 9608 members and 236 employees. (Table 1)

Table 1

## Statistics regarding the profile of cooperatives at national level

No.	Sector of activity	No. of agricultural cooperatives per NACE	No. of cooperatives per NACE with turnover	Turnover (lei 2012)	No. of member farmers	No. of employees
1	Growing of cereals (except rice), leguminous crops and oil seeds plants	66	8	3,106,330	1062	7
2	Growing of rice	16	1	363,001	297	0
3	Growing of vegetables and melons, roots and tubers	39	5	2,620,889	358	4
4	Growing of plants from annual crops	1	0	0	5	0
5	Growing of grapes	8	2	1,159,711	48	6
6	Growing of tropical and subtropical fruit	1	0	0	5	0
7	Growing of pome fruit and stone fruit	3	1	101,479	17	4
8	Growing of other tree and bush fruits and nuts	5	0	0	198	2
9	Growing landscape architecture plants	1	0	0	16	0
10	Plant propagation	1	0	0	5	0
11	Raising of dairy cattle	29	7	1,301,973	224	9
12	Raising of cattle for meat	5	0	0	168	0
13	Raising of sheep and goats	40	4	542,573	769	5
14	Raising of swine /pigs	31	8	13,111,301	231	1
15	Raising of poultry	13	3	2,886,603	99	3
16	Raising of other animals (bees, rabbits, ostriches, etc.)	55	24	3,526,165	739	10
17	Mixed farming (crop combined with livestock)	116	18	30,471,026	1586	15
18	Support activities for crop production	13	4	1,845,362	187	10

No.	Sector of activity	No. of agricultural cooperatives per NACE	No. of cooperatives per NACE with turnover	Turnover (lei 2012)	No. of member farmers	No. of employees
19	Support activities for animal raising	15	1	182,332	235	6
20	Preparing seeds for sowing	2	0	0	18	0
21	Freshwater fishing	1	0	0	11	0
22	Freshwater aquaculture	2	0	0	11	2
23	Fishing	3	2	56,886	62	11
24	Processing and preserving of meat	10	2	107,124	387	6
25	Processing and preserving of poultry	1	0	0	5	0
26	Manufacture of meat products	1	1	15,600	13	0
27	Manufacture of fruit and vegetable juice	1	0	0	5	0
28	Processing and preserving of fruit and vegetables	8	0	0	51	1
29	Manufacture of oils and fats	1	0	0	7	11
30	Manufacture of dairy and cheese products	3	1	206,242	168	10
31	Manufacture of bread; manufacture of fresh cakes and pastries	1	0	0	5	1
32	Manufacture of other food products	2	0	0	71	0
33	Manufacture of prepared feeds for farm animals	5	0	0	53	0
34	Manufacture of wine from grape	5	0	0	51	0
35	Agents involved in the sale of agricultural raw materials, live animals, raw materials and semi-finished goods	27	12	11,250,984	414	8
36	Agents involved in the sale of a variety of goods	1	0	0	5	0
37	Wholesale of grain, seeds, fodder and raw tobacco	57	26	110,772,935	439	25
38	Wholesale of flowers and plants	2	0	0	12	0
39	Wholesale of fruit and vegetables	39	9	11,488,364	665	16
40	Wholesale of livestock	14	7	54,102,831	291	23
41	Wholesale of meat and meat products	4	3	231,211	25	8
42	Wholesale of dairy, eggs and edible oils and fats	16	7	36,111,198	288	11
43	Non-specialized wholesale of food, beverages or tobacco	4	0	0	30	0
44	Wholesale of chemical fertilizers	1	0	0	5	0
45	Non-specialized wholesale of honey and bee products	1	1	876,010	95	2
46	Retail sale in non-specialized stores with predominant product	2	1	4,260	21	0
47	Retail sale of fresh fruit and vegetables in specialized stores	1	0	0	14	0
48	Other food products in specialized stores	1	1	106,243	10	0
49	Retail sale of vegetable outside stores, stalls, kiosks and markets	1	0	0	12	0
50	Wholesale of fruit and vegetables	5	0	0	40	0
51	Grain storage, cold storage, storage tanks	5	3	5,543,606	44	19
52	Holiday and other short-stay accommodation	1	0	0	5	0
53	Other accommodation	1	0	0	5	0
54	Consultancy activities for business and management	3	0	0	16	0
55	Renting and leasing of agricultural machinery and equipment	1	0	0	5	0
	<b>TOTAL</b>	<b>691</b>	<b>162</b>	<b>292,092,239</b>	<b>9608</b>	<b>236</b>

Source: Data processed by the National Trade Register Office, 2014

The Romanian food market is strongly influenced by the competition between the price and the capacity to market the products by the producers. In production, the international non-cooperative groups or private commercial companies with domestic capital hold the control of products in this sector, influencing the price and market trend.

The main activities carried out by the agricultural cooperatives in Romania, according to the turnover and the activity sector are: purchase and sale of production obtained by the cooperative members and supply of farms with: seeds of cereals, industrial crops, fodder crops, pesticides, diesel, fertilizer, agricultural and technical consultancy; wholesale of livestock; activities in mixed farming (crop combined with livestock); raising of swine/pigs; agents involved in the sale of agricultural raw materials and live animals, raw materials and semi-finished goods; wholesale of dairy products; wholesale of fruit and vegetables; grain storage, cold storage, storage tanks and growing of cereals (except rice), leguminous crops and oil seeds plants.

We have an urgent need to establish a high-level training program designed for the agricultural cooperative leaders such as the one organized by COGECA in collaboration with the Wageningen Academy, which is to be adapted to the level of culture of farmers as regards the cooperatives and the cooperative system with the particularities of each country. A gradual system depending on the evolution and stage, at which the cooperatives grouped in a few countries are, would have a strong impact.

The agricultural cooperatives are subject to the general provisions in terms of taxation, there being no specific exemptions, the applicable taxation being valid for all taxpayers, respectively 16%, not even different taxes applicable to transactions with members and transactions with those who are not members.

The national tax system is not adapted to the specificities of agricultural cooperatives; there are no tax exemptions for establishing indivisible reserves, but a general rule, respectively exemption from the profit share allocated to the mandatory reserves of 20% of the share capital. The exemption is progressive, respectively 5% of the due tax until it reaches 20% of the share capital.

There are no implications for the cooperatives which arise from the current provisions of the legislation in terms of competition regarding the state aids, being subject to the general rules.

The biggest problem of the Romanian agricultural cooperatives is the access to funding. This is due to the problems related to business and their specific legal form. In Romania, there is no law of cooperative lending, they are not included in the bank schedule and they are treated as any limited liability company. The agricultural cooperatives operating according to the authentic cooperative society's principles are still at the beginning in Romania due to the reticence caused by the history of cooperatives during the Communist period and there are few cases when they obtain bank funding due to the fact that they would rather benefit from certain services such as the purchase of inputs and common marketing of part of the production, instead of supporting the cooperative in order to create collection/storage/processing/trade spaces for them to provide stability and obtain considerable income for its members.

The collective political action in agriculture is crucial in order to achieve a more equitable food system allowing food producers to subsist on their production. (Georgescu I. L., Bercu F., 2014)

## ACKNOWLEDGEMENTS

For the elaboration of this paper, we have benefited from the financial support of the European Social Fond by the Sectoral Operational Programme Human Resources Development 2007 – 2013, in the project "Horizon 2020 Doctoral and Postdoctoral Scholarships: promotion of national interest by excellence, competitiveness and accountability in fundamental and applied scientific research" (Contract Code: POSDRU/159/1.5/S/140106), coordinated by the Research of World Economy.

## CONCLUSIONS

Almost all agricultural cooperatives in Romania are relatively newly established, in general since 2005 and until 2014, in comparison with the Occidental ones which carried out their activity for decades, even hundreds of years.

The agricultural cooperatives in Romania aren't yet involved in relevant activities of information, communication, research and innovation, support of generic promotion projects, social cooperative responsibility, economic, social, cultural, environmental development, food safety, rural development as regards the non-structural cooperative and governance principles, regarding: "Education, training and information", "Cooperation between cooperatives" and "Commitment to community" and should start such campaigns.

In the agricultural cooperatives in Romania, there were considerable evolutions in comparison with the financial years 2011 and 2012. The number of agricultural cooperatives has increased in only one year by 26%, the turnover has increased by 59%, reaching LEI 292,092,239, and the number of employees has increased by 50%.

Unfortunately, in the top of Romanian agricultural cooperatives, there were only agricultural cooperatives and cooperative companies which achieved input purchase services and the marketing of obtained raw material (cereals, industrial crops, livestock, etc.) by the members, unlike the Occidental ones where the collection/storage/processing and common marketing services are predominant and due to which they obtain high value added products.

## BIBLIOGRAPHY

1. Bercu F., 2012 – *Cercetari privind Perfectionarea Activitatii Cooperativelor Agricole din Romania*, Teză de doctorat, U.S.A.M.V. Bucuresti;
2. Bercu F., Botanoiu D., Tudor V., Alecu E., 2014, *Analysis of the modern agricultural cooperatives activity in Romania*, Romanian Agricultural Research, NO.31, 2014, DII2067-5720 2014-350 Institutul National de Cercetare-Dezvoltare Agricola Fundulea;
3. Bercu. F, 2014 – *Evolution of Agricultural Cooperatives from U.E.*, Chestionar Confederația Europeană a Cooperativelor Agricole din Europa (COGECA);
4. Lăpușan A., 2010 - *Cooperația agricolă, condiție fundamentală pentru dezvoltarea agriculturii românești*, Seminarul de Economie și Sociologie Rurală "Virgil Madgearu", București;
5. Georgescu I. L., Bercu F., 2014 - *Collective Action for an Equitable Food Production System*, Scientific Papers, Series A. Agronomy, Scientific Papers. Series A. Agronomy, Vol. LVII, ISSN 2285-5856, 400-406, Bucharest;
6. Peas C., 2014 – *Anul Internațional al Cooperativelor*, Declarație de presă COPA\_COGECA;
7. Stanzeleit D., 2013 – Memoriu transmis Ministerului Agriculturii și Dezvoltării Rurale;
8. [www.onrc.com](http://www.onrc.com);
9. [www.madr.ro](http://www.madr.ro);
10. [www.cnproagro.ro](http://www.cnproagro.ro);
11. [www.copa-cogeca.eu](http://www.copa-cogeca.eu).

## BUSINESS ENVIRONMENT ANALYSIS OF ROMANIA

DARIUS STAN<sup>1</sup>

**Summary:** *For much of human history, most people have been deprived of liberty without economic and investment opportunities being driven by poor living. Today, however, say that living in the most prosperous in history. In trying to remove poverty, disease, ignorance around the world, given the fact that in large part, the restriction on economic freedom is an important obstacle in trying to define an array in this analysis of the economic potential enlightening in the economic freedom in Romania. In 2014, the principles of economic freedom were again measured and collected in the Index of Economic Freedom, the source directories published by The Wall Street Journal and The Heritage Foundation. We also sought to highlight in an easy to use analysis, we can easily track progress in the development of Romania for economic openness, prosperity, opportunity. The paper will reveal the elementary analysis of the 10 freedoms - from property rights to entrepreneurship - in a report than 186 countries.*

**Key words:** *economic freedom indicators, opportunity, poverty, investment*

### INTRODUCTION

#### What is economic freedom?

Freedom economy is the fundamental right of every human to control his own prosperity and development of the cumulative rights. In a society free of economic, individuals are free to pursue economic activities to produce, consume, and invest without restrictions.

In companies free economy, governments allow labor, capital and goods to move freely, refraining from coercion or constraint, to the extent necessary to protect and maintain liberty itself.

For analysis of 2014, most of the data were taken into account from the second half of 2012 and full year 2013 as far as possible, the information considered for each factor was current June 30, 2014 . Also noted that some factors are important in the historical information based on previous years.

For example Factor of a country's monetary policy is 3 years; the weighted average rate of inflation was calculated from 1 January 2010 to 31 December 2013.

### MATERIAL AND METHOD

Evaluation of concrete realities of outdated stages throughout history helps us discover scientific truth. To conduct objective scientific approach we have chosen as an ally indisputable indicators, digital reporting. In this regard, information sources are generous, given the international classifications and directories of the report The Wall Street Journal, The Heritage Foundation holding information stringent the last 20 years indicators on it economic freedoms. The degree of development and proportion of investments made during the next in some states. Were taken in this way, data on economic development for 4 years and have done studies based on data collected to highlight changes in the business environment in Romania. The main method of investigation and data processing was the index method.

System performance has been carefully researched economic freedoms through benchmarking with other countries that have developed similar in the past but in recent times.

### RESULTS AND DISCUSSION

Thus, economic freedom index in Romania in 2014 is 65.5, which indicates a change in the source economy better at 62.3 indexes. Calculation proves an improvement of 0.4 points this year due to low reliefs in the 10 economic freedom, including monetary freedom, eradicate corruption and freedom of trade.

---

<sup>1</sup> Dr. law sciences, economical; Research Institute of Agricultural Economics and Rural Development - ASAS; [darius.stan@iceadr.ro](mailto:darius.stan@iceadr.ro)

Romania ranked 29 of 43 countries in the European region, and its overall index is higher than the world average.

Over history of Romania's economic freedom rose by about 23 points. Should be mentioned here, relevant efforts and enormous progress in eliminating economically repressive policies. There were structural reforms to enhance regulatory efficiency and open market economy that have advanced from "moderately free". In the 2014 index, Romania scored a noted improved even the best ever held (Elevator 0.4).

### Information. Economic Classifier Member - Romania

#### 1. Respect for property rights

Table no. 1

Position	Country
76	Ghana
77	Malawi
78	Burkina Faso
79	<b>Romania</b>
<b>80</b>	Zambia
81	Vietnam

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

2. Gross domestic product indicator based on purchasing power parity as a percentage of world GDP by 0.36 answer

3. The rate intellectual property protection, including anti-counterfeiting measures in the country (1 f weak - 7 f strong) Romania ranks 84 before having the following countries (table no. 1)

Table no. 2

Position	Country	Value score
80	Guyana	3.1
81	Trinidad and Tobago	3.1
82	South Africa	3.1
83	Egypt	3.1
<b>84</b>	<b>Romania</b>	<b>3.1</b>
85	Tanzania	3.1
86	Peru	3.1
87	Cambodia	3.0
88	Azerbaijan	3.0

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

4. In this report we look at evaluating more public confidence in the ethical standards of politicians in the country where it is ranked 57 of Romania before it with more confidence as member

Table no. 3

Position	Country	Value score
53	Kuwait	4.5
54	Gambia	4.5
55	Malaysia	4.5
56	Macedonia	4.4
<b>57</b>	<b>Romania</b>	<b>4.4</b>
58	Montenegro	4.3
59	Malawi	4.2
60	Hungary	4.2

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

5. To the question: To what extent is the judiciary in your country independent from influences of members of government? Romania ranks 81 Join in the personal influence:

Table no. 4

Position	Country	Value score
77	Tanzania	3.5
78	Columbia	3.5

79	Morocco	3.5
80	Nigeria	3.5
<b>81</b>	<b>Romania</b>	<b>3.5</b>
82	Turkey	3.4
83	Uganda	3.4
84	Bangladesh	3.4

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

6. And the favoritism of government officials that places the company projects are well ranked 110 and having before states:

Table no. 5

Position	Country	Value score
109	Madagascar	2.5
<b>110</b>	<b>Romania</b>	<b>2.5</b>
111	Chad	2.5
112	Uganda	2.5

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

7. Then analyze how burdensome it is for entrepreneurs in your country to comply with governmental administrative requirements. And this is before we find out how Guyana - 3.0; Lesotho - 3.0; Moldova - 3.0; Côte d'Ivoire - 3.0; Bangladesh - Romania is in position 115 2.9 - 2.9, followed by Burundi - 2.9 and Latvia - 2.9.

8. However, how effective is the legal framework in your country for private businesses are in position 137 out of 139 possible. before us are:

Table no. 6

Position	Country	Value score
134	Burundi	3.3
135	Libya	3.0
136	Venezuela	3.0
<b>137</b>	<b>Romania</b>	<b>2.9</b>
138	Chad	2.8
139	Bosnia and Herzegovina	2.7

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

When asked indicator measuring organized crime: the extent of organized crime (mafia-oriented racketeering, extortion) impose additional costs on businesses in your country?

9. We learn that Romania spent on average as the UK - 6.0, Cyprus - 6.0 Netherlands - 6.0 hovering in position 43 by about 5.9 of the global share.

10. Confidence in the police and state authorities to enforce law and order in the country we have before us 70 Ghana.4.2, Zambia 71 4.2, 72 Romania ..4.2

11. In terms of quality of port infrastructure ranked us 122 Romania having before us states like Lesotho 3.1, 3.0 Tanzania, Burundi 3.0, Nigeria 3.0.

Then the annual percentage change in the risk index of consumer prices for the products we ranked 98.

Table no. 7

Position	Country	Value score
95	Ecuador	5.1
96	Mexico	5.3
97	Honduras	5.5
98	<b>Romania</b>	5.6
<b>99</b>	<b>Algeria</b>	<b>5.7</b>
100	Bangladesh	6.1

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

12. And health are in a weaker position. For example the calculation of the number of cases of tuberculosis that are calculated per 100,000 population, respond in position 95 fewer cases were recorded in:

Table no. 8

Position	Country	Value score
92	Guyana	112.5
93	Morocco	116.3
94	Peru	119.1
<b>95</b>	<b>Romania</b>	<b>133.8</b>
96	Thailand	136.7
97	Bolivia	143.9

Source: The Wall Street Journal; The Heritage Foundation; Rank's score Economical

13. And infant mortality (death rate is calculated per 1,000 live births) are presented in 55th place with 11.6, 11.7 with Uruguay, Vietnam 11.8.

14. Life expectancy of people in Romania recorded a dramatic drop us standing next to Venezuela 73.5, 73.5 Armenia, Peru 73.3, 73.1 Nicaragua.

15. We arrived then and education where primary qualitative measures which are accompanied by better quality states Indonesia 4.1 4.1 Rwanda, Botswana 4.1 Albania 4.1 4.0 Romania, Kenya 4.0.

Finally, passing over other indicators have reached the benchmark to measure the state's interest in keeping and attracting talented people - Brain drain or brain drain indicator where we are in unfavorable position 116 139posibile, by a factor of only 2.4. Before us were countries such as Tajikistan 2.6 Ecuador 2.5 Lebanon 2.5 Egypt 2.5 Ukraine 2.5 and 2.4 followed by Cameron, Syria 2.4 Paraguay 2.4 2.4 Mali, Zimbabwe 2.4.

## CONCLUSIONS

### Economic freedoms system performance

In light of 2015 we will analyze indicators during the last quarter of 2014 the state recommend attractiveness. Romania obtained outstanding marks under "Ease of Doing Business in Romania" are:

- Eastern Europe & Central Asia Region
- Income Category Upper - Middle Income
- Population 18482395
- Income per capita (U.S. \$) 8330.00
- Doing Business 2015 - negative growth in position 56-54 (-2)
- Starting a Business in 2015 - negative growth from 44 to 41 (-3)
- Dealing with Construction Permits in 2015 - an improvement from 84 to 93 (so a plus 9)
- Registering Property 92 (no change)
- Getting Credit in 2015 - an increase from 15 to 14 negative (-1)
- Protecting Investors (investor protection) 2015 - negative growth of 44 to 41 (ie -3)
- Paying Taxes 2015 - negative growth at 151-147 (-4)
- Trading Across Borders in 2015 - negative growth 47 48 (1)
- Enforcing Contracts (performance contracts) 2015 - negative growth from 54 to 53 (-1)
- Closing a Business (business closed) 2015 - negative growth from 102 to 92 (so a -10)

On 2 June 2014 the European Commission recommended on the National Reform Programme 2014 of Romania, Romania's consistency program aimed primarily Chapters 11, 12 and 13:

- developing a national strategy plan on the efficient use of resources, especially human capital asset;
- development of a national plan on Labor Market Development.

In this report, the focus is primarily on recommendation taken to complete lack of structural reforms. The report states that in Romania the labor market is burdened with various institutional and legal constraints that hinder the effective use of human skills and at the same time, reduce the speed of response of the economy to growth opportunities.

Also specify that, as observed in the statistics, and contrary to the competitive demands of the market economy, the state is the main employer, the ratio of state employees to the private sector is 1.3 to 1.

The average salary in the public sector has come to rival - and sometimes rightly so - with the average private sector wage.

Currently, out of a total population of 22 million people, 11 million are assisted in various forms of state.

This cannot be called "social protection" but dependent state - the classic trap of underdevelopment. In these circumstances, the very social cohesion can be reached unable manifestation, once we recognize that economic and social cohesion policies are among the most important EU policies on strengthening economic growth, competitiveness and employment.

Need to ensure well trained human resources and competitive European labor market arises from the understanding that the competitive advantages that underpin economic growth can not ensure long-term sustainability, given the increased pressures of globalization and the continuing introduction of new technologies. We believe that only a flexible workforce and highly qualified will be able to build permanent changes in the labor market.

Today in Romania economic priority is to protect jobs and encourage private initiative viable, creating new jobs for Romanian. Extending unemployment crisis means in addition, that poverty and social costs for all. You must be aware that after the economic crisis, coming across Romania a wave of social problems. Unemployment, poverty, lack of perspective. Well-paid jobs are the result of the accumulation of capital and an institutional environment conducive to economic freedom.

This means low taxes, non-tariff barriers minimum, low inflation and a competitive business environment.

Inefficient companies should be allowed to disappear, as other companies, more efficient, to appear. The costs of this process in the short term are offset by growth in the medium and long term prosperity.

In other words, economic freedom is valuable as an end in itself. But equally important is the fact that the 10 of freedoms interact with and complement each economic freedom is also on a multidimensional process of achieving economic progress.

## REFERENCES

1. Friedrich A. Hayek (1944) - The Road to Serfdom (Chicago, Ill .: University of Chicago Press)
2. \*\*\* [http://ec.europa.eu/europe2020/making-it-happen/country-specific-recommendations/index\\_ro.htm](http://ec.europa.eu/europe2020/making-it-happen/country-specific-recommendations/index_ro.htm)
3. \*\*\* The Wall Street Journal - Annual report
4. \*\*\* The Heritage Foundation - Annual report
5. \*\*\* Rank's score Economical - Annual report

# COMPUTER MODEL FOR EVALUATING PERFORMANCE AND ECONOMIC RISK AT THE LEVEL OF FARMS OF DIFFERENT SIZES

BEREVOIANU ROZI LILIANA<sup>1</sup>

**Summary:** *Computer Model for performance evaluation and economic risk is a model complex based on appropriate methodologies with specific indicators, necessary to administer the agricultural farm, management, efficient and increase its productivity. System of indicators is intended as a centralized source of information necessary to improve economic performance and efficient use of production factors by which to ensure the development of commercial farms, efficient use of input, raising yields and improve economic performance.*

**Keywords:** *computer model, agricultural management, economic and financial indicators, economic risk*

## INTRODUCTION

The computer Model was developed as part of Project ADER 513"Establish the profitability and economic risk assessment in the vegetal and animal farm under the pedo-climatic conditions in the South of the country", with the main purpose to stimulate farmers in the use of computer software for making strategic management options.

By using the computer model will increase the profitability of the agricultural exploitations because information on the mode of operation of the establishment and progress of business, which will result in a direct way, to streamline the exchange of information and reducing information-decision cycle.

At the same time, the computer model is a useful tool for management of farms of different sizes and shapes. This leads to identify the most effective solutions, carrying out financial and economic activity of the farm, the possibility of anticipating the likely success of the business, making proposals for financing agriculture.

Through systematic on-line accessibility of data-processing model, the research team wishes to increase the contribution of scientific research and environmental education to the development and competitiveness of agricultural holdings, to develop an interactive source for farmers, managers, students, researchers and consultants involved in the management of agricultural holdings.

## MATERIAL AND METHOD

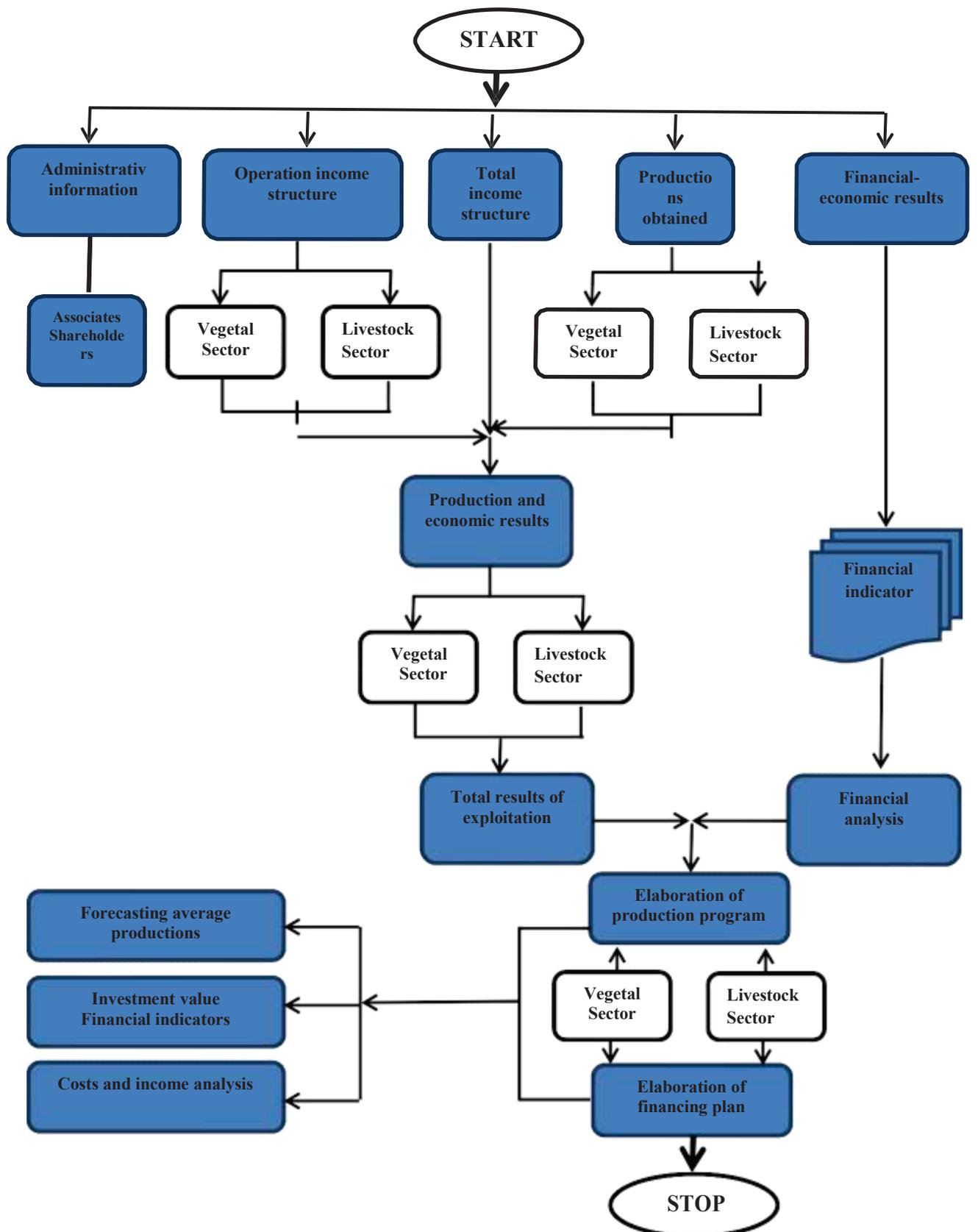
The computer model was designed based on an overall analysis of the components of plans and programmes, the identification of the necessary indicators and their applicability in the boundary area. As a result, it is seen as a unitary system, which manages data and information, with a large utility in the decision-making process.

The computer model has the support of a collection of tables, organized in such a way as to ensure the possibility of manufacturing records and, at the same time to establish a common data source for all applications in the system subsystems.

For an understanding of how to work within the computer model we present further linkage between Windows (sheet) in their logical sequence of usage:

---

<sup>1</sup>Scientific researcher II – Research Institute for Agriculture Economy and Rural Development



<b>Flow chart - flow of information</b>
---

To organize the tables by computer model components and to allow this procedure to be permissible under the agreement, it had the following features:

- table-size must be equal to the size or total number of the registered information;
- the degree of activity-refers to the number of records that are processed when running the system that uses a specific table;
- mobility-refers to the elimination of doubles records and the opportunity to delete or insert information into the table.

With regard to the processing of records in a table are the following basic processes:

- sequential processing where input data is grouped and sorted in order to follow the sequence of entries in the table, the records being processed in sequence, as are entered;
- processing random data is used for the processing of entries in the order in which they appear.

Program structure clarified the following:

- in order to run correctly, you must firstly declared administrative information, followed by the income structure, the structure of production and the economic-financial results for a period of 3 years;
- the model allows you to enter information and generate data for both crop production and livestock production.

## RESULTS AND DISCUSSION

Computer-model application program developed included:

- A.** data entry in the system (inputs),
- B.** system constants (information taken from the parts lists and tables),
- C.** data output from the system (outputs or reports)

**A. Data entry in the system (inputs)**the information input by the user of the system:

- administrative information;
- information about the structure of operating income sectors;
- information about the structure of total revenues;
- information about the plant - crop, area, total production, total expenditure, subsidies, production value etc .;
- information about livestock - animal category, total, total expenditure, subsidies, production value etc .;
- information relating to financial results etc.

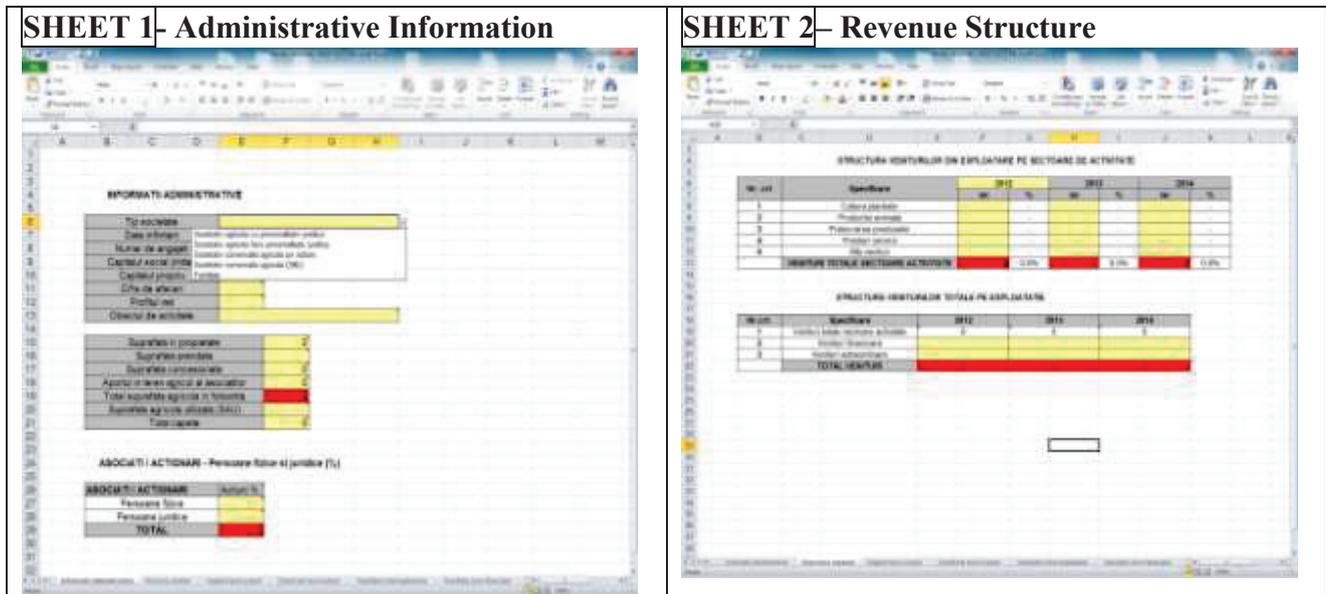
**B. Constants system** is information taken from lists and tables that can be achieved by classifying farms by economic size, the type of crop and animal species, determining the economic dimension in euro SO per farm (total standard production - SO euro), you can make judgments on economic indicators - those holding's financial.

**C. Output data**from the system are those reports that it generates system after loading the input data and constants, based on the calculation algorithms specific to each module designed:

- vegetable sector - the average yield, total physical production expenses per hectare, cost of production, crude, average selling price, etc;
- livestock - average yield, total physical production, livestock expenses, cost of production, crude, average selling price, etc;
- total expenses, total revenues, profit or loss, the rate of profit;
- forecasting average production;

- variations of production structures;
- analysis of revenue and expenditure in the previous period and the year in which the program is;
- financial projections for a period of three years from the receipt of financial assistance;
- basic indicators and calculation efficiency indicators etc..

Below are images and exemplified during the development / use computer model developed:



- SHEET-ul 1 „*Administrative Data*” -the user enters the data on the agricultural holding. There is a button for selecting the type of society that allows one choice, depending on user's choice.
- SHEET-ul 2 „*Income structure*” - the user enters the value in lei in operating income sectors. There selector button that allows the user the choice of year 1, then year 2 to year 3 (written automatically in ascending order).

The following spreadsheet (sheets) of the application require differentiation by sector of activity (plant and animal). Each module allows the user to enter the holding activity-specific data, respectively to obtain, through the automatic calculation, information on the results of economic and productive results. Thus:

- SHEET-ul 3 ”*Input-Output Plant*”
  - Cultivated land and acquired productions"-for the select (series of 3 consecutive years). In this section the user can enter data on existing crop cultivation: in the suite (there is a button for selection of vegetable crops in the database created), the area in hectares and total production in tonnes for each of the selected crops.

The data entered and the values obtained through calculations specified results are obtained for production and economic results, which will be displayed in the same sheet, table, as follows:

  - "Production and economic results" - select years (range 3 consecutive years). In this section the user enters data on: total expenditure (lei), grants (lei), the production (lei) for each crop in the system
- SHEET-ul4 ”*Livestock Input-Output*”
  - “Effective animals and yields obtained” - selected years (range 3 consecutive years). In this section the user enters data on: existing categories of animals on their premises (there are buttons for selecting the category of animals created database), total number of heads yields obtained for each animal category selected.

The data entered and the values obtained through calculations specified results are obtained for production and economic results, which will be displayed in the same sheet, table, as follows:

- "The production and economic Results"-selected years (series of 3 consecutive years). In this section the user can enter data: total expenditure (lei), subsidies (lei), the production value (lei) for each category of animal is introduced into the system.

### SHEET 3- Input-output Plant

Area under cultivation and the production obtained for the select (series of 3 consecutive years)

### SHEET 3- Input-output Plant

Production and economic Results for the select (series of 3 consecutive years)

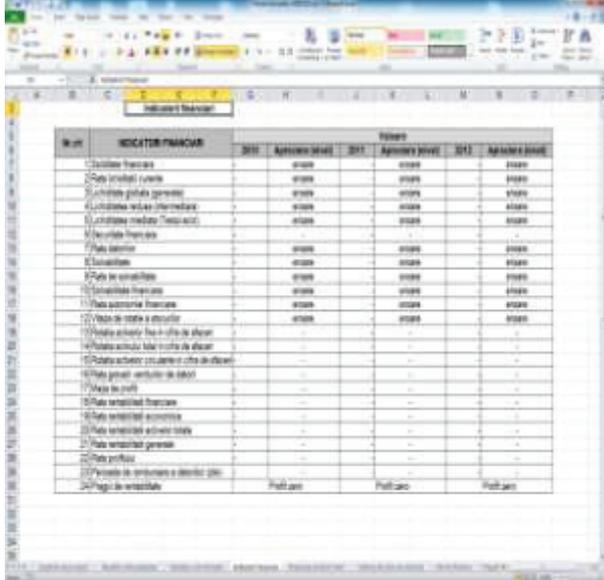
### SHEET 6- Economic-financial Results

### SHEET 6- Economic-financial Results

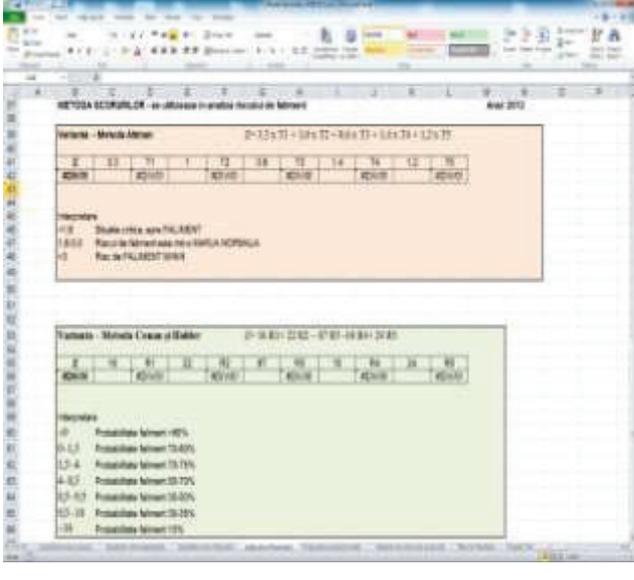
- SHEET-ul 5 "Total Results Holding" -it shows the information related to the production and economic results, the economic size of the holding and its classification corresponding to each year of production achieved for vegetable and animal sector. Classification of agricultural holding is handle according to The Standard Production SO (SO euro/expl.) and according to economic size (ESU/expl.).
- SHEET-ul 6 "Economic and Financial Results" -the user can enter data from the balance sheet and the profit and loss account. The accounts provide information on the State of assets, financial situation and results of the enterprise in a fiscal year.
- SHEET-ul 7 "Financial Indicators" - based on the data from Sheet 6 - "economic and financial results" are automatically calculates financial ratios for selected years (three years in

succession) and the risk of bankruptcy for the last year selected. These indicators is calculated usually for farm accounting who organized under the laws in force. Financial indicators are calculated automatically by specific formulas, and according to the obtained model enables information analysis and interpretation. Using the scoring method to automatically analyze the risk of bankruptcy for the last year selected, using the data from Sheet 6 - "economic and financial results"

**SHEET 7- Financial indicators**



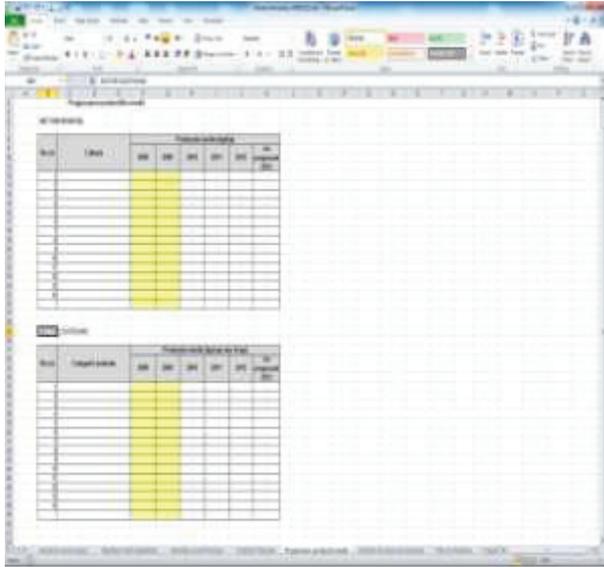
**SHEET 7- Financial indicators**



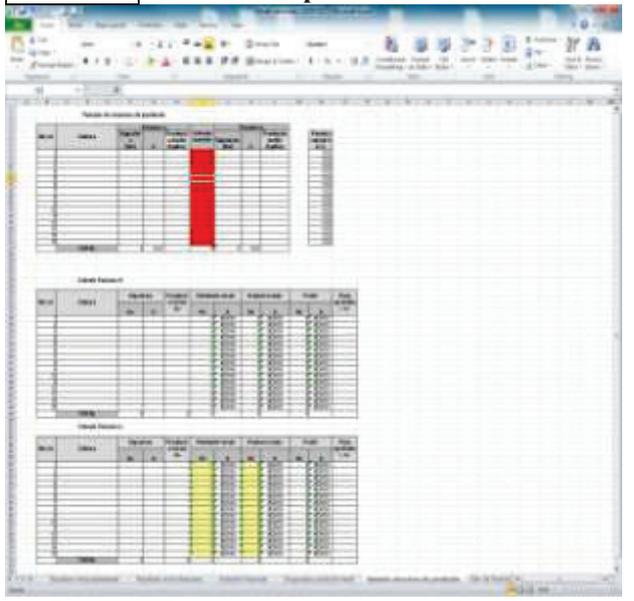
The next stage of processing model involves the elaboration of production program, which includes:

- SHEET-ul 8 "Forecasting average production" for selected years (range 3 consecutive years) both for crops (kg/ha) and for livestock (kg/animal head or l/cap animal), based on the values of the average production the last 5 years after production. To achieve forecasting average production, farm requires the results of production data in recent years. Forecasting average production will be done using methods that correspond, for each crop or animal categories, their evolutions in the previous period.

**SHEET 8- Forecasting average production**



**SHEET 9- Variations production structure**



- SHEET-ul 9 "Variations production structure" for crops - Making variants of the structure of production plant, the calculations in the appropriate "version 0" and "variant n". The user has

the possibility through successive attempts, changing culture surfaces selected last year to get other versions of production structure.

### SHEET 10 – Financing plan and financial projections

### SHEET 12 – Financial projections

- SHEET-ul 11 "Program production. Analysis of expenses and income "as version 0 and the year in which elaborate production program (version n).
- SHEET-ul 12 "Financial Projections" - The computer allows financial projections for the next three years of receiving financial aid, assessment of basic indicators (the investment, production costs/year, production value, profit/year) and the indicators efficiency (specific investment, payback period, profits recovered, total profit, total profit, economic investment). The specific calculations of these indicators are specific formulas that are inserted into the appropriate cells and taken for each value of the three-year financial projections.

## CONCLUSIONS

Documentation economic analysis - financial information prepared using model generates a series of very important information and conclusions to substantiate production programs so that it can be considered a useful tool at the hands of managers who can make a major contribution to decision-making steps necessary farm management.

### Evaluation of computer model

- providing economic model developed information that are not processed by the accounts, such as: Production Total Standard OS euro, Economic Size Unit production cost per unit of product, record, calculate and analyze farm-specific indicators over a period of three years etc.
- preparing the mid-term evaluation of the work already indicating items that should be reached or transformed (influencing the decision);
- projected path of evolution of farm management to see what the current functioning of the farm;
- describe developments that may have a farmer to improve farm management;
- developments states that the farmer can have them in connection with the use or adaptation of machinery for mechanization.

Efficiency and utility computing model is a means:

- stimulating farmers managing vegetable farms and animals in using computer applications at farm level for the evaluation of production;
- the complexity of the process of agricultural production (practical guidelines);
- communication between farmers, the main beneficiaries of project and agricultural research.

### **BIBLIOGRAPHY**

1. ADER 513, Project financing contract No. 513/14.11.2011-"Establish profitability and economic risk assessment in the vegetal and animal farm under the pedo-climatic conditions in the South of the country."
2. PS 622, Project financing contract No. 369/2006-"System for developing business plans, production strategies, feasibility studies and other analyses useful in the decision-making process of crop production"

## BEEKEEPING DEVELOPMENT OPPORTUNITY FOR SERBIAN DANUBE

NADA MIJAJLOVIĆ<sup>1</sup>, SLAVICA ARSIĆ<sup>2</sup>

**Summary:** *Beekeeping in the Serbian economy is one of the underdeveloped sector. Modern agriculture today can not be imagined without a developed and modern beekeeping as a part of agriculture and the national economy that is subject to economic laws that operate in the market and is inextricably linked to all the developments in the domestic and global economics. The importance of this activity is potentiated in this paper. The paper analyzed the production of honey, the total number of hives and honey production per hive in Central Serbia, Vojvodina and Serbian Danube region. The aim of this paper is to highlight the importance of beekeeping as an economic sector that has significant potential for sustainable development within the Serbian Danube region. The presented data related to beekeeping in statistical databases and literature data related to beekeeping.*

**Key words:** *beekeeping, honey production, sustainable development, Danube.*

### INTRODUCTION

Modern agriculture is not to be imagined without a developed and modern beekeeping because of agriculture and the national economy subject to economic laws that operate in the market and is inextricably linked to all the developments in the domestic and global economics. With five million acres of land - (arable land, garden, orchards, vineyards, meadows, pastures, and large areas of forest) Serbia has extensive natural resources for development of beekeeping and honey production quality.

In Serbia, beekeeping has a long tradition. Honey and other bee products are of high quality. In Serbia, there is a natural predisposition for the development of beekeeping in terms of climate (temperate continental climate), in terms of the rich flora and a variety of honey plants and excellent conditions for beekeeping. Beekeeping is one of the untapped agricultural potential of Serbia and the state level is increasing acknowledgment that there is potential for honey production and export potential of bee products. It is estimated by experts to be fond of hives which now has about 320 thousand could be the 1. 200.000 given the potential that Serbia has. Honey is a highly valuable food in terms of nutritional and in terms of medicinal ingredients. Composition and properties of honey depend on the properties of the nectar honey plants from which the bees collect it. (<http://www.makroekonomija.org/poljoprivreda/proizvodnja-i-izvoz-meda-iz-srbije-vise-kosnica-manje-meda/>)

Honeybee is an indispensable factor in crop production. Collecting nectar and pollen from flowers as food, they pollinate hundreds of different species of plants. The value created by the participation of honeybees in pollination is not assessable and unavoidable cropping measures that increase crop production and improves the quality of fruits and seeds (the impact of bees on the yield and quality of the fruit ranges up to 70 percent). Potential production of honey in Serbia looking natural conditions: climate, plant varieties, environmental status, etc. would be around 600-700 thousand hives with a production of about 20 kg of honey per hive or an average of about 14.000 tons. Export potential is around 12-14.000 tones, or almost the entire amount produced. The potential of foreign exchange inflow is around 30-40 million. That's still less than Hungary. ([www.pcela.rs/pcelarstvo](http://www.pcela.rs/pcelarstvo))

---

<sup>1</sup>M.A., Nada Mijajlović, researcher associate, Institute of Agricultural Economics, Volgina 15, 11060, Beograd, e-mail: [nada\\_m@iep.bg.ac.rs](mailto:nada_m@iep.bg.ac.rs)

<sup>2</sup>M.A., Slavica Arsić, researcher associate, Institute of Agricultural Economics, Volgina 15,11060, Beograd, e-mail: [slavica\\_a@iep.bg.ac.rs](mailto:slavica_a@iep.bg.ac.rs)

## MATERIALS AND METHODS

In the results were statistically processed data for the period since 2000th the 2010th of the number of hives and honey production in the Republic of Serbia, (Central Serbia and Vojvodina). The research in addition to sources of statistical data on beekeeping production used the data of the Ministry of Agriculture, Trade, Forestry and Water Management, World Bank data, the Food and Agriculture Organization (FAO), as well as numerous consulted the literature.

The collected data are analyzed by standard mathematical and statistical methods, which can serve as a solid basis for predicting the performance of certain production scale and production that can be expected in the future.

## RESULTS AND DISCUSSIONS

The world annual production of 1.3 million tons of honey. (<http://www.americanhoneyproducers.org>)

Most honey is produced in Asia (385.000 t), while in the EU the annual honey production is 133.000 t. The largest honey producers are countries in Southern Europe, where beekeepers are professionally engaged in the production of honey, such as France, with 31.000 t, 30.000 t of Spain and Greece with 15.000 tons per year. In Northern Europe, honey production is lower because it is mainly engaged in the production of honey beekeepers - amateurs. Honey they produce is for their own use and for sale at the local level. (Table 1)

**Table 1. Honey production in some European countries in 2009th**

No.	The name of the state	Weight of honey in 1.000 t
1	Austria	5,5
2	Belgium and Luxembourg	2
3	Denmark	3
4	Finland	1
5	France	31
6	Germany	15
7	Greece	15
8	Ireland	0,1
9	Italy	11
10	The Netherlands	0,8
11	Portugal	11
12	Spain	30,4
13	Sweden	3,3
14	UK	4
15	Serbian 5	5,5
16	Total	135,6

Source: FAO

The most important export market is the European Union, with in 2010. were exported 3/4 of the total exports (Germany with 45 % share, followed by Italy and Austria) and in addition to exports and to CEFTA countries (Macedonia, Montenegro and Bosnia and Herzegovina). This paper will provide a theoretical and practical contribution to responsible for the production of honey, have guidelines for appropriate measures to improve honey production in Serbia.

In Table 2 are listed statistics on changes in scale production of honey and hives all over Serbia, and also in Central Serbia and Vojvodina in particular. Calculation of data in Serbia in 2000 was 167,000 hives and 2663 tons of honey and honey production per hive for the year 2000 was 16 kg. Participation Central Serbia in the total number of hives in Serbia in 2000 was 92.8% and Vojvodina 7.2% share in the production of honey in Central Serbia is 92.0% and 8.0% of Vojvodina.

**Table 2. The beekeeping in Serbia from 2000th to 2010 th**

	The Republic of Serbia			Central Serbia			Vojvodina		
	<i>BEEHIVE S, thousands of pieces</i>	Producti on of honey	<i>Kilogram s, per beehive</i>	<i>BEEHIVE S, thousands of pieces</i>	Producti on of honey	<i>Kilogram s Perbeehi ve</i>	<i>BEEHIVE S, thousands of pieces</i>	Producti on of honey	<i>Kilogram s, per beehive</i>
2000.	167	2663	15	155	2447	15	17	216	15
2001.	179	2317	14	162	2178	15	<b>17</b>	139	9
2002.	164	2550	13	149	2340	13	15	210	10
2003.	201	3242	12	180	2662	12	21	581	13
2004.	266	3579	13	222	3041	13	44	538	13
2005.	270	3665	13	228	3196	13	42	468	13
2006.	304	4048	13	258	3633	14	46	416	9
2007.	267	3538	13	236	3155	13	31	383	12
2008.	298	2561	9	232	1824	8	66	738	11
2009.	302	4577	15	256	4142	16	45	434	10
2010.	320	4479	14	271	3951	15	49	527	11

Source: Statistical yearbook, 2000-2010., Statistical office of the Republic of Serbia

For the year 2001 the total number of hives has increased compared to the previous year 2000 to 7.2% in the Republic of Serbia, but the total honey production dropped by 13% Central Serbia share in the total production of honey in Serbia is 94.0% and Vojvodina only 6.0%.

Honey production in 2002 was 10% higher but the number of hives declined in Serbia by 8.4%. Production of honey in Central Serbia increased by 7.4% in Vojvodina to 51.0%, the proportion of Central Serbia in the total production of honey in Serbia is 91.7% and 8.2% of Vojvodina.

In the Republic of Serbia since 2003, increasing the number of hives to 201 thousand, which is 22.5% more than in the previous year, and with that, honey production, which amounted to 3,242 tons, which is 27.1% more than the 16kg per hive. Of the total production of honey in Serbia largest honey production in 2003 was in Central Serbia, 82.1% and 17.9% in Vojvodina. In the following year 2004 in Serbia there are increasing number of hives by 32.3% and the production of honey by 10.4% and per hive 13,5kg, compared to 2003. In 2005, following an increase in the number of hives accounted for only 1.5% and the production of honey by 2.4% compared to the previous year. Compared to 2005, 2006 to increase the number of hives is the largest 304 thousand, its 12.6% and the production of honey, which has reached a maximum production of 4,048 tons in the Republic of Serbia, or 10.4% more, which is 13.3 kg per hive. The share of Central Serbia in total honey production in 2006 was 89.7% and 10.3% of Vojvodina.

In 2007 there is a decline in the number of hives by 12.2% and the production of honey by 12.6% compared to the previous year due to severe drought because the bees did not have a good flow and in the winter they entered weakened, a spring pasture due to poor climatic conditions were not sufficiently abundant to allow the recovery of the hives. Therefore, it is killed more than 110.1 bee society.

Data for 2008 show that the total number of hives in the Republic of Serbia in relation to the previous year increased by 11.6%, but honey production declined by 27.6% (due to the above reasons), which is the production per hive with 13 dropped to 9 kg. According to the calculation of the total production of honey Central Serbia accounted for 71.2%, which is 42.2% less honey production compared to 2007, while the share of Vojvodina is 28.8%, which means that the honey production in Vojvodina twice as high compared to the previous year, with 383 tons in 2007, increased to 738 tons in 2008, which is 92.7% more.

Increasing the number of hives in 2009 by the Republic of Serbia is only 1.3% compared to the previous year, but honey production is 78.7% higher. The largest increase was in Central Serbia, 4,142 tons of honey, which is 2,318 tons, or 127.0% compared to the previous year, and the share in the total production of honey in Serbia for Central Serbia is 90.5% and only 9 t of Vojvodina, 5%.

According to statistical data related to the year 2010, the number of hives in the Republic of Serbia, although it increased by 6% but honey production dropped by 2.2%. The largest increase in honey was in Vojvodina and to 21.4%, while 4.6% lower production in Central Serbia, compared to the previous year. The share of Central Serbia in the total production of honey in Serbia is 88.2% and 11.8% of Vojvodina.

## CONCLUSIONS

Based on the presented results it can be concluded that beekeeping in Serbia is relatively well developed, but there is potential (especially in the Danube riparian areas) that this activity continues to develop and become more powerful export sector in Serbia. In recent years, honey yields have increased substantially. The application of modern technology and intensive training of beekeepers may be in a stationary beekeeping yields doubled, and in migration and quadruple. Honey is the most attractive product, many countries export it's achieve enviable foreign currency income. In addition beekeeping to export to foreign markets made a positive export balance, because honey from our area's quality and most sought after in the world. Although the last few years, the Ministry of Agriculture has taken measures to improve conditions in beekeeping through subsidies and allowances, and to the production of queen bees and swarms purchase beekeeping equipment, it is necessary to pay more attention to beekeeping.

## ACKNOWLEDGMENTS

The paper is prepared as a result obtained within the scientific project "Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region (III no. 46006), financed by the Ministry of Education, Science and Technological Development, Republic of Serbia in the period 2011-2014.

## REFERENCES

1. Strategy Beekeeping Association of Serbia for the development of beekeeping Serbia, 2010<sup>th</sup>
2. Statistical yearbook, 2000-2010., Statistical office of the Republic of Serbia
3. <http://www.fao.org/>
4. <http://www.spos.info>
5. [www.pcela.rs/pcelarstvo](http://www.pcela.rs/pcelarstvo)
6. <http://www.americanhoneyproducers.org>
7. <http://www.makroekonomija.org/>
8. <http://www.makroekonomija.org/poljoprivreda/proizvodnja-i-izvoz-meda-iz-srbije-vise-kosnica-manje-meda/>

# IMPROVEMENT OF NATURAL GRASSLAND AS A FACTOR OF RURAL DEVELOPMENT IN LOWER DANUBE REGION<sup>1</sup>

MARIJANA JOVANOVIĆ<sup>2</sup>, SLAVICA ARSIĆ<sup>3</sup>, ĐUROPAJČIN<sup>4</sup>

**Summary:** *The aim of this paper is presenting of importance of natural grasslands (meadows and pastures) in rural development of Lower Danube region. Production of efficient quantities of food for domestic animals and preservation of environment is strategically important for economic prosperity and animation of local population, as an aim to stay in rural areas and to develop their agricultural productivity. Lower Danube region have possibilities for development of agricultural production, because it possessed enough quantity of natural resources with highest quality. The territory of Lower Danube region make following municipalities: Golubac, Majdanpek, Negotin, Kladovo and Kučevo. In this municipalities land under meadows and pastures is on the second place, just behind arable land. Due to the presence of NP Đerdap on the territory of Lower Danube region is concluded that there are no obstacles for rural development, from the aspect of natural resources. But the following problems: fragmentation of land, the extensiveness of use, inadequate intake of organic matter and degradation processes caused by the action of man, affected the quality of natural grassland (meadows and pasture) and the production of forage crops in general. Because of that one of the most important tasks of rural development of these municipalities is proper using of grassland, which going to enabled development of this kind of agricultural production and protection of important plant species.*

**Key words:** *pastures, meadows, rural development, Lower Danube Region*

## INTRODUCTION

Rural areas in Serbia were defined as an area whose main physical and geographical characteristics of land use for the purpose of agricultural and forestry production. In Republic of Serbia almost 70% of area is treated as a rural and in those areas lives almost 43% of population. Main source of employment is agriculture (1/3 of the population in rural areas are employed in agriculture) (*Jovanović and authors, 2012.*). Because of that, one of the most important goals is finding the possibilities to improve agricultural production and animation of local population to quit migration from rural to urban areas.

Another goal of rural development (especially in area of Lower Danube region) is preservation of natural resources (water, land, plant and animal potentials – local species) in the way of creation the sustainable environment. Agricultural production beside of positive effects, also manifest a series of negative effects: it comes to changes in the natural environment by deforestation, soil conservation is intense, it comes to the elimination of diversity for the sake of creating uniformity - monoculture on arable land, the application of mineral fertilizers and pesticides is increasing and with more and more genetic manipulation of cultivated plants, it causes the weakening of natural soil fertility (reduction in the level humus) (*Kovačević, 2010.*).

*Kljajić (2012)* emphasises that the use of land in the Republic of Serbia is followed by a series of problems: fragmentation of land, the extensiveness of use, inadequate intake of organic matter and degradation processes caused by the action of man and nature. Erosion processes (72% of the land in Serbia is threatened by erosion), also affect land degradation.

Those effects represent potential damage for all types of agricultural lands, thereby endangers the possibility of development of rural areas. In these areas, depopulation processes are becoming more and more expressed, villages are becoming „old“ which has negative impact on

---

<sup>1</sup>This paper is part of project III 46006: “Sustainable agriculture and rural development in function of achieving strategic goals of Republic of Serbia within Danube region”, financed by Ministry of Education, Science and Technological Development of Republic of Serbia. Project period 2011-2015<sup>th</sup> year.

<sup>2</sup>BSc Marijana Jovanović, Research Assistant, Institute of Agricultural Economics Belgrade, Volgina 15. Street, 11060 Belgrade, Republic of Serbia. Phone: + 381 11 69 72 842, e-mail: [marijana\\_j@iep.bg.ac.rs](mailto:marijana_j@iep.bg.ac.rs)

<sup>3</sup>MA Slavica Arsić, Research Assistant, Institute of Agricultural Economics Belgrade, Volgina 15. Street, 11060 Belgrade, Republic of Serbia. Phone: + 381 11 69 72 852, e-mail: [slavica\\_a@iep.bg.ac.rs](mailto:slavica_a@iep.bg.ac.rs)

<sup>4</sup>BSc Đuro Pajčin, master – student, University of Belgrade – Faculty of Agriculture, Serbia, e-mail: [djuro.pajcin@gmail.com](mailto:djuro.pajcin@gmail.com)

livestock production and grasslands quality (especially in high mountain areas) (*Jovanović, Bekić, 2012a*).

With the advent of new trends in agriculture, production of sufficient quantities of food for domestic animals is a link in a development of family farms. *Arsić and authors* (2013) emphasize that this type of production creates a link between crop production and animal husbandry, where the conditions of intensive use of natural resources - land, water and solar energy.

Production of sufficient quantities of high quality forage food is one of the most important tasks in sustainable farming. So the question arises how it is possible to provide a stable basis for the development of livestock production, due to the devastation of permanently low subsidies. With the changing climate trends come to droughts in the period of vegetation, which affects the growth rates of concentrated animal feed, which then raises the price the price of basic foodstuffs. (*Jovanović and authors, 2013*.)

Production of forage crops on the natural grasslands is idea for finding the solution about balance between environment and agricultural production. Pastures and meadows are part of natural grasslands and them significantly create production of forage crops and involves in used agricultural lands. Only with proper using of grassland will be enabled development of this kind of agricultural production and protection of important plant species, especially because on the area of Lower Danube region is located NP "Đerdap".

## MATERIAL AND METHODS

Research is based on the results of quantitative and qualitative analysis of natural conditions and agricultural resources of the Lower Danube Region, with special emphasis on natural grasslands (pastures and meadows). Data were collected from available statistical documents (especially data from *Census of agriculture, 2012*), as well as from national publication and different scientific papers of this scientific area. Data were analysed by using the analytical-synthetically statistical method.

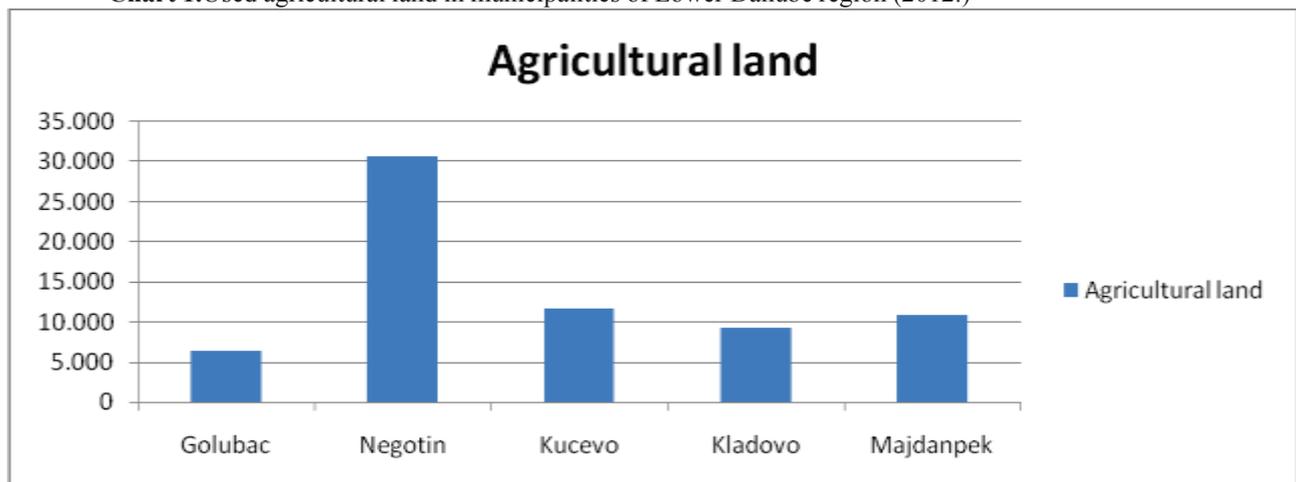
## RESULTS AND DISCUSSION

Lower Danube region (Carpathian area) is located in eastern Serbia and includes territory of the following municipalities: Golubac, Kučevo, Majdanpek, Kladovo and Negotin. This region gravitates toward the Danube River and orographically it belongs to southern Carpathians. It is the area of 732.35 km<sup>2</sup> and includes Iron Gate and NP "Đerdap". Climatic and soil factors are favourable for improvement of agricultural production and the Danube River represents the largest water potential of all municipalities.

*Capacities of natural resources and vulnerability of the National Park „Đerdap“ and its protected area, which includes the largest part of Carpathian area, predispose this area for reaffirmation and development of traditional agriculture and integral and organic production of healthy food with special quality characteristics, based on methods of traditional production. (Nikolić, Popović, 2010:205).*

In municipalities of Lower Danube Region there are favourable natural conditions for development of plant and animal agricultural production. However, besides unfavourable age structure, there is also large fragmentation of estates, weak clustering of agricultural producers and lack of organized production and sale which could be a problem in the process of sustainable development. (*Jovanović, Bekić, 2012*.)

According to the *Census of agriculture from 2012 year*, on territory of Lower Danube region agricultural land includes 68.883 ha. In the following chart will be seen territorial distribution of agricultural land by municipalities. (Chart 1.)

**Chart 1.**Used agricultural land in municipalities of Lower Danube region (2012.)

Source: *Census of agriculture, 2012., RZS, Belgrade*

According to Chart 1, on territory of Lower Danube region exist enough agricultural land for performing all kinds of agricultural production. The highest share of agricultural land is notified in municipality of Negotin (30.726 ha). On second place is municipality of Kučevo, with 11.622 ha of agricultural land. On the third place is municipality of Majdanpek (10.916 ha). Municipalities with a least agricultural land are Kladovo (9.203 ha) and Golubac (6.416 ha).

**Table 1.**Structure of used agricultural land in municipalities of Lower Danube region, in 2012. (ha)

Municipality	Agricultural area (ha)	Kitchen garden (ha)	Arable land (ha)	Meadows and Pastures (ha)	Orchards (ha)	Vineyards (ha)	Nurseries (ha)	Other (ha)
Golubac	6.416	35	4.436	1.698	179	65	-	2
Negotin	30.726	145	21.905	7.404	465	798	8	1
Kučevo	11.622	180	5.972	4.940	471	52	4	3
Kladovo	9.203	73	5.742	3.116	90	180	-	-
Majdanpek	10.916	89	2.876	7.575	328	56	-	-

Source: *Census of agriculture, 2012., RZS, Belgrade*

In the Table 1, is presented used agricultural land, by categories of using and with that is confirmed that on territory of Lower Danube region agricultural land includes 68.883 ha. Lower Danube region includes following municipalities: *Golubac, Negotin, Kučevo, Kladovo, Majdanpek*.

Following the used arable land in observed municipalities can be concluded that in municipality of **Negotin** is the highest amount – 21.905 ha (almost 4-10 times higher than the other municipalities). On second place are municipalities **Kučevo**(5.972 ha) and **Kladovo** (5.742 ha). On the third place is municipality of **Golubac** (4.436 ha). Municipality with lowest amount of used arable land in total used agricultural land is **Majdanpek** (2.876 ha).

In the structure of used agricultural land, on the second place are **meadows and pastures**. Municipalities of **Majdanpek**(7.575 ha) and **Negotin**(7.404 ha) have biggest amounts. On the second place are municipalities **Kučevo**(4.940 ha) and municipality of **Kladovo** (3.116 ha). Municipality with the smallest share of meadows and pastures is **Golubac**(1.698 ha).

One of the reasons why comes to decreasing the agricultural land under meadows and pastures is migration of local population, especially in mountain area of Lower Danube region. On that way comes also to reduction in livestock and increasing of the share of weed at the expense of quality grasses and legumes. On that way comes to reduction of production of fresh fodder for animals, emphasizes the increased consumption of concentrated feed, which ultimately leads to increased prices of final products: meat, milk and other processed products.

Share of other categories in total used agricultural land is smallest than arable land and pasture and meadows, but distribution is the next:

1. **Orchards:** biggest amount of agricultural land used for orchards is in municipalities **Negotin** (465 ha) and **Kučevo** (471 ha). On the second place is municipality of **Majdanpek** (328 ha). Municipalities with lowest share of orchards are in **Golubac** and **Kladovo**.

2. **Vineyards:** highest part of vineyards on territory of Lower Danube region is located in **Negotin** (where exists the tradition of wine production), and it amount 798 ha. On the second place is municipality of **Kladovo** with 180 ha used for this kind of production. Municipalities **Majdanpek**, **Kučevo** and **Golubac** have 2-3 time hectares less than in **Kladovo** (almost 10 times less than **Negotin**).

3. **Kitchen garden:** at municipalities **Negotin** and **Kučevo** is notified approximately 145-180 ha. In rest of the municipalities of Lower Danube region is 2-3 time hectares less used for kitchen garden.

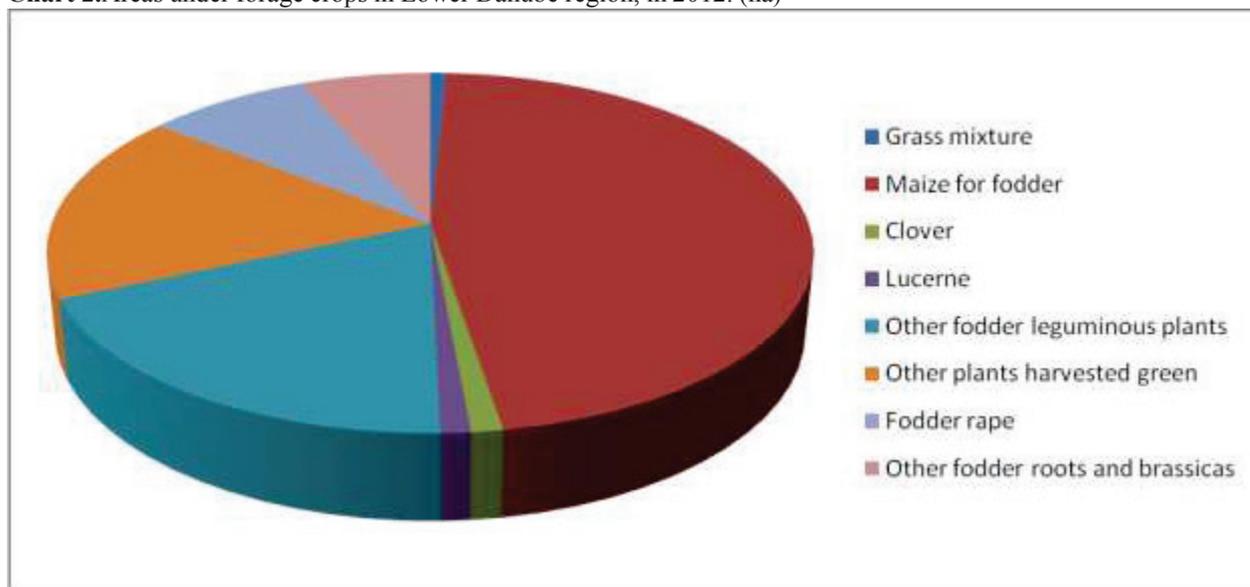
4. **Nurseries and other:** Share of these categories of used agricultural land in the municipalities of Lower Danube region is very small, almost immeasurably. In some municipalities they don't even exist. So it can be concluded that this kind of production is not interesting in these area.

The existence of sufficient meadows and pastures for managing the forage crop production is important for the future development of rural areas. Increasing of areas under meadows and pastures in the future leads to enlargement of plant production, i.e. production of sufficient amount of quality green biomass for grazing and basis for silage production for the period when animals aren't on open land.

Permanent use of land can lead to reduction in the share of suitable grasses and legumes in the mixture (in terms of cultivated grassland), reducing the nutritive value of biomass. On the natural grasslands situation is almost the same. Without grazing it comes to leads to the appearance of poor quality grass, thereby reducing the quality of food.

To emphasise the importance of improvement the natural grassland (meadows and pastures), in the following text will be show the areas under forage crops, as well on the level of Lower Danube region, as well on the level of Municipalities which constitute LDR<sup>5</sup>. (*Chart 2*)

**Chart 2.** Areas under forage crops in Lower Danube region, in 2012. (ha)



Source: *Census of agriculture, 2012.*, RZS, Belgrade

Based on previous data, in areas under the forage crops in Lower Danube region amounts 5.838 ha. The structure of used land for fodder production is diversified: areas under **grass**

<sup>5</sup>LDR – Lower Danube Region (acronym authors)

**mixture** occupies 1.484 ha (25.42%); areas under **corn for fodder** occupies 87 ha (1.49%); areas under **clover** spreads on 2.141 ha (36.67 %); while areas under **lucerne** spreads on 2.033 ha (34.82%). **Other fodder legumes** cover 35 ha of total land (0.60%). Almost the same area covers and **other plants harvested green** (0.55%), **fodder rape** (0.26%) and **other fodder roots and brassicas** (0.21%).

From this data can be concluded that the agricultural producers still rely their own production on production of clover and lucerne in large percentage. That kind of uniformed production is economically cost-effective, but it can lead to the poring of land, no matter of that these two plants are very important animal meal.

Based on data from Census of Agriculture, in municipalities of lower Danube region is following situation, related to the structure of areas under the forage crops (Table 2.):

**Table 2.** Areas under fodder crops in municipalities of Lower Danube region, in 2012 (ha)

	Grass mixtures	Corn for fodder	Clover	Lucerne	Other fodder legumes	Other plants harvested green	Fodder rape	Other fodder roots and brassicas
<b>Kladovo</b>	23	5	115	89	5	-	-	3
<b>Majdanpek</b>	211	30	616	164	-	6	13	5
<b>Negotin</b>	764	33	414	1.052	25	14	1	4
<b>Kučevo</b>	387	4	720	347	2	6	-	1
<b>Golubac</b>	101	15	249	381	3	6	1	-

Source: *Census of agriculture, 2012, RZS, Belgrade*

Clover production is dominant way of land using in almost every municipality. The highest area used for clover production is in municipality of **Kučevo** (720 ha) and in municipality **Majdanpek** (616 ha). Lowest area is notified in municipality **Kladovo** and it amounts 115 ha.

Lucerne production is on the second place, when is talking about structure of land using for purpose of forage production. Most intensive production is in municipality of **Negotin** and production is spread on 1.052 ha. Lowest area under lucerne is notified in municipality of **Majdanpek** and it amounts 164 ha.

Production of grass mixtures is not as intense as clover and lucerne production in municipalities of Lower Danube region. Municipality with highest areas under grass mixture is **Negotin** (764 ha), while the lowest areas are in municipality **Kladovo** and it amounts only 23 ha.

Production of corn for fodder have long history in world production of corn, but in Republic of Serbia is not so common. But is noticeable that areas under this production grows from year to year. Municipalities in which is spread this kind of production are **Negotin** and **Majdanpek**, until the less areas are notified in **Kladovo** and **Kučevo**.

Production of other categories of fodder in municipalities of Lower Danube region are not developed as the other, but they are also significant. Production of fodder rape, fodder roots, brassicas and other legumes is important from the aspect of preparing of qualitative meals for animal and possibilities for using the plant residues as a green manure.

Following reason to highlight the need of improvement of natural grassland as a factor of rural development in these area in presence of National park Đerdap at the area of Lower Danube region.

National park „Đerdap“ spreads on 63.608 ha and includes 43 highly protected species and 124 protected plant species and also many animal species. Biodiversity of this area represents an important link with countries of Eastern Europe since Carpathian area is located from Bratislava in Slovakia to Iron Gate, where Danube enters Romania, in length of 450 km. This could lead to creation of different strategies of sustainable development promotion in the countries - signatories of Carpathian convention.

In paper of *Jovanović and Bekić (2012)*, is emphasized that the Action plan for agro-biodiversity, instrument of Common Agricultural Policy (CAP), which is adopted in 2001 provides

the basis for introduction of biodiversity in European Union agricultural politics. Priorities of this plan are:

- Improvement and support of agricultural production favourable for environment and those systems which directly benefit biodiversity;
- Support to sustainable agricultural activities in area of rich biodiversity;
- Preservation and strengthening of favourable ecological structure; and
- Promotion of activities for the purpose of preservation of local and endangered cattle or plant species.

One of the tasks is taking care about qualities of natural grasslands (meadows and pastures), used for agricultural production or for some other human need. One of the limiting factors of the development of local areas may be:

- fragmentation of large individual holdings,
- poor farmers pooling of interests,
- lack of organized production and sales.

In the Lower Danube region, arising problems as a result of unplanned use of agricultural resources and negligent attitude towards the environment. Unplanned deforestation may threaten the biodiversity of mountain regions and cause erosion process, causing the damage on the surface layer of natural grasslands. Large number of old landfills and illegal waste can lead to contamination of groundwater. Underutilization of the potential for biomass production and obtaining bioethanol and biogas, complex administrative procedures, together with insufficient information producers and consumers may make the slow process of revitalization of the agricultural sector. Although these facts as alarming factor initiating the manufacturing process, with an orientation towards new methods of production management, preservation autochthonous species and the environment it will be possible to achieve a high level of development of rural areas.

## CONCLUSION

In area of Lower Danube region and their municipalities (Golubac, Negotin, Kučevo, Kladovo, Majdanpek), exist enough potential for agricultural production, with special emphasis on forage crop production. In the structure of used agricultural land, on the second place are meadows and pastures (24.733 ha). Municipality of Negotin and Majdanpek have highest share of agricultural land used for forage crop production and municipality of Golubac have the lowest one. Production is very diversified, but still agricultural producers rely their own production on production of clover and lucerne in big percentage. Due to the presence of NP Đerdap on the territory of Lower Danube region is concluded that there are no obstacles for rural development, from the aspect of natural resources.

With justified using of natural resources (water, land and air) in this area, managing of natural grasslands will lead to the sustainable rural development of all municipalities. On that way will be possible to expect that in near future accomplish main goal: highest yields of qualitative forage, environment protection and improvement of grassland managing.

## BIBLIOGRAPHY

1. Census of Agriculture. 2012. Book 1. Statistical office of Republic of Serbia, Belgrade.
  2. Jovanović Marijana, Vučković Savo, Potrebić Velibor. (2012): *Posibilities for rural development of agriculture in mountain areas of Serbia*. Сборник научных трудов по материалам Международной научно-практической конференции «Аграрная наука, творчество, рост». UDK 657:005.342, ISBN 978-591628-084-7.
- Kovačević (2010). *Savremenikonceptodrživograzvojojaplojprivrede*. AkademijainženjerskihnaukaSrbije. Predavanja. <http://ains.etf.rs/predavanja/Dusan%20Kovacevic%20predavanje%20AINS.pdf>

3. Marijana Jovanović, Bojana Bekić (2012a): *Lower Danube region as a model for application of the concept of sustainable agricultural development*, Thematic Proceedings from the International Scientific meeting „Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region“- preservation of rural values -, Tara 6-8.12.2012. pp. 398-416., ISBN 978-86-6269-018-0.
4. Marijana Jovanović, Slavica Arsić, Savo Vučković (2013): *Economic justification for use the green forage conveyor in production*. Journal Ekonomika. YUISSN 0350-137X, UDK: 338 (497,1). pp. 240-244
5. Nataša Kljajić, Slavica Arsić, Nada Mijajlović (2012). *Zemljište kao ekološki faktor poljoprivredne proizvodnje*. Tranzicija, Vol.14 No.29 Rujan 2012. ISSN 1512-5785 (Tisak), UDK: 330.142. Ekonomski institut Tuzla, JCEA Zagreb, IEP Beograd, Faculty of Agrifood and Environment Studies (BAES), Bucharest
6. Nikolić, M., V. Popović (2010): *The possibility of safe food production in protected areas*, XIV International Eco-Conference 2010, 22nd-25th September 2010. Proceedings, Ecological Movement of Novi Sad, p. 199-206.
7. Slavica Arsić, Marijana Jovanović, Vučković Savo (2013): *Voluminozna (kabasta) stočnahrana kao faktor ekonomskog unapređenja ovačrske proizvodnje u Srbiji*. Zbornik naučnih radova 2013. Radovisa XXVII Savetovanja agronoma, veterinarla, tehnologa i agroekonomista Vol 19, br. 3-4, str. 147-157, ISSN 0354-1320.

# SUSTAINABLE DEVELOPMENT OF OSTROV AREA, CONSTANTA COUNTY THROUGH RURAL AND WINE TOURISM

RADU ANDREI IOVA, ELENA LASCĂR<sup>1</sup>

**Abstract:** *The purpose of this paper is to discuss the conceptual and solid dimension of the sustainable development of Ostrov area, Constanta county, regarding the rural and wine tourism and wine, and their correlation and determination of the relationship between them. The research is both a theoretical one, which exposes the ideas on this aspect, but also a practical one, which can show the efficiency and sustainability of applying a development plan. The ultimate purpose is to provide a theoretical and methodological, but also an applicative background for the development of Ostrov area. The suggested aspects have a relevant importance for development, because it determines the areas that are attractive and repulsive, managing to highlight proposals for the development strategy of the area. This approach is based on the use of some qualitative data, analyzing and forecasting the dynamics of the commune and area, and the tourism potential generating image, and finally ideas to improve and promote the existing situation through an integrative management. The main theme of this paper is to highlight and capitalize the importance of Ostrov area, for which, through the rural and wine tourism, the sustainable development becomes a certainty.*

**Key words:** *development potential, sustainable tourism, rural tourism, wine tourism, wine tasting tourism*

## INTRODUCTION

The wine tourism is called generically also wine tasting tourism, or newly grape tourism. What is and what does grape tourism represent? One thing is certain, namely, that it goes around the same area, so much discussed and written, grape vine. In short, the grape tourism is the tourism segment that refers to all activities related to grapes.

This type of tourism has developed in our country recently, due to the European programs that have helped, by access to funds, to develop, first, the viticulture, and then, the tourism segment preceding the viticulture area. With the support of the European Union for the development of the vineyards, the consumer education for the Bacchus drink was only a step. By the thematic courses to complete the talent of taster, the profession of sommelier, of general notions about wine, it was sought to educate, a change in popular mentality, to make us consume wine, to know better the secrets of this liqueur, to respect it. Once the concepts about wine were learned, the need to know the vineyards directly was a serious motivation for the development of this segment of tourism. The wine tourism aims, firstly, to attract the wine lovers, connoisseurs, professionals in the area, but also the ordinary people who want to know the secrets of each vineyard. Analysing the mystery of wine tasting wine, learning about wine process, about the respective process, about the local customs and traditions in the area, is a crucial factor that the wine tourism, wine tasting tourism.[1].

## MATERIAL AND METHODS

As research methods, we used documentation, the analysis and data processing from a secondary analysis. These methods are based on the synthesis processes, induction and deduction, analogy and comparative analysis. Once the information was defined, known and interpreted, the next step was the detailed documentation of the interest area. In the analysis activity, the study of the documentation available for the area or for the analysed system is a starting point. This allows in the analysis to obtain the first knowledge and information. The documentation implied also the analysis of the legislation or the compared analysis of the various specialised sources.

The documentation, the analysis and the data processing and the information obtained from the following sources: monographic papers [3], scientific papers about tourism and agro-tourism [1,2], informative data collected from S.C. OSTROVIT S.A. [8], direct information, from the

---

<sup>1</sup>PhD Lecturer Radu Andrei IOVA, PhD Lecturer Elena LASCAR, University of Agronomical Sciences and Veterinary Medicine Bucharest, Calarasi subsidiary

inhabitants of the area.

## RESULTS AND DISCUSSIONS

**Ostrov** commune, **Constanța** county, is located in the South-Western part of Dobrogea, on national road DN3. It is bordered in the physical-geographical unit of South Dobrogea Plateau, sub-unit of Oltina Plateau, fragmented by short, deep valleys, finished by river coasts when flowing into the Danube – Bugeac Coast. In Ostrov commune area there is a very important economic factor Ostrov vineyard area. Ostrov Vineyard Area is in the region of the Danube Terraces (Region VII), near Greaca vineyard. This region is located mostly on the Danube terraces in the South-East part of the Romanian Plain and includes in its area, besides Ostrov and Greaca vineyards, also 5 vineyards centers in the vineyards: Aliman, Băneasa, Oltina, Ostrov, Greaca and 3 independent wine centers: Zimnicea, Giurgiu and Fetești [9].

From the existing documents there were no reliable data about the age of the vineyards in this vineyard in Ostrov. The natural complex conditions, so favourable for the vine, may be evidence that wine-growing was also practiced in this part of the country from ancient times. Ostrov vineyards area is located in the South-West of Constanta county, along the right bank of the Danube on the Upper Terrace, with a length of 30 km.

The hills presence and the Danube waters gives very good conditions for the grapes to reach full maturity and fulfil all the organic and physical-chemical characteristics in order to obtain high quality wines [2] .

S.C. “OSTROVIT” S.A. [3] is situated in the South-West part of Dobrogea and it lies on the territory of Lipnita and Ostrov commune. It borders the Danube river and the land border to Negru-Voda and Bulgaria. By crossing the Danube one can reach Călărăsi, that is located at a distance of 10 km. Compared to Bucharest, it is at a distance of 140 km, 140 km of Braila, 175 km of Galati, 135km of Constanta.

Its geographical location is favourable for the trade relations with Western and Eastern Europe countries; it has a specific microclimate that allows obtaining some products very important in ensuring a balanced and diversified food consume for the population in the area and in Bucharest.

The current owners have successfully managed to bring the vineyard and winemaking technology according to the European standards, so that the way to follow in order to achieve a high quality wine to meet the most demanding conditions, bottling of „Ostrov Vineyards” can be done in its own cellar.

The wines produced in this vineyard have noble and original features which gives them a strong and distinct personality. The wines in „Ostrov Vineyards” respect and promote the quality requirements of the European Union. High quality guaranteed by the European Union by certification confirming the name of controlled origin and the geographical indication. Wines range in „Ostrov Vineyards” by its wide variety can satisfy the most demanding tastes, so the slogan is ... **Wine ... for you!** Ostrov Vineyards is the brand under which Ostrovit SA produces wines in Ostrov Vineyard.

The varieties that are grown in Ostrov Vineyards are the following: *Merlot, Cabernet Sauvignon, Fetească Neagră, Pinot Noir, Syrach* and *Rebo* for red wines. For white wines the varieties grown are: *Sauvignon Blanc, Chardonnay, Pinot Gris, Fetească Albă, Fetească Regală, Riesling Italian, Muscat Ottonel* and *Crâmpoșie* [4].

The main wine ranges, *Ostrov Vineyard brand* are the following: *Ostrov Vineyard Reserve, Cetatea Durostorum, Canaraua Fetii, Domeniile Ostrov, Cosa di Vino, Premiat, Labyrinthum* and *Vinaria Ostrov*.

At present, *Ostrov Vineyards* has an agricultural surface of 2000 hectares, a wine area of 1300 hectares (including wine centers Ostrov și Lipnița, Constanța county, situated on the left bank of the Danube, at Romania border with Bulgaria), 500 hectares orchards (apricot, peach, apple, plum, cherry, walnut), vegetables have a surface of 200 hectares. Ostrov Vineyards Area includes two wine stations: Ostrov Wine Cellar [8] is located in Regiei street, Ostrov commune, near the

customs Ostrov, acting as wine storage and bottling. Ostrov Wine Cellar is the vital center of Ostrov Vineyards Area. The precinct, with an area of 27,000 m<sup>2</sup>, is about 700 m from the ferry and „*Ceas bun*” terrace in the national road DN3. Ostrov wine cellar has the following visit objectives: a modern *wine station*, at European standards (primary winemaking with a capacity of 150 t/day, with an automatic production process, storage 450 wagons in *three wine cellars* in polstif tanks of one two or three wagons); *cold bottling plant* (12 million of conventional bottles/year and bag-in-box packaging); basement for wine aging barrel (60 oak barrels from France, for wine varieties Sauvignon Blanc, Chardonnay, Cabernet Sauvignon, Merlot; *laboratory for physical, chemical and wine analysis*; tasting room, administrative meetings, dinners, folk and fashionable events; *outdoor space*, complementary salon.

Inside the wine cellar there is also a *distillation plant*, with a copper cylinder with 7 segments (for occasional and exclusive products for personal consume); concrete tanks for storing grape marc, lees and wine.

The second station is **Lipnita Wine Cellar** [8], located when leaving Lipnita village, 27 km from Ostrov Wine Cellar, having the role of wine and wine storage. „Wine Cellar”, we use the term as a generic, it is an example of combination of culture, industry, business and tourism. The visit to the wine cellar involves presenting old and new technological process, also tasting the famous Dobrogea pie takes place here. It has a primary wine of 200 t/day and a storage capacity of 850 wagons in concrete, polstif and steel tanks (interior and exterior). 30 Romanian oak barrels wait to enter the circuit.

An interesting thing is that Lipnita Wine Cellar is the fact that there are three types of technologies in different periods of time, namely: the 70s period, represented by about 10000 1 Romanian oak wood barrels, the 80-90s period, represented by polstif tanks, and the current technology represented by the stainless steel tanks.

The administrative building houses the former *grape crushing and pressing station*, waiting to be exploited from tourist point of view. The building structure, the dimensions of the existing spaces with the mentioned industrial archaeology plant, the constructive outbuildings, on-site storage, single-family and duplex houses outside the premises of Wine Cellar, prison relics that provided most labour force during the Communist period (along with the pioneers, students, military), lead to the organization of an interesting **Wine Museum**.

Ostrovit producer has implemented the requirements of the standard of Good Agricultural Practice (GAP) on the entire chain of production, being authorized EUREP GAP - the world leader in the standards of Good Agricultural Practice (GAP).

During 2005-2013, at Ostrov Vineyards Area, an extensive investment program was achieved, both in terms of conversion of vineyards and orchards and providing them with specific equipment (viticulture and orchards equipment, irrigation systems) and the modernization of the two wine stations.

From 2005 until now, at Ostrov Vineyards Area 24 million euros were invested [8]. The money was used for the conversion of plantations (strong start, but later in the competition with the large vineyards from Cotnari, Jidvei or Murfatlar) by successive annual programs, irrigation systems, providing equipment and specific equipment. Also, the two wine stations, Ostrov, respectively Lipnita were brought up to modern standards. Slowly but surely, the wines from Ostrov Vineyards have their honourable place on the national market, even international market. Clearly, Ostrov Vineyards recovered, largely, the delayed start to compete the high quality wines.

The investments in the modernization and acquisition of fixed assets, every year in the analysed period, determined also a reduction of profit, these investments being achieved based on the obtained results. In Figure 1, it is presented the number of employees in the analyzed company. It is found out that in 2012, the number of employees increased by 81% compared to the previous year, then, the following year, decreased to 72%, following the reconsideration of the staff policy and of the company financial situation.

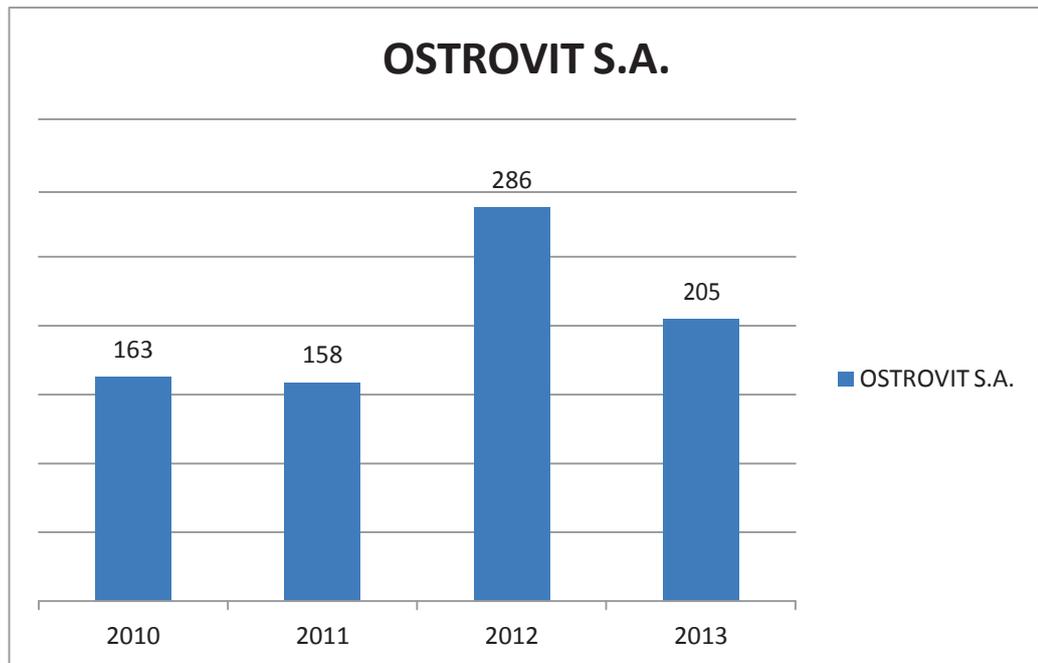


Fig. 1. Evolution of the number of employees [8]

As it is shown in figure 2, the turnover has the oscillations from one year to another. In the analysed period, 2010 records the highest turnover, and year 2011, the lowest value. The situation improves in 2012, but, following the replacing of the old plantation of wine and trees [8] it decreases in 2013, to 81% compared to the previous year.

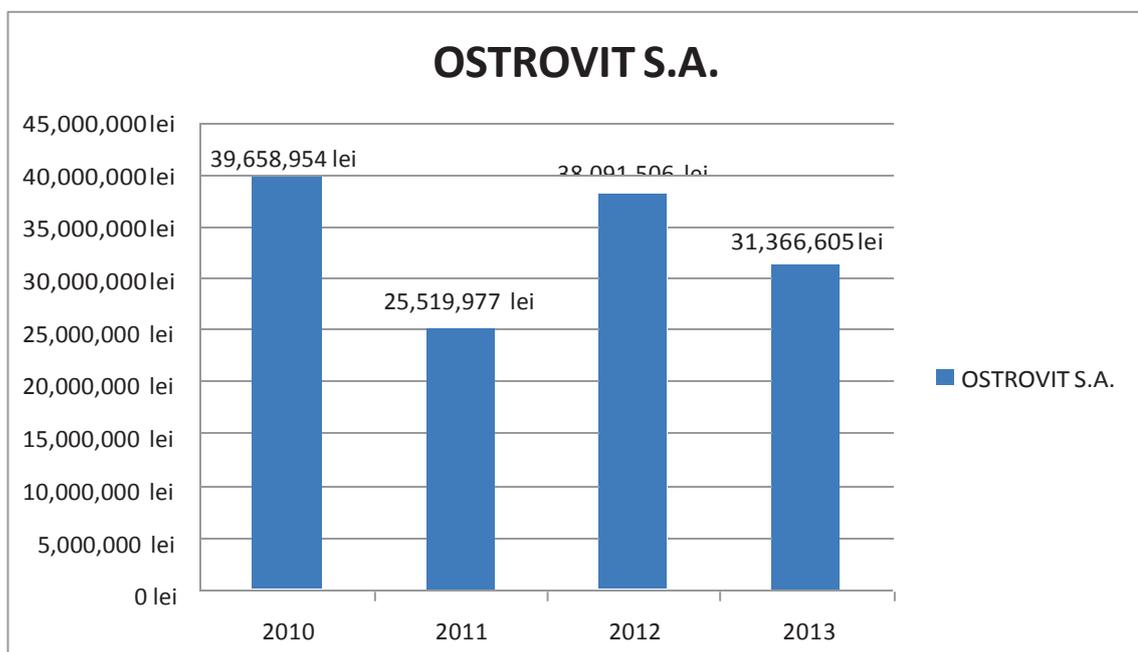


Fig. 2. Evolution of turnover [8].

In the analysed period, we see that, except for 2013, each year the income exceeds the costs and the company obtains profit. Net profit margin decreased from 1.13% in 2011, to 0.35% in 2012 and to - 4,98% in 2013, as it is shown in figure 3.

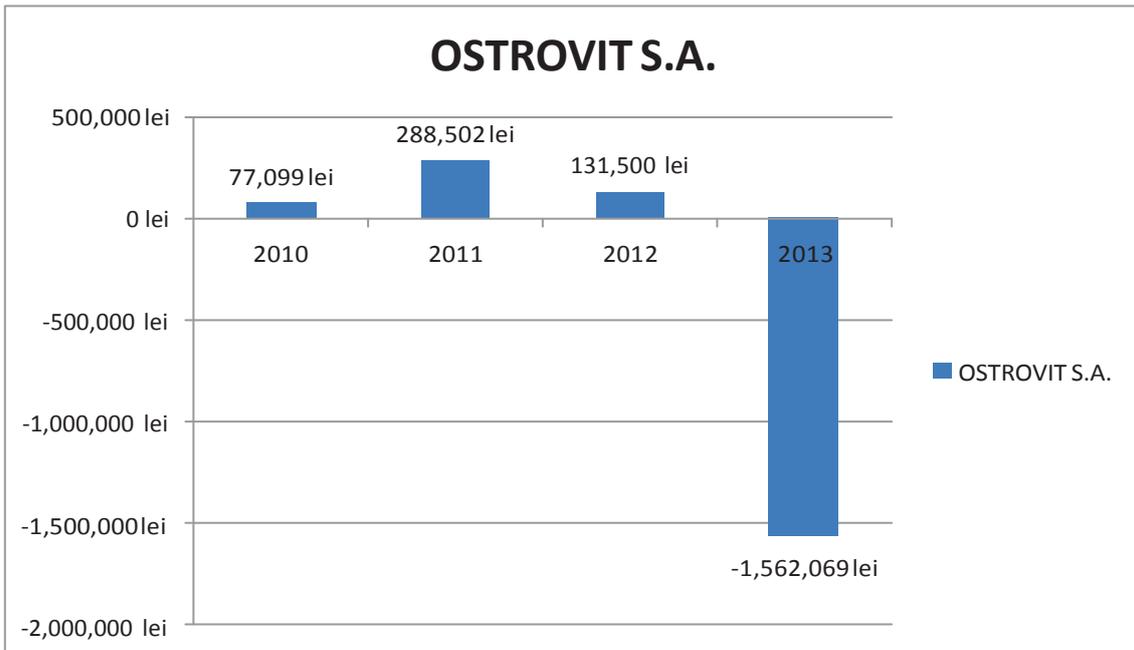


Fig.3.Evolution of net profit [8]

As regards the tourism [5], Ostrov Vineyards Area benefits by a rich cultural heritage represented by the churches in villages Bugeac and Ostrov, Durostorum archaeological site, the remains of the Byzantine fortress Păcuil lui Soare, cemeteries, such as those in Bugeac and Ostrov, and others. Ostrov commune also has a valuable natural tourism potential that is considered as a rich local resource and it provides the opportunity to develop a sector with positive results for the local economy. It is noted a striking similarity with the Danube Delta by numerous islets, with arms and separating channels, winding, created by the Danube water, vegetation and fish fauna characteristic to the Delta [9].

This rich and expressive presentation of the tourism potential was a motivation for which Ostrov Vineyards Area decided to launch also in tourism, especially in wine tourism. A tourism so fascinating that covers almost all types of tourism. The purpose is to attract to the area tourists who know the art of wine but also ordinary people that can be initiated to this fascinating way.

## CONCLUSIONS

A visit to a wine cellar organized in a detailed manner, or rather, free, provides the opportunity to learn some technical aspects of wine making and the cultivation of the vine. This enables in the same way the tourist to get acquainted with a great diversity of landscapes without being deprived of the luxury of a comfortable accommodation and a good meal [3]. The consumers benefit, among others, by a practical advantage, which is to taste the wine before buying it and buying special types which are not on the market.

In Romania it is also considered the exploitation of the important recognized wine potential of our country, by organizing visits for tourists, with tasting at wine cellars in famous vineyards [6].

The Ministry of Tourism [7] performs in this regard special actions to promote the program „**Romania – country of wines**” by the participation in international fairs and exhibitions and publishes various information materials. Among the areas covered by the program there are included vineyards from Murfatlar, Niculitel, Valea Calugareasca, Vinju Mare, Potelu and Ostrov.

Moreover, Romania is in the top ten wine countries in the world. And this is normal, because many ancient sources attest that the vine, and of course, the wine enjoyed a great attention among the Dacians. Maybe too much attention, since Burebista (82-44 BC) had, it seems, to give

order that vine roots to be removed from the large areas of land [4]. And last but not least, our country offers fantastic views and unforgettable wine roads.

The tourism potential is quite large in terms of tourism sights that Ostrov area has. The religious, historic, natural sights are striking reasons for attracting tourists to the area, and for the development of the rural tourism. But Ostrov area comes with something in addition to the other area, and that is wine tourism represented by Ostrov Vineyard. Ostrov Vineyards Area was able to take advantage of the tourism potential of the area, developing, besides the agricultural chain, the tourism sector, by building a very important complex of hostels, hotels, recreational facilities and a program to start the wine tasting. All these are prerequisites for the success of the implementation of wine tourism.

The recommendations that support the development of this sector are the following: first is the need to promote. Promotion is through its website through advertisements both on TV and radio stations, a comprehensive operational and marketing program is needed for the direction Ostrov Vineyards Area has to move. Another way is to participate in fairs and wine tourism promotion with brochures, flyers, sheets for vineyard and pensions presentation, which presents the vine offer, the wine offer and thus promoting the area too. Another recommendation is to organize wine festivals, where advertisement, promoting the area is more practical.

The wine tourism in Ostrov area, represented by Ostrov Vineyards Area is vital for the area, because it is a quite important potential economic factor, and this should be speculated by all major stakeholders in the political, economic and legal sector.

## BIBLIOGRAPHY

- [1] Crețu Daniela, Neagu Cecilia, Constantin Dumitra-., Sustainable development of the rural communities by promoting the agrotourist activities” Do-Minor Publishing Bucharest 2008-ISSN 1844-5640, International Scientific Symposium ”Prospects of agriculture and rural areas development” –pg.390-395, The Research Institute Agriculture Economy and Rural Development, Bucharest.
- [2] CREȚU Daniela, IOVA Radu Andrei, CONSTANTIN Dumitra, NEAGU Cecilia “Sustainable use of local resources in the rural area, by agro tourism-International Symposium – Competitiveness of Romanian agriculture in the process of European integration, 5-6th June 2009 , Bucharest ” - Ars Academica Publishing, Bucharest 2009-ISBN 978-606-8017-25-9, pg. ” pg. 143-150, The Research Institute Agriculture Economy and Rural Development, Bucharest.
- [3] Cotea, V.D., N. Barbu, C.C. Grigorescu, Dobrogea vineyards and vines, Bucharest 2003, p. 289
- [4] Cotea, V.D., Florin Andreescu, Romania – Country of wine, Bucharest, 2008, p. 176
- [5]\*\*\* „Ostrov – past and present – monographic pages”, elaborated under the project EU-RO-Formare Ovidius, funded by the European Union, 2008-2009,
- [6] \*\*\*Analysis of current situation NDP 2007-2013, General Direction of Rural Development, management Authority for NPRD [http://www.madr.ro/pages/dezvoltare\\_rurala/](http://www.madr.ro/pages/dezvoltare_rurala/)
- [7]\*\*\* <http://www.ministerulculturismului/program/romania-taravinurilor/>
- [8]\*\*\* Financial and statistical situations - S.C. Ostrovit S.A.
- [9]\*\*\*<http://www.primariaostrovconstanta.ro>.

## RURAL AND HISTORICAL TOURISM IN DOBRUDGEA

ELENA SIMA<sup>1</sup>

**Abstract:** *By its geographical location, the rural area from Dobrudgea has a diversified tourism potential, provided by the contrasting natural environmental factors, ranging from the oldest to the youngest relief units, natural protected areas, balneary resources and cultural, historical, religious sites, as well as multicultural local customs and traditions of the rural area. This potential can be used under various forms in the rural area: cultural tourism, historical tourism, religious tourism, ecotourism, fishing tourism or bird-watching tourism, as well as other kinds of rural tourism. By linking these tourism resources and tourism forms, tourism routes can result, which, together with the local customs, traditions and cuisine may contribute to the social and economic development of Dobrudgea's rural area, through sustainable tourism as an alternative to seasonal seashore tourism.*

**Key words:** *sustainable tourism, rural area, economic development, Dobrudgea*

### INTRODUCTION

The essence of human society sustainable development is given by the present and future management modality of the natural, energy, material and informational resources, in relation to the economic growth objectives, providing for an increasingly better quality of life and environment. One of the main sustainable development challenges is to find ways to encourage the environment-friendly economic activities, to discourage the activities that bring about environment deterioration (Zaman, Gherasim, 2007).

Since its emergence, in 1987, the sustainable development concept has targeted all the economic and social life activities. In the conditions in which, in the European Union, 50% of the population of the member states lives in the rural areas, which cover 80% of its territory, getting aware of the complex problems of the rural space needed to attenuate the main discrepancies and to establish certain socio-economic connections between the urban and the rural areas. On the basis of this desideratum, guidelines and programs were designed that led to the shift of focus from the agrarian policy to the rural development policy.

One of the rural development policy objectives of the European Union has in view the *development of certain job-generating complementary and alternative activities*, in order to counteract the depopulation of agricultural areas and to strengthen the economic and social substance of rural areas; one of the principles that lie at the basis of the rural development policy is that referring to the multisectoral and integrated approach to the rural economy, in the sense of *diversification of activities*, creation of *additional income and employment sources*, as well as rural heritage preservation.

It is under this framework that the *rural tourism* has developed, which became an "industry" that allows for cash receipts in national and foreign currencies, contributing to local community development by the creation of new jobs (P. Nistoreanu, 1999).

### MATERIAL AND METHODS

The Romanian rural economy has a preponderantly agricultural character, yet most farmers are involved in part-time agriculture, spending insufficient time on farming activities. The non-agricultural economy (industrial SMEs, services, rural tourism) has a low share in rural Romania, and the rural tourism is quasi-non-existent, except for in certain mountain zones and in the Danube Delta.

The objective of this paper is to highlight the tourism potential and the tourism market development in Dobrudgea's rural area. The motivation for selecting this area is that for most of us Dobrudgea means the Black Sea shore with its resorts or the Danube Delta with its priceless biodiversity, but between the Danube and the Black sea there is a territory that represents a true

---

<sup>1</sup> Institute of Agricultural Economics, Romanian Academy, Bucharest, elena.sima2008@yahoo.com

reason for a travel in space, time and spirituality, where nature, history, creed and traditions are intermingled, forming a unique picture.

The study starts from the premise that the specific resources of Dobrugea's rural area are not fully and appropriately put into value. The methodological approach includes the identification of the "territorial tourism capital" of the rural settlements from Dobrugea located outside the influence zone of the Black Sea shore, where the "cultural-historical potential", by association with the other resources, can contribute to the concrete actions of implementing the proposed strategic objectives for shaping the community future as integrating part of the rural development policy of Dobrugea's space. The research methods used are the inventory-type analysis of the usable resources in the rural tourism and the cause-effect explanation of the investigated phenomenon. The analysis of the cultural-historical tourism potential of Dobrugea's rural area is based on data and information obtained by bibliographic documentation and field visits. The main investigated elements are the tourism resources with cultural-historical character, the existing infrastructure, the opportunities for rural tourism organization and practice, as well as the possibilities of licensing and certification of qualified staff for different tourism activities in the rural area.

For the researcher of the contemporary rural phenomenon, the investigation of relations that exist between the environmental and social factors, at local level, makes it possible to define the necessary mechanisms for the sustainable development of tourism activities that should contribute to the increase of the number of jobs and of alternative incomes, as well as to the increase of rural space attractiveness.

## RESULTS AND DISCUSSIONS

The rural tourism is a segment of the tourism sector. This includes tourism-related practices, while facilitating people's coming into contact with the beauty of nature, earth's richnesses and local people's hospitality. The natural and anthropic tourism resources of a certain area generate specific tourism forms, which complete each other within the different destination categories. The historical tourism is a niche of the rural tourism, insufficiently exploited at present. Our country's territory has a great variety of cultural-historical values (folk art, ethnography, folklore, traditions, historical relics) located in a harmonious natural environment, with a various and picturesque landscape.

Dobrugea is a Romanian historical province located between the Danube and the Black Sea, consisting of two counties from the administrative point of view: Tulcea and Constanța. At present, the economic system specificity and the functional typology of Dobrugea's settlements are determined by the utilization of local resources as well as by the distribution and territorial absorption of the foreign financial support for investments.

Dobrugea's tourism vocation is equally conferred by its geographic position, characterized by a beautiful and diverse landscape, as well as by the cultural-historical profile of the region, with rich and various archaeological remains and historical monuments. Located at the confluence of several pan-European transport corridors and benefitting from the generous proximity of the Danube and Black Sea, the two counties – Constanța and Tulcea, can easily develop a whole set of tourism products, namely: summer tourism, balneary tourism, recreational tourism, sport and nautical tourism, scientific and business tourism, cultural tourism and history-oriented tourism (for those who want to visit the archaeological sites), as well as cruise and itinerary tourism. Another important characteristic is represented by the harmonious blending of the old and new, of tradition and modernity. This complementarity makes Dobrugea more attractive to tourists and gives them the possibility to know and understand the history and tradition of the places they are visiting.

**The rural settlements with tourism potential in Dobrugea** cover the largest part of Dobrugea (72%). In the case of *Tulcea county*, 83% of the territory is represented by natural areas of high scientific and landscape value (the Danube Delta Biosphere Reserve, Măcin National Park, the Danube river plain) and the cultural-historical heritage (the relics alongside the Danube, Niculițel, Adamclisi, Enisala, Baia centers). *Constanța county*, by the balneary and cultural

potential from the southern part of the Romanian coastline and the historical, cultural and religious resources from Oltina Plateau, accounts for 59% of the remarkable tourism potential. Tourism developments are found in the perimeter of resorts, of the urban or rural localities or on isolated basis, depending on the potential resources that require their existence.

*Two areas for the rural tourism practice* can be delimited in Dobrudgea: 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, which use the rural tourism potential for the gastronomic, ethnographic, historical, religious and scientific tourism practice.

The rural settlements feature tourism interest depending on the natural environment factors, on the historical and cultural conditions in which they evolved; putting into value the tourism attractiveness elements is strongly influenced by the access possibilities, which most often represent an important constraint. In most villages with tourism interest, mainly in those located in zones with complex high value tourism potential, there are more than two–three potential travel motivations (villages of balneary, fishing and hunting, cultural-historical and religious, ethnographic, viticultural interest). Most rural localities have a complex tourism potential and the differences between these stem from the main attractive elements. The isolated settlements have a strictly tourism function and put into value the natural potential from their proximity.

**The natural tourism potential of Dobrudgea** is represented by the Black Sea shore, the Danube Delta and the wetland of the river and sea zone of Dobrudgea, the continental Dobrudgea, the lakes with therapeutical or recreational value, a specific bioclimate and numerous protected areas.

The Romanian Black Sea shore comprises two sectors, namely:

- a sector subject to intense abrasion and to alluviation, consisting of fragile seashore areas, with the largest natural beach in the country (between Sulina and Sf. Gheorghe) and with the largest lakes from the country (area of the former bay Halmyris): lake Razim (415 km<sup>2</sup>), lakes Sinoie (171 km<sup>2</sup>), Golovița (118 km<sup>2</sup>) and Zmeica (55 km<sup>2</sup>);

- another sector, which begins south of Cape Midia, comprises seashore areas, bays, capes and beaches, sometimes protected by stone dykes built up to diminish the sea abrasion; from the morphological point of view, this can be delimited into two subsectors: the former between Cape Midia and Constanța with a transition area from the low coastline with accumulation of sediments from the Danube to the high coastline with Sarmatian chalkstone cliffs and the latter between Constanța and Vama Veche, a high seashore with cliff (up to 40 m high), shaped into limestone and loess, fragmented into bays and promontories.

The wetland of the river and sea zone of Dobrudgea is one of Romania's most important tourism destinations, comprising 3 types of areas: low areas (the Danube river plain and the Danube Delta), lagoons (the Razim-Sinoie complex) and coastline (south Dobrudgea seashore).

In Dobrudgea, the Danube course is about 409 km long, lying from the western part of the locality Ostrov to Sulina. The high banks that neighbour the Dobrudgea Plateau (in the west and north) have steep slopes that are 70-100 m high, sculptured in hard rock formations (green crystalline schists, granite, limestone), which are most often buried into recently formed sediments. The Danube Delta and the lagoon complex Razim-Sinoie is the largest wetland area from Europe, with an original landscape of great tourism attraction and scientific importance.

The morphological aspects of continental Dobrudgea define a contrasting environment from that of the wetland areas, characterized by a rigid relief with different geological structures adapted to the continental climate, with strong dryness. The old Hercinic mountains, forming the highest area of Dobrudgea, provide a landscape with angular mountain ridges with ruiniform aspect and pyramid-like peaks, mainly in the sectors where the forest vegetation is absent. South Dobrudgea is characterized by even flat areas connecting the valleys deepened into limestone and loess deposits, where sometimes they form miniature canyons.

The hydrographical components with landscaping, therapeutic and recreational value are represented by the sea water, maritime limans, temporary rivers, the Danube – Black Sea Canal. A few littoral lakes (Taşaul, Siutghiol, Tăbăcărie, Techirghiol, Tatlageac, Mangalia) feature a landscape with steep banks sculpted in limestone, bays and promontories, being fed by permanent or temporary rivers and groundwaters and in certain cases they have sapropelic muds used in thalassotherapy.

The bioclimate of Dobrudgea's wetland is characterized by comfortable cool temperatures influenced by the aquatic areas and it has two subtypes: *the seashore subtype* with therapeutical qualities in the period May-September and the *river plain type*.

The contrast between the areas with rich vegetation from the floodable areas or the compact forest massifs from north-east and rare floristic associations from the coastal areas and the steppe inside the plateau represents a high attractiveness of natural resources. In the plateau part, there is a great number of flower species (over 50% of Romania's flora), steppe and forest steppe species, deciduous and deciduous-resinous xerothermal forests, deciduous and deciduous-resinous mesophilous forests. The bird populations from the Danube Delta, the lagoon spaces and the coastal zones of the Black Sea are represented by 325 species. The ichthyological fauna (about 130 species) has an economic and tourism interest, with fish classes differentiated by the aquatic environment (fresh, brackish, saline).

Dobrudgea has 85 protected areas, including integral protection areas from the Danube Delta Biosphere Reserve and the Măcin Mountains National Park: 1 national park, 53 natural reserves, 19 scientific reserves, 12 natural monuments. The Danube Delta Biosphere Reserve accounts for 31.6% of the total surface of protected areas from Romania.

**The tourism ethnocultural patrimony** reunites the material and spiritual culture of the past and present, which makes out of Dobrudgea a genuine *museum in open air*, and many monuments, archaeological sites and architectural assemblies are included in 46 protected areas. The *archaeological relics* of ancient times can be known by visiting the remains of human settlements established by the pre-historical, Geto-Dacian, Greek and Roman civilizations or the indoor or open-air museum collections. Among these, the remains of the ancient towns Histria, Tomis and Callatis have a particular importance, completed by the discoveries from Halmyris, Arrubium, Dinogetia, Beroe, Aegyssus, Noviodunum, Tropaeum Traiani, Capidava, Carsium. The main historical objectives from the Byzantine period are the mediaeval citadel Păcuiul lui Soare (dating back from the 10th – 11th century), Citadel Heracleea from Enisala (13th century), rebuilt by the Genovese, the rupestral complex from Basarabi (10th century).

The *religious* tourism objectives include worship places and cemeteries belonging to several religions and represent attractiveness elements by the significance of feasts (titular saints), age of settlements and architectural style, location. New worship places were added to the old monasteries Cocoş (1833), Celic Dere (1835), Saon (1846), Techirghiol (1928) and Dervent (1936), namely (the Cave of Saint Apostle Andrew, Cave of Saint Ioan Casian, Halmyris-Saints Epictet and Astion, Monastery Saint Helen by the sea) with important religious significances. In the southern part of Dobrudgea, where Turkish and Tartar communities are living, there is a large number of mosques and Muslim places of worship.

The numerous *ethnic communities* created an original material and spiritual culture in which we can notice the traditional houses from reed and earth from the Danube Delta. Of great importance for the cultural tourism, we can mention the archaeology museums (Adamclisi, Istria), art museums (Limanu, Topalu), ethnographic museums (Enisala), scientific and technical museums, memorial houses (Panaghia-Babadag and Panait Cerna, in Tulcea county). The hydrotech constructions (bridges, lighthouses, the Danube – Black Sea Canal and Sulina) stand out in the landscape of the areas where they are located.

**The cultural-historical tourism in the Dobrudgea's rural area** has as main objectives the archaeological sites from Adamclisi, Enisala and Histria. Yet, on Dobrudgea's territory there are more archaeological sites that are not put into value from the tourism point of view. Among these, we can also mention the citadels that are part of the military fortification system on the Danube

border in the Roman Empire period. On the right bank of the Danube, from Ostrov to Tulcea, the following archaeological sites can be visited: Durostorum-Ostrov, Altinum-Oltina, Sucidava-Dunăreni, Axiopoli-Cernavoda, Capidava, Ulmetum-Pantelimonul de Sus in Constanța county, Noviodunum-Isaccea, Dinogeția-Garvăn, Troesmis-Turcoaia, Aegystus-Tulcea in Tulcea county. The sight of these can be compared to that existing in many other places from Europe that are visited by tourists.

The main practiced tourism routes are the following:

*Tourism route Constanța – Murfatlar – Adamclisi – Ion Corvin – Ostrov – Ion Corvin – Cernavodă – Murfatlar – Constanța*, with the objectives: Murfatlar vineyard, Vine and Wine Museum, Murfatlar wine cellars, floristic reserve Valu lui Traian, Monastic complex Basarabi sculpted in stone, floristic reserve “Fântânița-Murfatlar”, Triumphal monument from Adamclisi, Monastery “Saint Apostle Andrew’s Cave”, Derwent Monastery, Canaraua Fetii reserve, Esechioi forest, Byzantine citadel from “Păcuilui lui Soare”, lakes Bugeac, Vederoasa, Oltina, fossiliferous points alongside the Danube (fig. 1);

*Tourism route Constanța – Iistria – Baia – Babadag – Enisala – Murighiol – Tulcea – Niculițel – Măcin – Ciucurova – Baia – Constanța* with the objectives: Histria and Enisala citadels, monasteries Celic Dere, Saon, Cocoș, Uspenia, Basilica with martyricon from Niculițel, National Park Măcin Mountains, archaeological reserves alongside the Danube (fig. 1).



Source: Popescu M., Urdea Cornelia-Maria, 2012

Fig. 1 The main routes with rural tourism potential from Dobrugea

For each route, specific tourism packages can be provided, in which the traditions and customs are accompanied by Dobrudgian cuisine preparations as well as wine tasting from the famous vineyards of the region. At the same time, in the tourism region Dobrugea, tourism programs can be established for putting into value the tourism potential in the rural areas throughout the year, with a higher frequency in the warm season for the tourists coming to the seashore.

## CONCLUSIONS

As a multifunctional space, Dobrudgea has been and will continue to be mainly a human *living territory* (rural settlements) and a *social space* (resting, recreation, conviviality/tolerance relations) for the local communities. At the same time, the Dobrudgean space is also an *economic space*, providing agricultural land and other resources as production and existence means.

A space identity results from the topographic, landscape, historical, cultural and economic identities that have to be taken into consideration in the territory management actions for tourism purposes. The tendencies of rural area development for tourism target the southern part of the seashore, the low seashore area, the localities alongside the Danube and those from the Danube Delta. The diversity of (natural and cultural) attractive resources from Dobrudgea represents the premise for the development of certain complex tourism forms and types, from classical ones (balneary, recreational and rest tourism) to specific forms (eco-tourism, rural tourism). The accessibility of resources creates regional differences that are reflected in tourists' circulation, development of specific material base and of practicable tourism forms.

The rural settlements alongside the main transport axes have developed transit tourism forms and the role of coordination of activities. The territorial distribution of tourism infrastructure is highly differentiated – an excessive concentration in the southern part of the seashore and highly dispersed in the Danube Delta. The recreation facilities can be found in the tourism resorts at the sea shore, and their absence in other zones is due to the low number of tourists. Although at first sight the landscape from Dobrudgea is rather dull, there are natural resources and objectives in the rural areas, which could be put into value for tourism purposes. An advantage could be represented by the rustic buildings, with traditional architecture, typical for this region.

The rural people, the small entrepreneurs and the representatives of townhalls from the rural localities with tourism objectives are interested in their utilization for tourism purposes and are willing to revive old customs and habits, which can attract tourists: wedding customs, local people's evening reunions with recreational purpose, vine and wine festival. If the small entrepreneurs attended free of charge courses in local traditions that were offered to them, they would find sufficient resources, funding programs and maybe sponsors who should invest more for their village to enter the rural tourism circuit.

Investigating Dobrudgea's rural area, we shall find out that this is the depository and preserver of an inestimable thesaurus of architecture and art with historical monuments and relics, as well as of a high value ethnofolkloric heritage. In this context, the rural tourism, as alternative to the seasonal seashore tourism, does not depend to the same extent on the seasonality that characterizes the classical tourism from Dobrudgea and can contribute to the socio-economic development of the rural area.

## BIBLIOGRAPHY

1. Bordânc Floarea. (2008). *Analiza regională a spațiului rural dobrogean*, București: Editura Universitară.
2. Ciangă N. (2001). *România. Geografia Turismului*, Cluj-Napoca: Editura Presa Universitară Clujeană.
3. Căndea M., & Bran F. (2001). *Spațiul geografic românesc. Organizare, amenajare, dezvoltare*, Editura Economică,
4. Glăvan V., (2003), *Turism rural. Agroturism. Turism durabil. Ecoturism*, București: Editura Economică.
5. Ionașcu V. (2011). *Dobrogea. Studiu de geografia turismului*, București: Editura Universitară.
6. Nicoară V. (2006). *Dobrogea. Spațiu geografic multicultural*, Constanța: Editura Muntenia.
7. Popescu M., Urdea Cornelia-Maria. (2012). *Rolul turismului în dezvoltarea economiei spațiului rural dobrogean*, in Otiman P.I., Toderoiu F., Sima Elena (Editura Academiei Române, București) *Economie agroalimentară și dezvoltare rurală în România, implicații ale Politicii Agricole Comune asupra securității alimentare* (pp. 539-547).
8. Trușcă C., Bran F., & Martinescu D. M. (2009). *Ecoturism și turism rural*, București: Editura Alpha MDN.
9. <https://sites.google.com/site/cetatidobrogea/tomis>

## ANALYSIS OF THE IMPORTANCE OF THE MEREI PARISH IN THE TOURISM AND AGROTOURISM IN BUZAU COUNTY

Necula Diana<sup>1</sup>, Necula Raluca<sup>2</sup>

**Summary:** *The paper is analysing the evolution of the main indicators that characterize tourism and agrotourism in Buzau County, emphasizing the contribution that the Merei Parish has in attracting tourists in this area, by calculating the weight held by the number of the touristic structures, of the housing capacity, the arrivals and overnights of the tourists from the registered total in Buzau County. The Merei Parish represents one of the key points of attraction for both Romanian and foreign tourists, benefiting from many views, a treatment resort, an area that is favorable to the development of the majority of types of tourism, including agrotourism, also being an area where agrotouristical activities can take place and high quality products can be produced in order to trade them in boarding houses.*

**Key words:** *tourism, agrotourism, Buzău Parish, Merei County.*

### INTRODUCTION

For its historical significance and especially for the very beautiful mountain and hill areas, Buzau County is a special attraction for the tourists who come to spend their spare time here.

Regarding tourism potential, Buzau County stands out because of some landscapes of a beauty that is rarely seen in Romania. When you say Buzau, you think, first of all about the Mud Volcanoes, about the cave settlements and about Sarata Monteoru resort from Merei Parish.

The Merei Parish has a special sightseeing potential, due to the existence of the Sarata Monteoru balneary resort, of the oil mine, unique in Europe, of the arboretum set in the Monteoru mansion's yard.

Sarata Monteoru was chosen to be the representative headquarters in Buzau County, because of the fact that it is one of the main tourism attractions in the County, this destination having an enormous potential in attracting foreign tourists, but it's conditioned by the service offerings which has to be adapted to the international demands and standards.

The resort is famous for its salted, iodided, brominated, magnesian, sulphurous, calcic mineral water springs and for the submission mineral mire from the natural sulphurous springs. These are indicated in the treatment of the locomotor apparatus conditions, in the gastrointestinal conditions, hepatobiliary.

Another point of attraction for the extreme sport lovers, is the biggest zip line in the country, 200 meters and another of 40 meters for children. Also, a climbing wall, as well as a bike renting center in order to be able to visit all the attractions in the area.

### MATERIAL AND METHODS

The indicators that were used emphasize the evolution of the studied data studied by analysing the period's averages and growths throughout each year.

**Dynamic analysis** (housing capacity-CC)

Abnormalities in absolute measures: with a fix base:  $\Delta CC = CC_n - CC_0$ ,

Fix base indexes :  $I_{CC} = (CC_n / CC_0) * 100$

For this one, it is considered one of the variables as an independent variable or a predictor variable (t), and the other variable as a dependent variable or response variable (nr/an).

The formulas that are used to calculate these indexes are:

For the arithmetic mean =  $\bar{x} = \frac{\sum x_i}{n}$  ; in which :  $x_i$  = average values on a number of years;  
n = the number of years taken under consideration

<sup>1</sup> Scientific Researcher, Necula Diana, ICEADR, necula.diana@iceadr.ro

<sup>2</sup> Assistant Dr. Necula Raluca, USAMV-Bucharest

The annual rate of growth =  $r_{2003-2013} = \sqrt[11]{\prod (p_1/p_0) - 1}$ ; where :  
 $r_{2003-2013}$  = annual rate;  $\prod p_1/p_0$  = growth linked indexes.

## OUTCOMES AND DISCUSSIONS

### 1. The evolution of the tourist accomodation structures

The tourist accomodation structures are defined as: Any constructions and appliances intended, by design and execution, for accomodation or for serving meals for tourists, together with the associated specific services.

The tourist accomodation structures include, apartment hotels, motels, youth hostels, hostels, villas, cottages, bungalows, holiday villages, trailer camps, apartments or rooms for rent in family homes or in buildings with another destination, river and sea ships, touristic boardings and agrotouristic boardings, other units with tourist accomodation functions.

By analysing the evolution of the tourist accomodation structure types in Merei Parish from Buzau County (table nr.1) it's found that that from the reference year 2003 until 2013 their number increased by 37,5%.

**Table nr. 1 The dynamic of the structures types of tourist accomodation and of agrotouristic boardings in Buzau County and Merei Parish during 2003-2013**

Structure types of tourist accomodation	County/ Locality	2003	2005	2007	2009	2010	2011	2012	2013	Medium rate	Annual rate
		Nr.	Nr.	%	%						
Total	Buzau County	38	49	57	66	71	71	85	<b>88</b>	<b>160.3</b>	<b>8.76</b>
	Merei Parish	16	21	16	18	18	18	22	<b>22</b>	<b>108</b>	<b>3.24</b>
	% from County total	<b>42.1</b>	<b>42.8</b>	<b>28.0</b>	<b>27.2</b>	<b>25.3</b>	<b>25.3</b>	<b>25.8</b>	<b>25</b>	<b>X</b>	<b>X</b>
Agrotouristic boardings	Buzau County	8	18	26	31	33	30	42	<b>44</b>	<b>337.5</b>	<b>18.59</b>
	% from the County total structure	<b>21.05</b>	<b>36.73</b>	<b>45.61</b>	<b>46.97</b>	<b>46.48</b>	<b>42.25</b>	<b>49.41</b>	<b>50</b>	<b>X</b>	<b>X</b>
	Merei Parish	4	8	9	9	9	8	13	<b>13</b>	<b>215.9</b>	<b>12.51</b>
	% from County total	<b>50</b>	<b>44.4</b>	<b>34.6</b>	<b>29.0</b>	<b>27.3</b>	<b>26.6</b>	<b>30.9</b>	<b>29.5</b>	<b>X</b>	<b>X</b>
	% from the County total structure	<b>25</b>	<b>38.1</b>	<b>56.2</b>	<b>50.0</b>	<b>50.0</b>	<b>44.4</b>	<b>59.1</b>	<b>59.1</b>	<b>X</b>	<b>X</b>

Source: Own calculations after data taken from the Romania Statistical Yearbook, data series 2003-2013, NSI

By analysing the data from table nr.1 regarding the tourist accomodation structure from Merei Parish, we consider that thier development trend has been sinously increasing.

Their share in the tourist accomodation structures total in Buzau County represents only 25%, due to the significantly increasing number of structures at County level by 131,58.% in 2013 compared to reference year 2003.

Agrotouristic boardings represent 25% from the total tourist accomodation strucures in 2003 reaching to represent more than a half, meaning 59,09% in 2013.

Even though the number of boardings increased in the analysed period from 4 boardings in 2003 to 13 agrotouristic boardings in 2012, with an annual growth rate of 12,51%, their share in the total amount of agrotouristic boardings in Buzau County has decreased from 2003 (50%) until 2013 when it registered a share of 29,55% from the total of agrotouristic boardings in the County.

### 2. Housing capacity

Tourist housing capacity represents the number of accomodations of tourism pupose registered in the last document of reception, ratification, classification of the tourist accomodation with housing fractions, excluding the extra beds that can be installed if necessary.

**Table nr. 2. The dynamic of the housing capacity in the Merei Parish compared to Buzau County on tourist accomodation structure types between 2003-2012**

Specification	Localities	2003	2005	2007	2011	2012	2013	Medium rate	Annual rate
		nr acc	%	%					
Total	Buzau County	2653	2382	2181	2748	3097	3158	94.4	1.76
	Merei Parish	1074	965	653	889	889	889	73.3	-1.87
	% Buzau County total structure	40.48	40.51	29.94	32.35	28.71	28.15	X	X
Agrotouristic boardings	Buzau County	117	262	365	496	809	853	375.7	21.98
	Merei Parish	42	107	123	142	272	272	331.6	20.54
	% total boardings in Buzau County	35.9	40.84	33.7	28.63	33.62	31.89	X	X
	% from the total structure in the County	3.91	11.09	18.84	15.97	30.6	30.6	X	X

Source: Own calculations after data taken from the Romania Statistical Yearbook, data series 2003-2013, NSI

Buzau County's housing capacity had a continuous growth in the accomodation structures, except for the year 2004 when a decrease of almost 33% from the previous year was registered. In 2013 it reaches a growth of 19,04% compared to the same year. In the Merei Parish, where in 2003, 1074 housings were registered, in 2004 this number decreases by 60,71%, the trend being an increasing one in the next period, reaching, 889 housings in 2011, 17,23% less than the year of reference. This situation stayed the same until 2013.

The share of available housing in the Merei Parish's from the total housing capacity per County, decreased from 40,48% in 2003, to 28.71% in 2012 and 28,15% in 2013.

Regarding the housing capacity in the agrotouristic boardings from the Merei Parish, this has a significant growth. If in the year 2003 there were 42 accomodations available, in 2008 it reaches a housing capacity of 132 accomodations and at the end of the analysed period, it registers 272 available accomodations, representing a growth of 547,62 % compared to 2003.

If in 2003 the number of available accomodations in the agrotouristic boardings had a share of 3,91% from the total County accomodation capacity, in 2013 things stand very differently, this share reaching 30%. It appears that a third of the County housing capacity comes from the Merei Parish.

### 3. Tourist Circulation

**Table nr. 3 The analysis of the evolution of the number of arrivals in the tourist accomodation structures in Buzau County and Merei Parish, between 2003-2013**

Specification	Localities	2003	2005	2007	2011	2012	2013	Medium rate	Annual rate
		nr of peop.	%	%					
Total	Buzau County	61304	63226	64584	48128	56991	63593	100.7	0.37
	Merei Parish	6944	9127	12586	12418	11997	11087	163.8	4.79
	% County total structure	11.33	14.44	19.49	25.8	21.05	17.43	X	X
Agrotouristic boardings	Buzau County	2322	5462	9458	9809	12717	12273	373.1	18.12
	Merei Parish	572	2632	3480	3180	3168	3020	502.2	18.1
	% from County total	24.63	48.19	36.79	32.42	24.91	24.6	X	X
	% Merei Parish total structure	8.24	28.84	27.65	25.61	26.41	27.23	X	X

Source: Own calculations after data taken from the Romania Statistical Yearbook, data series 2003-2013, NSI

As seen in the data included in table nr.3, in 2003 were registered the arrivals of 61304 people. In 2004 their number grew by 11,29%, showing then a decrease until 2007. The biggest growth is registered in 2008, of 16,36% compared to 2003. At the opposite, the year 2011, registers the biggest decrease from the analysed period of 21,49% compared to the year of reference. In 2013 the number of arrivals in the accomodation structures in the County increases by 12% compared to previous year.

Compared to the arrivals in the County, the number of arrivals in the Merei Parish, has a significant growth. In 2012 the number of arrivals increases in a very large percent, 72,77% compared to 2003, but the most important growth is registered in 2010 when the growth percent exceeds 150%. In 2013 there is a small decrease in the number of arrivals by 5% compared to last year.

The agrotourist boardings from the Parish had a number of tourist arrivals of 572 people in 2003, reaching 3168 people in 2012, which means a growth of 453,85% compared to 2003, but, in this case also, in 2013 the number of arrivals decreases by 5% compared to last year.

The share of tourist arrivals in the agrotourist boardings from the Parish has a 24,61% percent from the County's total in 2013, which means a quarter of the total arrivals at the agrotouristic boardings in the entire Buzau County.

In 2003 the share of arrivals at the agrotouristic boardings represented 8,24% from the total of arrivals in the Merei Parish and 0,93% from the total of tourist arrivals from the accomodation structures total in Buzau County. In 2013 the arrivals at the agrotouristic boardings represented 27,24% of the total tourist arrivals in the Parish and 4,75% from the total of arrivals throughout the County in all the accomodation structures.

**Table nr. 4 The analysis of the evolution of the number of overnights in the accomodation structures in Buzau County and Merei Parish, between 2003-2013**

Specification	Localities	2003	2005	2007	2011	2012	2013	Medium rate	Annual rate
		Nr.	Nr.	Nr.	Nr.	Nr.	Nr.	%	%
Total	Buzau County	169686	158998	182862	153856	166716	182934	100.3	0.75
	Merei Parish	65370	64086	71577	79377	76070	65739	103.7	0.06
	% County total structure	38.52	40.31	39.14	51.59	45.63	35.94	X	X
Agrotouristic boardings	Buzau County	3454	8464	16259	17419	21262	20043	419.7	19.22
	Merei Parish	681	3234	4321	5996	5874	5041	664.8	22.16
	% County boardings total	19.72	38.21	26.58	34.42	27.63	25.15	X	X
	% Parish total structure	1.04	5.05	6.04	7.55	7.72	7.66	X	X

Source: Own calculations after data taken from the Romania Statistical Yearbook, data series 2003-2013, NSI

Overnights have a growth rate of 0,75% in Buzau County's accomodation structures in the analysed period.

In Merei Parish overnights in the accomodation structures increase from 2003 until 2012 by 11,37%, but in 2013 there is a decrease of 10% compared to last year. The overnight share in the tourist accomodation structures from the Merei Parish represented, in 2012, 45,63% from the overnight total in Buzau County and in 2013, 35,94% percents.

Regarding the overnights in the agrotouristic boardings in Buzau County, they increased in 2012 by 515,58% compared to the reference year 2003. The year 2013 registers, however, a 28% decrease compared to last year. In the Merei Parish, a spectacular increase of 762,56% is observed in 2012, followed in 2013 by a small decrease of 12% compared to last year. The annual growth rate is 19,22% in Buzau County and 27,17% in the Parish.

If in 2003 the overnights agrotourist boardings share in the Merei County represented 19,72% from the overnights total, in 2012 it owned 27,63% percents, and in 2013 it registers a share of 25,15%.

Even though boardings have more than 59% from the accomodation structures in the Parish, the hotels in the Parish have the biggest percent with a share of 88,66%, which shows that tourists prefer hotels as accomodation structure in a bigger percent, even though the area has a high agrotouristic potential.

## CONCLUSIONS

1. Buzau County represents an attraction for all types of tourists, due to the fact that along the County one can find areas where to engage in different activities of recreation, relaxation, treatment, etc. The analysis on the data shows the fact that, even though the potential is high, there is still the need to develop the accomodation structure basis, to improve the infrastructure considerably and to find new ways of increasing the number of visitors.

2. It also requires working on the development of the tourism offer and of the modern and inovative services in order to maintain and attract new tourists to Buzau County and also Merei Parish's interest areas. Also, the focused on activities, according to the EU standards are the increase of competitiveness by optimising the values chain in the local tourism industry, improving the quality of the touristic services (services that reach the european standards).

3. The analysed data show the special importance that the Merei Parish has in the Buzau tourism and agrotourism, the shares that it had on the analysed indexes evolutions are big enough, reaching even a quarter of the recordings that were made.

4. Agrotourism is still an underdeveloped part, it's shortcomings are being felt on an accomodation structures level, housing capacity as well as on the people who prefer hotels to agrotouristic boardings.

5. An increase of the provided service's quality is necessary, as well as the diversification of entertainment. The promotion of the touristic area, and of the Merei Parish especially, should be done better, so that it would bring a change in the tourist preferences, by orienting them toards agrotourism.

## BIBLIOGRAPHY

1. Ceapoiu N., (1968), Applied Statistical Methods In The Agricultural And Statistic Experiments, Agro-Silvica Publishing, Bucharest
2. Daniela Turcu, (2008), Tourism Economy, Eurostampa Publishing, Timisoara
3. Features, Perceptions And Approaches Specific In The Boarding Tourism, Romanian Tourists Quality Study, The South-Muntenia Region, [http://www.intreprinzatorism.ro/wp-content/uploads/2012/05/ITPR-Studiu-calitativ-turisti-romani-Regiunea-Sud-Muntenia\\_martie-2012.pdf](http://www.intreprinzatorism.ro/wp-content/uploads/2012/05/ITPR-Studiu-calitativ-turisti-romani-Regiunea-Sud-Muntenia_martie-2012.pdf)
4. \*\*\*Demographic Growth, [http://www.dictsociologie.netfirms.com/\\_IndDem/IndReproducere.htm](http://www.dictsociologie.netfirms.com/_IndDem/IndReproducere.htm)
5. Standards Regarding The Issue Of The Classification Of Tourist Acoomodation And Catering Structures Certificates Of Tourism Licences And Patents, <http://turism.gov.ro/wp-content/uploads/2013/05/Norme-metodologice.pdf>
6. \*\*\*<http://travelbuzau.com/sarata-monteoru-devine-sediul-oficial-al-clusterului-turistic-carpatin-din-romania-pentru-judetul-buzau#sthash.iSmVjK03.dpuf>

## STUDIES ON THE CURRENT SITUATION OF THE ARCHIEPISCOPATE OF BUCHAREST AGRICULTURAL PATRIMONY

UNGUREANU FLORIN<sup>1</sup>, ALECU IOAN NICULAE<sup>2</sup>

**Abstract:** *The Romanian Orthodox Church, founded as Patriarchy in 1925, performs alongside the pastoral and missionary works specific to the orthodox cult and administrative works. The cult units of the Archiepiscopate of Bucharest, as part of the Metropolitanate of Muntenia and Dobrogea, own agricultural, horticulture and forestry land. The agricultural and horticultural lands are cultivated under own regime or under a lease. For the areas with forest vegetation the cult units have forest service contracts with private or state Forest Districts, specialized inspectors of the Archiepiscopate of Bucharest participating in the sustainable forest management. Vineyards are subject to the reconversion program (by APIA programs) with noble varieties of vineyards and for producing wine it was built a section of vinification, by accessing European funds, with modern technology. The cult units participate in improving the quality of life in rural areas by implementing programs for accessing European funds (job creation, efficient exploitation of land, economic development, strong correlation between the creditworthiness of agricultural land and infrastructure).*

**Keywords:** *Archdiocese of Bucharest, agricultural patrimony, horticulture, forestry*

### INTRODUCTION

The Romanian Orthodox Church is the community of the orthodox Christians, clergy, monks and laity, canonically constituted in parishes and monasteries in the Romanian Patriarchate episcopates located inside and outside Romania, who confess God the Holy Trinity, Father, Son and Holy Spirit, under Holy Scripture and Holy Tradition and participating in the church life through the same Sacraments, liturgy and canonical order [3]. On 4 February 1925, the *Holy Synod* decided to establish Romanian Orthodox Patriarchy, and on 1 November 1925 took place the investiture and inauguration of the first Patriarch Miron Cristea (1925-1939). His descendants were the patriarchs Nicodim Munteanu (1939-1948), Justinian Marina (1948-1977), Iustin Moisescu (1977-1986) and Teoctist Arăpașu (1986-2007), and currently, the Romanian Orthodox Church is headed by Patriarch Daniel Ciobotea.

The Patriarch of Romanian Orthodox Church is Archbishop of Bucharest and the Metropolitan of Muntenia and Dobrogea. His title is: "His Holiness, His Beatitude (N), Archbishop of Bucharest, Metropolitan of Muntenia and Dobrogea, Deputy to the throne of Caesarea of Cappadocia<sup>3</sup> and Patriarch of the Romanian Orthodox Church". Romanian Patriarchy includes dioceses<sup>4</sup> (archbishops and bishops) grouped into metropolises. All of assets belonging to parishes,

<sup>1</sup> Priest in the Archdiocese of Bucharest, agronomist, e-mail: protos\_petru@yahoo.com

<sup>2</sup> Prof.Univ.PhD. University of Agronomic Sciences and Veterinary Medicine Bucharest.

<sup>3</sup> In the Byzantine city of Caesarea in Cappadocia (now the city of Kayseri in Turkey) existed at the beginning of the first millennium a Christian bishopric, which was led by St. Vasile cel Mare (370-379). Named at 14 June 370 the bishop of Caesarea throne, St. Vasile held in this position the rank of Metropolitan of Cappadocia and Exarch of Pontus, his authority extending between the Balkan Mountains, Mediterranean Sea, Aegean Sea and to Euphrates. St. Vasile is considered one of the most important fathers of the Orthodox Church and one of the greatest Christian theologians, being glorified and celebrated every year on January 1 and also on January 30 with St. Ioan Gura de Aur and St. Grigore of Nazianz (Feast of the Holy three Hierarchs, established in 1081 by Patriarch Ioan of Constantinople in the memory of these three great saints and Orthodox theologians. Following the conquest of this region by the Ottoman Empire, the bishops of Caesarea in Cappadocia had to stop activity for the lack of believers (who run from Turks, they were killed in battles or changed to Islam), but in the Byzantine church hierarchy preserved the honorary title of bishop of Caesarea in Cappadocia. To perpetuate the memory of this ancient episcopal seat, the Synod of the Patriarchate of Constantinople, during the Patriarchy of Sophronius, decided on 10 October 1776, the Metropolitan of Ungrovlahia (with residence in Bucharest) to bear the honorary title of "Deputy of Episcopal Throne of Caesarea (Caesarea) Cappadocia ". Since 1925, this title is held by the Patriarch of the Romanian Orthodox Church.

<sup>4</sup> Diocese (Ἐπαρχία) from the administrative point of view, is the church administrative unit that is under the authority of a bishop, which is composed of parishes and monasteries that are found in that territory. The term "diocese" was borrowed from Roman legal language. The Emperor Constantin cel Mare (306-337) - following the example of his predecessor, Diocletian (285-305) – has divided the Empire into 4 prefectures, which were divided into dioceses.

monasteries, deaneries, bishops, archbishops, metropolitans and Patriarchy, associations and foundations established by the Church, the funds for a religious purpose, and foundational churches wealth, form the religious heritage which belongs to Romanian Orthodox Church. In terms of its destination, the church patrimony contains sacred and common goods. Holy assets are those that by consecration of blessing are intended solely and directly to cult: places of worship (cathedrals, churches, chapels etc.), treasures and church vestments, books of ritual, cemeteries etc. The common goods of the Church are: church school buildings, church administration buildings, religious museums, establishments and cultural, philanthropic and economic institutions, agricultural and horticultural land, forests, pastures and patrimonial rights [3].

## MATERIALS AND WORKING METHODS

It was studied the organizational structure of the Romanian Orthodox Church and of the Archdiocese of Bucharest. Currently, the subunits of Archdiocese of Bucharest own agricultural, horticultural and forestry land with documents of ownership (property title, act of donation, documents of sale-buy) and land returned under the laws governing restitution of property that belonged to religious cults in Romania. Thus, the parishes and monasteries from the Archdiocese of Bucharest participate in the ongoing development of the national agricultural, horticultural and forest patrimony, by implementing national programs for rural development and sustainable management of forests [4]. Visits were conducted on the land of parishes and monasteries where it was found the situation of the ownership documents and the land status.

## RESULTS AND DISCUSSIONS

**A. Organizing of Romanian Patriarchy.** The Romanian Orthodox Church includes inside and outside Romania the following Metropolitanates, Archiepiscopates and Episcopates:

1. Metropolitanate of Muntenia and Dobrogea (figure 1), that includes:
  - Archiepiscopate of Bucharest, with headquarter in Bucharest.
  - Archiepiscopate of Tomis, with headquarter in Constanța.
  - Archiepiscopate of Târgoviște, with headquarter in Târgoviște.
  - Archiepiscopate of Argeș and Muscel, with headquarter in Curtea de Argeș.
  - Archiepiscopate of Buzău and Vrancea, with headquarter in Buzău.
  - Archiepiscopate of Dunărea de Jos, with headquarter in Galați.
  - Episcopate of Slobozia and Călărași, with headquarter in Slobozia.
  - Episcopate of Alexandria and Teleorman, with headquarter in Alexandria.
  - Episcopate of Giurgiu, with headquarter in Giurgiu.
  - Episcopate of Tulcea, with headquarter in Tulcea.
2. Metropolitanate of Moldova and Bucovina (figure 2), that includes:
  - Archiepiscopate of Iași, with headquarter in Iași.
  - Archiepiscopate of Suceava and Radăuți, with headquarter in Suceava.
  - Archiepiscopate of Roman and Bacău, with headquarter in Roman.
  - Episcopate of Huși, with headquarter in Huși.

---

Dioceses were composed of several provinces, which, in Greek, were identified by the term dioceses (ἐπαρχίαι). From here, the term "diocese" passed later in the language of the Church, at first with the meaning of "province" (metropolitanate), and then with the current "bishop".



Fig. 1 – Metropolitanate of Muntenia and Dobrogea



Fig. 2 – Metropolitanate of Moldova and Bucovina

### 3. Metropolitanate of Ardeal (figure 3), including:

- Archiepiscopate of Sibiu, with headquarter in Sibiu.
- Archiepiscopate of Alba Iulia, with headquarter in Alba Iulia.
- Romanian Orthodox Episcopate of Oradea, with headquarter in Oradea.
- Episcopate of Covasna and Harghita, with headquarter in Miercurea Ciuc.
- Episcopate of Deva and Hunedoara, with headquarter in Deva.

### 4. Metropolitanate of Cluj, Maramureș and Sălaj (figure 4), including:

- Archiepiscopate of Vadu, Feleacul and Cluj, with headquarter in Cluj-Napoca.
- Romanian Orthodox Episcopate of Maramureș and Sătmar, with headquarter in Baia Mare.
- Episcopate of Sălaj, with headquarter in Zalău.



Fig. 3 – Metropolitanate of Ardeal



Fig. 4 – Metropolitanate of Cluj, Maramureș and Sălaj

### 5. Metropolitanate of Oltenia (figure 5), including:

- Archiepiscopate of Craiova, with headquarter in Craiova.
- Archiepiscopate of Râmnic, with headquarter in Râmnicu Vâlcea.
- Episcopate of Severin and Strehaia, with headquarter in Drobeta-Turnu Severin.
- Episcopate of Slatina and Romanați, with headquarter in Slatina.

## 6. Metropolitanate of Banat (figure 6), including:

- Archiepiscopate of Timișoara, with headquarter in Timișoara.
- Archiepiscopate of Arad, with headquarter in Arad.
- Episcopate of Caransebeș, with headquarter in Caransebeș.



Fig. 5 – Metropolitanate of Oltenia



Fig. 6 – Metropolitanate of Banat

## 7. Metropolitanates, Archiepiscopates and Episcopates of outside Romania:

- Metropolitanate of Basarabia
- Romanian Orthodox Metropolitanate of Western and Meridional Europe
- Romanian Orthodox Metropolitanate of Germany, Central and Northern Europe
- Romanian Orthodox Archiepiscopate of the two Americas
- Episcopate of Dacia Felix
- Romanian Orthodox Episcopate of Ungaria
- Romanian Orthodox Episcopate of Australia and New Zealand

### B. Organization of the Archiepiscopate of Bucharest

The units of the Romanian Orthodox Church, organized as Patriarchy, are: parish, monastery, deanery<sup>5</sup>, **eparchy (archiepiscopate and episcopate)** and the Metropolitanate.

The eparchies are church units consisting of a number of parishes, grouped as deaneries and the monasteries located on a certain territory. The eparchies are archiepiscopates or episcopates, led by archbishop or bishop. None of the eparchies can have, or establish and manage religious units on the territory of other eparchy [3]. In the mid-nineteenth century, the Archiepiscopate of Bucharest comprised 9 deaneries (one in Ilfov, one in Ialomita, one in Dâmbovița, one in Prahova, one in Muscel, one in Teleorman, one in Vlașca and two in Bucharest), with 1,029 parishes (urban and rural), 1,680 churches (parish and subsidiaries) and 1547 priests and 17 monasteries and hermitages (with monks and nuns), with 920 people.

Since 1929, the deaneries were set in plasi, in a county being between 2 and 6 deaneries corresponding to the number of plasi. Archiepiscopate of Bucharest had 21 deaneries (3 in the every city of Bucharest, Ilfov county, Dâmbovița, Teleorman and Vlașca, 2 in Muscel and 4 in Prahova

<sup>5</sup> *protopopiatele* sunt structuri organizatorice teritoriale care au în subordine parohii, mănăstiri, schituri, centre social-filantropice și au rolul de a-l ajuta pe chiriarh în a-și desfășura activitatea pastoral-misionară și administrativ-bisericească în teritoriu (pentru Arhiepiscopia Bucureștilor - București și județele Ilfov și Prahova)

county), with 1,109 parishes and 405 branches. In these parishes and branches were 1,514 churches, with 1,260 priests serving [4].

Since 1990, in conditions of freedom, under the leadership of Teoctist Patriarch, new churches were built in parishes, schools, military units, hospitals, nursing homes, prisons, social assistance centers. However, the Archiepiscopate of Bucharest ceded 5 counties (Dâmbovița, Ialomița, Calarasi, Teleorman and Giurgiu) of its coverage for the establishment of new dioceses: Archiepiscopate of Targoviste (1990), Episcopate of Slobozia and Calarasi (1993), Episcopate of Alexandria and Teleorman (1996) and Episcopate of Giurgiu (2000), restricting jurisdiction over Ilfov and Prahova counties plus Bucharest.

It should be noted that on 17 May 1990, the National Church Assembly, based on "historical, administrative – religious and missionary - pastoral" and to respond to the "current requirements of the clergy and believers", approved the decision of the Holy Synod of change Metropolitan of Ungrovlahia name in "Metropolitan of Muntenia and Dobrogea".

Today, under the leadership of His Beatitude Daniel, Archiepiscopate of Bucharest has in jurisdiction 12 deaneries with 712 church units (634 parishes and 78 affiliates), and 977 priests and 33 monastic establishments (26 monasteries and 7 hermitages) with 784 people.

Currently, under the *Statute for the organization and functioning of the Romanian Orthodox Church*, the Archiepiscopate of Bucharest Diocesan Center operates under the careful coordination of the Hierarchy, aided by Assistant Bishop, the diocesan administrative vicar and diocesan advisers through the **Diocesan Chancery** and **Diocesan administration** [2].

In the **Diocesan Chancery** operates:

- Diocesan Secretariat;
- Canonical and legal office;
- Church Inspection body.

In the **Diocesan Administration** operates 12 sectors:

1. **Church Administrative Sector:** Service of Personnel - Human Resources
2. **Cultural and media Communications Sector:** Publishing Word of Life
3. **Education and Youth Activities Sector:** Theological education, Catechetical office
4. **Social Philanthropic and Missional Sector:** Religious assistance, Social assistance, Social Cantina "Barnabas House", Retirement Home "Pasarea", Palliative Care Center "Saint Nectarie", "Joy Aid" Foundation, Information and Advice Centre.
5. **Economic-Financial Sector:** Accounting Service, Factory of candles "Faclia of Romanian Saints" Service of canvassing, Icons workshop "Eternal Faces", laundry "Bob de roua", Workshop "Reverend", Funeral Services, Center "Justin Patriarch" Center "St. Calinic" at Cernica, the monastic House, monastic Cantina
6. **Church Real Estate Sector**
7. **Monuments and church buildings sector:** Technical service, Transport
8. **Patrimony and church painting sector:** Painting, restoration and conservation, Museums and church collections
9. **Sector of Exarchate:** Patriarchal Cathedral, Monastery St. Cuv. Parascheva, Cathedral of St. Spiridon
10. **Agricultural, Forestry and Viticulture sector:** wine warehouse, annex households
11. **Sector Cemeteries, Memorials and Funeral Services**
12. **Financial Control and Internal Audit Sector**

For a better organization and management of the agricultural, horticultural and forestry patrimony of the Diocesan Center and subunits (parishes, monasteries), it was established in 2008 the Agricultural, Vineyard and Forestry Sector of the Archiepiscopate of Bucharest, operating in Bucharest, Ilfov and Prahova.

**The Agricultural, Vineyard and Forestry Sector** coordinates and manages several areas:

1. **The agricultural domain:**

- takes care of the proper administration of the agricultural land belonging to the Diocesan Center and its subordinate cult units;
- review, control, and makes proposals on improving the operation and management of land belonging to monasteries, parishes, deaneries and other church institutions with legal personality from Archiepiscopate;
- the cult units work both in own regime cultivating their agricultural land with grain and in land leasing regime.

**2. Horticultural domain:**

- a) **manages the vineyards** of the Archiepiscopate of Bucharest in jud. Prahova (Figures 7 and 8): wine farm Urlati, with an area of 10.0 ha; Ceptura wine farm, with an area of 23.0 ha; Chițorani wine farm, with an area of 12.0 ha.

The whole area planted with vineyard has undergone the conversion process through APIA, using noble varieties of vineyard (Merlot, black Fetească, Cabernet Sauvignon, Fetească Royal Sauvignon blanc).

- b) **Department of wine Urlați - Prahova** (Figure 9):

- In 2009 was founded agricultural *Cooperative second degree "Vineyard of the Lord"* (with five cooperative members - religious units in the Archiepiscopate of Bucharest) in which are processed the grapes obtained from vineyards, to produce liturgical wine;
- European funds were accessed (Measure 123) for building a *wine Section* in accordance with European and national rules;
- liturgical wine produced is distributed in both dioceses in the country and the Diaspora, as well as in specific stores.



Fig. 7 – Vineyard in reconversion program (first year from planting)



Fig. 8 – Vineyard in reconversion program ( year III from planting)



Fig. 8 – Vinification section (equipments for wine storing)



Fig. 9 – Vinification section (equipments for wine bottling)

- c) **The annex household of the Diocesan Center** administers an area of 3.5 ha planted with: fruit trees (apple, pear, quince, plum, cherry, sour cherry, apricot, peach, nectarine, walnut - Figure 10; vineyard (table grape varieties - *Sultanina*, *Hamburg*, *Victoria*, *Italia* - Figure 11) shrubs (raspberry, blackberry, strawberry - Figure 12); vegetables in the open and protected areas (Figure 13).
3. **The forestry domain** sustainable manages the forest belonging to religious units (Figure 14) totaling 1,600 ha:
- Antim Monastery - 600 ha;
  - Zamfira Monastery - 224 ha;
  - Pasarea Monastery - 30.0 ha;
  - Cheia Monastery - 100 ha;
  - Ghighiu Monastery - 150 ha;
  - Snagov Monastery - 300 ha;
  - Căldărușani Monastery - 134 ha;
  - Cornu Monastery - 4.5 ha;
  - Church of Icoanei - 30.0 ha.



Fig. 10 – Plantation of fruit trees



Fig.11 – Plantation of vineyard (table grapes)



Fig. 12 – Strawberries



Fig.13 – Tomatoes under protected space



Fig. 14 – Deciduous forest ( Cernica Monastery)

Romanian Patriarchy participated since 2012 as member of the National Coordination Committee of RNDR<sup>6</sup> by representatives of the Romanian Patriarchy and the Archiepiscopate of Bucharest and at the Working Groups of the Managing Authority of the Ministry of Agriculture and Rural Development (Agriculture and Food Industry, Economic Development in Rural Area, Environment).

### CONCLUSIONS

The Archiepiscopate of Bucharest conducted alongside pastoral and missionary work specific to the orthodox cult, the administrative. In this respect, the Archiepiscopate of Bucharest:

- participates in knowledge and good relationship with other dioceses;
- carry out exchanges with dioceses running European projects or from own funds in agriculture, horticulture and forestry;
- advise subunits to capitalize the agricultural, horticultural and forestry patrimony;
- good management of the areas planted with vineyards to produce wine needed to cult (Holy Sacraments and religious service);
- transmit to the cult units useful information on how to access EU funds through the National Program of Rural Development and through APIA.

### BIBLIOGRAPHY

1. PĂCURARIU, Pr. M., (2006), *Istoria Bisericii Ortodoxe Române*, Bucharest, Editura I. B. M. B.O.R.;
2. \*\*\* *Îndrumător administrativ Bisericesc*, (2010), Bucharest, Editura Cuvântul vieții a Mitropoliei Munteniei și Dobrogei;
3. \*\*\* [www.patriarhia.ro](http://www.patriarhia.ro);
4. \*\*\* [www.arhiepiscopiabucurestilor.ro](http://www.arhiepiscopiabucurestilor.ro);
5. \*\*\* [www.madr.ro](http://www.madr.ro);
6. \*\*\* [ro.wikipedia.org](http://ro.wikipedia.org).

---

<sup>6</sup> National Network of Rural Development

#### **SECTION 4: ADER Project 211**

***"Determination of the technical and economical technologies for crop and animal production applied in order to increase environmental performance (cost, productivity, profitability, gross margin)"***

# CONTRIBUTIONS OF LIVESTOCK HOLDINGS TO THE ENVIRONMENT OBJECTIVES IMPROVEMENT

CHETROIU RODICA<sup>1</sup>, IURCHEVICI LIDIA<sup>2</sup>

**Abstract:** *The complexity of the relations between agriculture and environment has created the need to introduce environmental issues into the CAP. The principle of good agricultural practices is essential to understand this relation between agriculture and environment. Environmental measures in agriculture aim at the animal farm activity takes place in accordance with the recommended technologies and livestock waste management in conditions of minimum impact on the environment factors. In this paper, it estimates the annual production of organic fertilizer from farm activity, the quantities of nutrients (nitrogen, phosphorus and potassium) resulting from these, and the areas of agricultural land that can be fertilized with these quantities. The calculations took into account farm modules for the following products: cow's milk, sheep's milk, goat's milk, beef, pork, poultry, and eggs for consumption.*

**Keywords:** *environment, animal husbandry, fertilizers, organic, agricultural holding*

## INTRODUCTION

The European Commission launched at the end of 2012 the 7th Environment Action Program which established the framework for EU environmental policy by the end of the decade. Its title - „A good life, in the limits of our planet” - emphasizes the importance of consolidation in coming years of Europe ecological resistance and transforming EU into a sustainable and inclusive green economy.

The action program sets out three thematic objectives to guide environmental policy by 2020:

- ❖ first is to protect, conserve and enhance the natural capital that underpins our economic prosperity and welfare;
- ❖ second, as provided in the emblematic initiative for a resource-efficient Europe, promoting an orientation toward an economy that uses resources effectively;
- ❖ the third objective is based on the progress already made by the EU in providing important health benefits for its citizens, increasing efforts to combat air pollution, noise pollution and water pollution, improve the management of chemicals and preparing for climate change impacts.

## MATERIAL AND METHOD

In this paper, it estimates the annual production of organic fertilizer from farm activity, the quantities of nutrients (nitrogen, phosphorus and potassium) resulting from these, and the areas of agricultural land that can be fertilized with these quantities. The calculations took into account farm modules for the following products:

- Cow's milk;
- Sheep's milk;
- Goat milk;
- Beef;
- Pork;
- Poultry;
- Eggs for consumption.

---

<sup>1</sup> PhD Candidate Chetroiu Rodica – Scientific researcher, The Institute for Agriculture Economy and Rural Development, e-mail: rodica.chetroiu@iceadr.ro;

<sup>2</sup> Eng. Iurchevici Lidia – Scientific researcher III, The Institute for Agriculture Economy and Rural Development Rurală, e-mail: lidia.iurchevici@iceadr.ro

## RESULTS AND DISCUSSIONS

The production activity of livestock farms may have a minimal impact on the environment through the application of technologies that will meet the EU standards in domain and the best practices. Thus, through ventilation system it can provide an appropriate climate inside animal shelter, reducing moisture, odor and ammonia emission. Also, given the proper management of waste from the housing (solid manure, bedding, liquid manure) through appropriate collection and storage, it contributes to the environmental protection.

The storage of manure shall be located near farmland; storage capacity must be designed according to the number of animals, ensuring its perfect tightness. It will use appropriate construction materials and installations must be reliable and of quality. The farm will have a waste management plan, which will decide when, where and what dose of organic fertilizer to be spread on farm land.

In the livestock farms, the environment objectives are:

- reducing harmful greenhouse emissions and a better management of waste from production activities.

Conducting production activities in animal farms will seek to minimize the impact on the environment. The waste is collected in manure pits and after transforming in natural fertilizer, will be applied to fertilize the area land for producing forages, or other crops and domestic waste is collected in closed containers, on types of waste, will be taken periodically and store on the town landfill or transfer to collection centers of recoverable materials.

- reducing of ammonia and other gases, by compliance with the veterinary standards, hygiene and animal welfare.

The activity of livestock farms will have a minimum impact on the environment, the shelters and the rest of areas must be fully monitored. Natural and artificial ventilation, with elements of automation, should provide a good microclimate, to refresh the air inside shelters and thus significantly reducing moisture, odor and ammonia emissions. The control of manure will be done by appropriate collection and storage in spaces specifically designed for this purpose. Thus, the ammonia emissions are minimized and odor inside shelters and around it is completely removed.

The evaluation of nutrients balance in terms of livestock farms provide a complete view of the factors and processes that influence the accumulation of nutrients, which in some cases exceed the maximum limits and present a potential for pollution of environmental resources. The primary sources of these nutrients within a farm are known, but it is important to establish management strategies through that the excess accumulation of these elements is reduced. The following strategies can be applied to agricultural management through that negative nutrient balance at farm level can be corrected:

- efficient use of nutrients originated from agricultural manure;
- use of alternative animal feeding rations;
- valorisation of nutrients from manure;
- applying manure treatment processes.

### Agri-environmental indicators of livestock holdings:

Table 1 - Agri-environmental indicators of a dairy cows farm, capacity 150 heads, average production 6000 l/head

INDICATORS	VALUE		
Annual production of manure, tons	1711,2		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	12150	2250	8100
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	71,5		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	819		
Storage capacity of manure for 5,6 months, m <sup>3</sup>	1092		
Storage capacity of manure for 6,5 months, m <sup>3</sup>	1267,5		

Table 2 - Agri-environmental indicators of a sheep farm, capacity 500 heads, average production 75 l/head

INDICATORS	VALUE		
Annual production of manure, tons	421,5		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	3500	500	2500
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	20,6		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	195,3		
Storage capacity of manure for 5,6 months, m <sup>3</sup>	260,4		
Storage capacity of manure for 6,5 months, m <sup>3</sup>	302,3		

Table 3 - Agri-environmental indicators of a goats farm, capacity 500 heads, average production 500 l/head

INDICATORS	VALUE		
Annual production of manure, tons	421,5		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	3500	500	2500
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	20,6		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	195,3		
Storage capacity of manure for 5,6 months, m <sup>3</sup>	260,4		
Storage capacity of manure for 6,5 months, m <sup>3</sup>	302,3		

Table 4 - Agri-environmental indicators of a young fattening cattle farm, capacity 300 heads, average production 1000 g/head/day

INDICATORS	VALUE		
Annual production of manure, tons	2323,8		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	16500	6000	12900
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	97,1		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	1512		
Storage capacity of manure for 5,6 months, m <sup>3</sup>	2016		
Storage capacity of manure for 6,5 months, m <sup>3</sup>	2340		

Table 5 - Agri-environmental indicators of a fattening pork farm, capacity 2000 heads/series, 7600 heads/year, average production 800 g/head/day

INDICATORS	VALUE		
Annual production of manure, tons	2934		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	22000	8000	14000
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	129,4		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	1680		
Storage capacity of manure for 5,6 months, m <sup>3</sup>	2240		
Storage capacity of manure for 6,5 months, m <sup>3</sup>	2600		

Table 6 - Agri-environmental indicators of a poultry farm, capacity 20000 heads/series, 118000 heads/year, average production 50 g/head/day

INDICATORS	VALUE		
Annual production of manure, tons	240		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	7200	1400	2000
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	42,4		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	319,2		
Storage capacity of manure for 5,6 months, m <sup>3</sup>	425,6		
Storage capacity of manure for 6,5 months, m <sup>3</sup>	494		

Table 7 - Agri-environmental indicators of a laying hens farm, capacity 10000 heads, average production 280 eggs/head

INDICATORS	VALUE		
Annual production of manure, tons	120		
Annual production of nutrients (kg)	<i>N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
	3600	700	1000
Area (ha) that can be fertilized with the manure of farm (max. 170 kg N/ha)	21,2		
Storage capacity of manure for 4,2 months, m <sup>3</sup>	252		

INDICATORS	VALUE
Storage capacity of manure for 5,6 months, m <sup>3</sup>	336
Storage capacity of manure for 6,5 months, m <sup>3</sup>	390

## CONCLUSIONS

The results of the estimates show that livestock activities are, under appropriate management of manure, a valuable source of organic fertilizer, helping to meet environmental objectives and realizing at the same time saving money to purchase fertilizer. Thus, a farm with 150 dairy cows provides a quantity of manure that can fertilize almost half of the area required for the production of forages (71.5 ha). The sheep or goats farm with capacity of 500 heads provides a quantity of organic fertilizer that can be applied on 20.6 ha and the fattening young cattle farm of 300 heads can fertilize 97.1 ha. As for holding of 2000 fattening swine/ series, it may provide enough for 129.4 ha. In raising broilers, a farm with 20,000 heads / series can fertilize 42.4 ha and 10,000 laying hens farm provides manure for 21.2 ha.

Increasing the environmental performance in livestock activities include the use of technology to control pollution (air pollution control, waste management), the use of services with less energy and natural resources, the adopting of more efficient management practices of natural resources.

The benefits of applying environmental technologies consist mainly of reducing raw material consumption, lowering emissions of pollutants and waste prevention. The application of environmental technologies leads to reduced operating costs and increased productivity. These are applied in almost all sectors, their use generating long-term benefits that far outweigh the initial investment costs and create the potential to reduce environmental externalities generated by economic activities.

The development fund constituted in agricultural holdings modules can modernize technological processes of the farm by acquiring modern equipment; also may invest to increase the environmental performance, consisting of monitoring equipment and automatic control of microclimate factors in shelter, investments to meet the requirements on storage and treatment of manure, etc., thus contributing to the objectives environment.

## BIBLIOGRAPHY

1. ADER 121Project - Phase 9 - Studiu privind conservarea eficienței economice a producției vegetale și animale, în condițiile intervențiilor pentru creșterea performanțelor de mediu, Bucharest, 2014
2. Ministerul Mediului și Gospodăririi Apelor, Cod de bune practici agricole pentru protecția apelor împotriva poluării cu nitrati din surse agricole, Bucharest, 2005
3. Proiectul Controlul integrat al poluării cu nutrienți – Ghid de bune practici, June 2010
4. Mihaela Hăbeanu, Ioan Surdu, Anca Gheorghe, Lefter Nicoleta, Aurel Florentin Badiu - Studiu privind standardele, directivele și cerințele minime obligatorii de promovare a bunăstării și de valorificare a potențialului bioproductiv al animalelor de fermă
5. Henrik Frederiksen, Daniel Dănuț, Mihai Mașinistru, Adrian Greculescu, Sisteme pentru depozitarea dejectiilor. Standarde de fermă, Proiect MAKIS, June 2010
6. Institutul Național de Cercetare-Dezvoltare pentru Pedologie, Agrochimie și Protecția Mediului – ICPA București - Codul de bune practici agricole pentru protecția apelor împotriva poluării cu nitrați din surse agricole (Draft), 2012

# THE SYSTEM OF INDICATORS OF ESTIMATION THE ECONOMIC EFFICIENCY IN THE PRODUCTION OF GOAT MILK

CETROIU RODICA<sup>1</sup>, CĂLIN ION<sup>2</sup>

**Abstract:** *The analysis of economic efficiency is the main method of economic systems analysis. This concept is the most important qualitative indicator of the economic development, essential factor in accelerating the economic growth and is also one of the criteria for scientific substantiation of decisions. Applied in the milk production domain, represents the obtaining of maximum quantity of milk per animal, with minimal expenditure of manpower and materials. Regarding determining the economic efficiency of goat milk production, the most used indicators are: total physical production, average production, value of total production (total revenue), production costs, material costs, cost per unit, profit, rate of return, breakeven point etc. The paper presents the calculation method of indicators and their average values for 2014.*

**Keywords:** *economic efficiency, indicators, milk, goat, rate of return*

## INTRODUCTION

The determination economic efficiency of goat milk production requires the development and use of a system of indicators that quantify both the efforts made to obtain the production and the effects resulting from these efforts. In this way, it can be performed a complex analysis and conclusions can be drawn regarding the directions of increasing economic efficiency (Parmacli D., Stratan A., 2010). Decisions taken in the production activity depend on information on the performance of the allocation factors in different sectors of activity, which affects the quality of the estimates and the perception on different needs and problems of the activity components (J. Johnson, K. Baum, R. Prescott, 1985).

## MATERIAL AND METHOD

Indicators are numerical expression of an economic process or phenomenon, defined in time and space (Rodica Tănăsescu, 1997) and are characterized by:

- absolute measures (numerical expressions);
- relative measures (percentage);
- average measures (arithmetic averages, weighted averages, geometric averages);
- indices (with fixed base or chained base);
- coefficients (ratio between two absolute measures).

Absolute measures (concrete numerical expressions) reflect the size of the studied phenomenon and underlie determining the indicators derived: relative measures, average measures, indices and coefficients. These absolute measures can express cultivated area, livestock, material resources, financial resources, human resources, production, costs, revenues, profit etc., having specific units of measure: hectares, heads, kg, hl, pieces, days, hours, RON, etc.

The relative measures result by dividing two absolute measures, are expressed as a percentage and can show the intensity or structure of the phenomena studied. Intensity relative measures indicate how returns per unit of measure, 100 or 1,000 units of the second measure. Thus, these measures can show the economic development level of the company (interest rate, costs per 1,000 RON income, income per 1000 RON costs etc.).

Relative measures of the phenomena structure are: surface structure, livestock structure, costs structure, income structure etc.

---

<sup>1</sup> PhD Candidate - University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Mărăști Bvd, sector 1, e-mail: rodigeo7@yahoo.com

<sup>2</sup> Prof. PhD - University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Mărăști Bvd, sector 1, e-mail: icalin63@yahoo.com

Average measures represent generalizing ways of presentation in a synthetic form of statistical data related to the studied phenomenon. These can be: simple arithmetic average, weighted arithmetic average, geometric average. Using the average values, there can be determined: the average yield per hectare or per animal, the production value / worker, the average selling price etc.

Indices are ratios between two absolute measures and are used to show the evolution of a phenomenon (fixed base indices) or annual growth of the phenomenon (chained indices). Their use allows comparing indicators across time and space, showing the trend of the phenomenon under study, so their interpretation is helpful both to achieve a retrospective analysis of the activity, as well as for previewing of it.

The coefficients are ratios between two absolute measures, indicating the usability degree of the various factors in the production process (coefficient of utilization production capacity, coefficient of utilization equipment etc.). (Jilăveanu Ciulinaru I. Denisa Carmen, 2005).

The indicators are tools for monitoring, evaluation, forecasting and decision support. The main quality of indicators is the ability to express in a concise manner the complexity of the phenomenon. They also have the property to describe the links between the nature of the production system and its characteristics, in terms of vulnerability and sustainability (Penot E., Marie Bar, Hélène David-Benz, 2013).

## RESULTS AND DISCUSSIONS

In order to assess the economic efficiency, are used a large number of indicators, according to the analyzed domain. Regarding determination of the economic efficiency of the goat milk production, we consider that the most used indicators are:

- **Total physical production**
- **Average production**
- **Value of total production (total revenue)**
- **Production costs**
- **Material costs**
- **Cost per unit of product**
- **Profit**
- **Rate of return**
- **Breakeven point etc.**

**Total physical production** is one of the indicators that measures the effects of the activity, and in raising goats, represents the total amount of products obtained of this species, in terms of time and place determined.

The main production (goat milk) is the main purpose pursued by the production technology applied and material and human resources allocated to production activity and is expressed in physical units (natural), gravimetric or volumetric: tons, or hl.

The secondary production represents total products obtained simultaneously with the main product, by applying the same technology and the same resource allocation, as a result of the biological characteristics of the animals (I.C.E.A.D.R.-P.S. 211/2011, Stage 3).

**The average production** per animal is the ratio between total gross production (main or secondary) and the number of animals from that production was obtained to or the average number of animals fed.

$$q = Q / Na$$

In which:

q – average production per animal

Q – main total production

Na – average number of animals fed

The average production is also a level parameter that indicates the magnitude order of the elements ensemble of the random variable represented by production. In this respect, it is an

abstract value that provides information about the central tendency of the variable values. It is a theoretical value that can probably substitute any value in the range of values it represents (Ghe. Sandu, 1995). Due to the fact that between animals there are differences in productive capacity, to determine the total herd average production level, it can use the weighted average method, by relation (Margareta Oancea, 2003):

$$q_m = \frac{\sum_{i=1}^m n_i \times q_i}{\sum_{i=1}^m n_i}$$

in which:

$q_m$  – farm average production;

$n_i$  – number of animals from a certain productive group;

$q_i$  – average production per animal from  $i$  group.

### Value of total production (total revenue)

Total revenue is an indicator of effect (Dinu E., [www.biblioteca-digitala.ase](http://www.biblioteca-digitala.ase)) and its analysis is of particular importance because it allows the assessment of the production unit place in its sector of activity, its market position and skills to develop different activities profitably. Concomitantly, the variation of total revenues is reflected on the effectiveness of the activity.

Total revenue (value of total production) is the sum of the earnings from selling products obtained. Value of total production  $VQ =$  main production value  $VQ_p +$  secondary production value  $VQ_s$ :

$$VQ = VQ_p + VQ_s$$

The main production value  $VQ_p$  is obtained by multiplying the selling price per unit of product ( $p$ ) by the amount of the main production (milk) obtained ( $Q_p$ ):

$$VQ_p = Q_p \times p$$

The secondary production value  $VQ_s$  similarly results by applying the same formula for each of the secondary products (kid, manure, reforms) with economic value:

$$VQ_s = Q_s \times p$$

### Production costs

The elements of economic effort that expresses one of the aspects of the economic efficiency are the costs. According to the definition given to this term by Cârstea Gh., Călin O., the cost represents „the monetary expression of the consumption of material resources, labour and money made to meet the needs of productive, unproductive, individual or social consumption”. Production costs represent the expenses reflecting productive consumption of resources incurred in carrying on production (Gherasim A., 2007).

In structure, the cost of production include:

- **variable costs;**
- **fixed costs**

The calculation formula is:

$$ChT = ChV + ChF$$

In which:

$ChT$  – total production costs

$ChV$  – variable costs

$ChF$  – fixed costs

**Variable costs** are directly influenced by the changes in production volume. They start the production process and ensure its deployment (Chiran A., Gîndu Elena, A. Banu, 2002). The main variable costs in the production of goat milk are:

- feeding costs Chf;
- biologic material costs Chmb;
- electricity and fuel costs Cee;
- medicines and veterinary costs Chmed;
- other material costs Cham;
- supply costs Chap;
- animal insurance costs Chas.

The calculation formula of variable costs is:

$$\text{ChV} = \text{Chf} + \text{Chmb} + \text{Cee} + \text{Chmed} + \text{Cham} + \text{Chap} + \text{Chas}$$

#### *Feeding costs*

Have the largest share of total variable costs and are a lever through it can influence both the level of production on an animal and the cost of the main product. Feed expenses are calculated based on average daily intake, respectively fodder varieties included in the ration, the duration of the animal maintenance, delivery prices for each range of forage in the ration. For each element of the ration, forage quantity is multiplied by its price and adding up the results, according to the formula below:

$$\text{Chf} = \sum_{i=1}^n q \times \text{pf}$$

in which:

Chf – feeding costs;

n- no. of fodder varieties;

q – quantity of fodder variety;

pf – fodder price.

*Biologic material costs* represent the counterpart of the replacement and extending effort for the existing livestock, both from own breeding and through purchases from outside the farm (I.C.E.A.D.R.-P.S. 211/2011, Stage 3). In milk production, such expenditure shall be determined by taking into account the price of replacement heifers that is introduced into the breeding herd and of operation period. The calculation formula is:

$$\text{Chmb} = \text{ptf} / D$$

in which:

Chmb – biologic material costs;

ptf – price for a heifer;

D – duration of operation period, in years.

#### *Electricity and fuel costs*

Energy consumption is due to feed processing, lighting and warming shelters, manure removal, water supply etc. In determining the power consumption is taken into account: type and number of consumers, the installed capacity of each, aggregates power, number of hours of operation. Fuel consumption involves supplying with raw materials into the farm, transport of foddors inside farm, their distribution in the manger, transport of primary and secondary animal products etc. The amount of daily consumption of electricity and fuel indicates the yearly necessary per head. The calculation formula is as follows:

$$\text{Cee} = \text{Tee} \sum_{i=1}^n \text{qeei} \times \text{Di}$$

in which:

Cee = quantity of electricity;

Tee = tariffs of electricity;

qeei = quantity of electricity per consumer;

Di = duration of operation for each consumer.

*Medicines and veterinary costs*

Veterinary actions contribute to maintaining the health of livestock and require measures to detect and prevent cases of disease, disinfection and mandatory vaccinations etc. Veterinary medicines and materials are used to make mandatory and necessary treatments, for individualization animals, treating legs diseases, pregnancy detection etc. Their value per head is summed at the end of year, resulting in costs of veterinary medicines and materials.

The calculation formula is:

$$Chmed = Cho + Chn$$

in which:

Chmed - medicines and veterinary costs;

Cho – mandatory actions costs;

Chn – necessary actions costs.

*Other material costs*

These costs involve maintenance and repair farm machinery and equipment, labour protective equipment insurance, sanitary veterinary instruments, buckets, rub down instruments, chains, forks, shovels etc.

*Supply costs*

Supply costs are due to ensuring farm with foddors, veterinary medicines and transport of biologic material, as a share of these expenditure categories.

*Animal insurance costs*

The size of this category of expenditure depends on the total amount for which the animals were insured and on the insurance agent that insurance was made with.

**Fixed costs** include those expenses that are not directly dependent on the volume of production (Chiran A., Gîndu Elena, A. Banu, 2002) and include:

- labour costs Chfm;
- general costs Chg;
- depreciation costs Cha;
- interest on loans Chd.

The calculation formula is:

$$ChF = Chfm + Chg + Cha + Chd$$

*Labour costs*

Depend on the needs of the farm labour force, which are determined by the working norms, given the degree of mechanization and specific activities.

*General costs* are a variable share (about 2-3%) of the variable costs.

*Depreciation cost* is the cost of investment on stable place, shared to the operation period of the assets.

*Interest on loan* depends on the nature and duration of the loan, its source and size.

**Material costs**

In the total production costs, material costs are an important share. They are also called intermediate consumption and are part of variable costs. In their structure are included:

- foddors costs;
- biologic material costs;
- cost of medicines and veterinary material;
- other material costs.

The calculation formula is:

$$Ch_{mat} = Ch_f + Ch_{mb} + Ch_{med} + Ch_{am}$$

in which:

$Ch_{mat}$  – material costs;

$Ch_f$ - fodders costs;

$Ch_{mb}$  – biologic material costs;

$Ch_{med}$  - cost of medicines and veterinary material;

$Ch_{am}$  - other material costs.

#### **Cost per unit of product (unitary cost)**

J. Stuart Mill, quoted by Şteliac Nela ([www.oeconomica.uab.ro](http://www.oeconomica.uab.ro)), showed that the maximum limit under that the selling price of products cannot decrease is given by the production cost. This is one of the most synthetic indicators of economic activity, which reflects by its structure, the effectiveness degree of the farm activity (Postelnicu Gh., 1994). The production cost is the intrinsic value of the commodity, as it is the sine qua non condition of simple reproduction, of continuity of production (Popescu, Gh., 2002).

Production cost is not a given measure, has not a constant character, but it is influenced by a number of factors, such as: production volume, production structure, production factors prices, products quality and features, the quality level of labour and of technical equipments of production, production organizing etc. It can be reduced by optimizing the use of these factors (<http://www.cuttingcost.wordpress.com>).

This indicator highlights the total production costs incurred in carrying out a principal product unit (in this case, milk) and is the main indicator that influences the profit. Since in the case of milk production, in addition to the main production, is obtained a secondary production with economic value, the unitary cost is calculated by the remaining value method, like in the formula (Chiran A., Gîndu Elena, A. Banu, 2002):

$$C_p = Ch_T - VQ_s / Q_p$$

in which:

$C_p$  – unitary cost of production;

$Ch_T$  – total production costs;

$VQ_s$  – value of secondary production;

$Q_p$  – total main production.

#### **Profit**

The profit is a synthetic indicator of assessing the farm economic efficiency and represents the difference between revenues obtained and total production costs. This result is called *gross profit* or taxable income. Deducting tax from him, we get *net profit*.

The calculation formula of gross profit is:

$$P_b = VQ - Ch_T$$

in which:

$P_b$  – gross profit;

$VQ$  – total income;

$Ch_T$  – total costs.

The capacity of a farm to obtain profit is called *profitability*.

Profitability is a complex economic category, which reflects in a synthetic form the efficiency of the entire production activity of a farm. In the market economy, is an essential condition for the existence of entities. Profitability involves obtaining higher revenues than expenses, after capitalization of production, understanding by this the capacity of the economic unit to get a financial surplus from activities (Andronic B.-C., 2000).

The profitability of a farm is a concept commonly used and generally expressed by the rate of return.

**The rate of return** is a relative value that expresses the degree to which the whole capital brings profit, being one of the most synthetic efficiency indicators of the farm activity (Gheorghiu Al., 2004). This indicator expresses the efficiency of production costs using, or more precisely, the gross profit for 100 RON related production costs. Rate of return, as an indicator of efficiency, can have different forms, as considering the gross profit or the net profit in the numerator, or reporting base that expresses the effort or cost of production process changes. The calculation formula is:

$$Rr = (P / Chp) \times 100$$

in which:

Rr – rate of return;

P – profit;

Chp – related production costs.

In the general form, economic efficiency is called return and if the ratio between effect and effort is expressed as a percentage, this is called rate of return (Zaman Ghe., Geamănu Marinela, 2006). The rate of return is a ratio between an indicator of results (profit or loss) and an indicator that reflects the resources consumed (Vâlceanu Gh., Robu V., Georgescu N., 2004).

### **Breakeven point**

Breakeven point represents a modality of a farm activity risk assessment, depending on fluctuations in the economic environment. It is also called critical or equilibrium point, indicating the production extent to which total costs are equal to revenue, resulting in null. Up to this level of production, the farm register losses; activity becomes profitable after the breakeven point.

Breakeven point can be measured both in physical and value units. Formula for calculating breakeven point (PR) is (Zaman Ghe., Geamănu Marinela, 2006):

$$PR = ChF / MCV$$

in which:

CF – fixed costs;

MCV – variable costs margin;

MCV = VQ – ChV.

The breakeven point analysis is an instrument which highlights the point where the farm activity become profitable, determining the minimum level of income, needed to cover fixed and variable expenses. The fixed costs are lower, the faster it can reach the breakeven point, and then get profit.

In the year 2014, for goat milk, the indicators described above are illustrated in Table 1:

Table 1 – Budget of goat milk 2014

<i><b>INDICATORS</b></i>	<i><b>Average production 350 l/head</b></i>	
	<i><b>Lei/head</b></i>	<i><b>Lei/l</b></i>
<b>A. VALUE OF PRODUCTION</b>	900,00	2,57
A <sub>1</sub> . Of which main production	700,00	2,00
<b>B. SUBSIDIES</b>	38,20	0,11
<b>C. GROSS PRODUCT</b>	938,20	2,68
<b>D. TOTAL COSTS</b>	751,35	2,15
D <sub>1</sub> . Of which for main production	551,35	1,58
<b>I. VARIABLE COSTS</b>	651,66	1,86
<b>1. Fodder costs</b>	532,20	1,52
2. Biologic material	60,00	0,17
3. Energy and fuel	17,13	0,05
4. Medicines and veterinary material	17,00	0,05
5. Other material costs + water	8,00	0,02
6. Supply costs	15,23	0,04

<b>INDICATORS</b>	<b>Average production 350 l/head</b>	
	<b>Lei/head</b>	<b>Lei/l</b>
7. Animal insurance costs	2,10	0,01
<b>II. FIXED COSTS</b>	99,69	0,28
- Labour costs	80,00	0,23
- General costs	12,69	0,04
- Interest on loans	4,00	0,01
- Depreciation	3,00	0,01
E. GROSS PROFIT	148,65	0,42
Taxes	23,8	0,07
<b>F. NET PROFIT + subsidies</b>	163,1	0,47
<b>G. RATE OF RETURN (%)</b>	27,0	27,0
<b>H. RATE OF NET PROFIT + subsidies (%)</b>	29,6	29,6
<b>COST OF PRODUCTION</b>	551,3	1,58
<b>PREDICTABLE INTERNAL MARKET PRICE</b>	700,0	2,00

The goat milk estimated budget for 2014 for an average of 350 l / head shows that within the total costs, variable costs represent the largest share (86.7%), the difference being of fixed costs. In the variable costs, the highest share is of feed costs (81.7%), followed by biological material costs (9.2%). Estimated cost per unit of product is 1.58 lei/ l milk, with a profit of 0.47 lei / l and a rate of return of 27%.

Table 2 – Breakeven point - Simulations of possible scenarios

<b>Indicators</b>	<b>Values</b>	<b>%</b>	<b>Breakeven point (profit 0)</b>	<b>Profit obtainable at an increase in the production value by 20%</b>	<b>Profit obtainable at a decrease in the value of production by 20%</b>	<b>Maintaining initial profit when fixed costs are reduced by 10%</b>
Value of total production	900	100	361	1080	720	863,87
Variable costs CV	651,66	72,41	261,31	781,99	521,33	625,50
Variable costs margin MCV	248,34	27,59	99,69	298,01	198,67	238,37
Fixed costs CF	99,69		99,69	99,69	99,69	89,72
Gross profit	148,65		0	198,32	98,98	148,65

Simulation from Table 2 indicates that for an increase / decrease in the value of production by 20%, gross profit increases / decreases by 33.4%, and if it keeps the profit value, while lowering fixed costs by 10%, total production value is about 96% of the initial. Breakeven point value for a production value of 900 lei / head is 361 lei / head.

## CONCLUSIONS

Economic efficiency in the production of goat milk refers to the value of all inputs used. Of all the means of production technically efficient, it must be chosen the one that attracts the minimum amount of inputs, which involves economic efficiency.

Determination of economic efficiency must be based on knowledge of the elements that characterizes the production effort and has three main sources:

- Optimal use of resources;
- Rational use of labour;
- Production management.

Regarding the size of income from milk goats' operation activities, it depends on:

- production of milk obtained and the by-products;

- prices level;
- costs of production factors;
- interest on loans;
- forms of state support;
- economic, natural and biological factors that influence income.

## BIBLIOGRAPHY

1. Andronic B.-C., 2000 – Performanța firmei – abordare transdisciplinară în analiza microeconomică, Polirom Publishing, Iași
2. Chiran A., Gîndu Elena, Banu A., 2002 – Economia creșterii animalelor – teorie și practică, Bucharest
3. Dinu E., Analiza economică și financiară a firmei, Cap.5, [www.biblioteca-digitala.ase.ro/biblioteca/carte](http://www.biblioteca-digitala.ase.ro/biblioteca/carte)
4. Gheorghiu Al., 2004 - Analiză economico-financiară la nivel microeconomic, Economică Publishing, Bucharest
5. Gherasim A., 2007 – *Perfecționarea metodologiilor de analiză și evaluare a eficienței economice la nivelul firmei integrate în economia de piață*, PhD Thesis
6. Grodea Mariana, 2013 – *Piața laptelui în România – evoluții și tendințe post-aderare*, publicată în Determinanți economici, sociali și instituționali ai performanțelor și securității alimentare, pag.301-3016, ISBN 978-973-27-2367-8
7. I.C.E.A.D.R., 2012 – P.S. ADER 211- *Determinarea indicatorilor tehnico-economici ai tehnologiilor de producție la produsele vegetale și animale aplicate în vederea creșterii performanțelor de mediu (costuri, productivitate, rentabilitate, marjă brută)*, Stage III – *Proiectarea metodologiei de estimare și evaluare a activității din producția vegetală și animală*
8. Jilăveanu Ciulinaru I. Denisa Carmen, 2005 – Cercetări privind sporirea eficienței economice a producției de cereale și de plante tehnice în județul Călărași, PhD Thesis
9. Johnson J., Baum K., Prescott R., 1985 - *Error and limitations in economic indicators and agricultural policy analysis*, USDA, [www.amstat.org/sections/srms/Proceedings/papers/](http://www.amstat.org/sections/srms/Proceedings/papers/)
10. Oancea Margareta, 2003 – *Managementul modern în unitățile agricole*, Ceres Publishing, Bucharest
11. Parmacli D., Stratan A., 2010 – Eficiența economică a producției agricole, IEFS Publishing Complex, Chișinău
12. Penot E., Marie Bar, Hélène David-Benz, 2013 - Use of relevant economic indicators for the evaluation of farming systems in terms of viability, resilience, vulnerability and sustainability: the case of the Lake Alaotra region in Madagascar, [hal.archives-ouvertes.fr/.../penot\\_bar\\_benz\\_V3\\_IFSA\\_with\\_figures\\_viab...](http://hal.archives-ouvertes.fr/.../penot_bar_benz_V3_IFSA_with_figures_viab...)
13. Popescu, Gh., 2002 - Evoluția gândirii economice, Edition II, George Barițiu Publishing, Cluj-Napoca
14. Postelnicu Gh., 1994 - Economie politică, vol. I, curs litografiat, U.B.B. Cluj-Napoca
15. Proiect ADER 121 - Faza 9 - Studiu privind conservarea eficienței economice a producției vegetale și animale, în condițiile intervențiilor pentru creșterea performanțelor de mediu, București, 2014
16. Sandu Gh., 1995 – Modele experimentale în zootehnie, Coral Sanivet Publishing, Bucharest
17. Șteliac Nela - Cheltuielile și costurile de producție – abordări conceptuale, ([www.oconomica.uab.ro](http://www.oconomica.uab.ro).)
18. Tănăsescu Rodica, 1997 – *Analiza economică*, curs litografiat, U.S.A.M.V., Bucharest
19. Turek Rahoveanu A., 2006 – Forme de exploatare a terenurilor în condițiile agriculturii românești – PhD Thesis
20. Vâlceanu Gh., Robu V., Georgescu N., 2004 - Analiză economico-financiară, Economică Publishing, Bucharest
21. Zaman Ghe., Geamănu Marinela, 2006 – Eficiență economică, România de Măine Foundation Publishing , Bucharest
22. <http://www.cuttingcost.wordpress.com>

# INTERPRETATION OF THE RESULTS OF THE TECHNICAL INDICATORS OF AGRICULTURE-SPECIFIC ECONOMIC

OLTEANU VICTOR<sup>1</sup>

**Summary:** *The passage of a technological process is carried out only in circumstances where the process is efficient in economic terms. Assessment of technological processes can be done by means of indicators which can be: economic, technical, economic and technical. Technical-economic indicators used in assessing technological processes are scalars with or without dimensions, which characterizes a substance, a technical device, a system, or a technological process both technically and economically.*

**Keywords:** *system technology, agricultural establishments, financial statements.*

## INTRODUCTION

Analysis of the activity of agricultural units is subject in scope and depth of system metrics and information capacity of each indicator is a numeric expression of a phenomenon, or economic process, defined in time and space and can be characterized by absolute size, relative sizes, medium sizes, indices and coefficients. Use of indicators in the economic analysis has several advantages, such as:

- evolution of a suggestive pose phenomenon (fixed-base indices);
- presents the annual growth factors or phenomena (chain indices);
- can be done comparing the indicators over time and space;
- offers some independence towards value indicators, in terms of significant price variations;
- in her analysis give an "alarm signal" by showing the trend phenomenon analyzed;
- can be used both in the analysis of retrospective and forecast.

In the case of agricultural holdings, the information needed to maintain the competitiveness of its own affairs and its products must be obtained from both internal sources (annual financial statements, management accounting and budgeting analysis), as well as from external sources (other than the holding's accounts). This information allows the evaluation, selection and choice of all allowable variants, the most effective decisions, imposing the need for use of methods and ways of working based on addressing systemic and economic-mathematical modeling, to allow a thorough technical-economic analysis based on consideration of all technical possibilities, linking close to production targets with existing resources, concurrent analysis of all possible variants of action to establish a rational priorities for meeting the diverse needs etc..

## MATERIALS AND METHOD

In order to be able to calculate and interpret the multiple aspects of the relationships that are formed objectively between efforts and results in the production of agricultural holdings, it was necessary to the development and use of a system of economic and technical indicators with which to be able to tackle specific agricultural activities, systemic.

### A. Technical indicators

The use of such indicators in the indicators are: agricultural land fund; investment indicators; mechanization of agriculture indicators; mainly indicators of agricultural production; indicators of growth and exploitation of animals; forage base indicators; indicators of employment and labour productivity; indices of agricultural production.

Land Fund are indicators: the indicators of land use indicators, areas cultivated, structure of cultivated (indicators indicate percentage).

---

<sup>1</sup> CsIII. Olteanu Victor: Institutul de Cercetare pentru Economia Agriculturii și Dezvoltare Rurală

Investment indicators most used are: specific investment; investment recovery period; the coefficient of efficiency of investments; investment cost/total production 1000 lei; the increase of production/production unit (ha); reduce cost/unit of product.

Mechanization of agriculture indicators be expressed through: indicators of energy resources (databases) and energy resource use indicators.

Indicators of energy resources (databases) are represented by: the total volume of resources, energy endowment, factor structure of energy resources (assets), the total number of tractors (physical, conventional)

**Energy resources use indicators are: the volume of work performed, the average number of tractors that have actually worked**

Mainly agricultural production indicators have in mind that the use of chemicals is aimed at increasing yields and achieve higher quality, constant production. The main indicators used are: the total quantity of fertilizer used (chemical fertilizers, organic fertilizers); the amount of fertilizer (organic chemicals) used on crops, which in the case of chemical fertilizers is expressed in gross substance or active ingredients; chemical fertilizers assortment (nitrogenous, phosphatic, complex); structure (percentage) on the surface of chemical fertilizers (total, crops) that have been applied chemical fertilizers (area fertilized, treated, as amended); share (%) of chemicalize surfaces relative to the total area and crops.

**Indicators of growth and exploitation of animals. Indicators on the basis of the forage. Indicators used in animal husbandry**

Livestock accounts for all the animals of the same species, race, category from a farm. The main indicators characterizing the livestock are:

- Livestock species, age groups, sex, breed, destined to a specific date;
- Rolling stock is the number of animals that are holding it in a certain period, resulting from the original herd, plus entries from this period;
- The minimum number of animals represent the lowest number of animals of a species, category during the year;
- The maximum number of animals is the largest number of animals of a species, category during the year;
- The average number of animals represents the average number of animals of a species, category in a given period, determined by the evolution of animals during that period.

Apart from structural indicators mentioned in economic calculations are used:

- the structure of the race of each breed to share = total number of species. The percentage is determined by the ratio between the number of animals in each race and the total number of animals of the species concerned, in physical units.
- norm (of) serving = number of animals that can be taken care of by an employee or a group of employees in the technical and organizational conditions well defined.

Indicators of employment and labour productivity are represented by resource indicators: work on staff, representing the total number of employees, average number of employees, the labour structure.

- Labor utilization indicators are: the average number of employees (Nef), index (grade) of the use of force, the degree of seasonality of Supply, employment seasonality, the intensity of seasonality.
- Labour productivity indicators: Productivity Index labour productivity

## B. Economic indicators

The indicators of this type is the system of indicators go into agricultural holdings, which assists in the economic analysis of production and technologies required to provide the results of the characterization of the production activity in the conditions of application of a specific technology, to measure the volume of production factors, assign highlighting material and financial means are used and how to use it in production. They should highlight the contribution of technical progress introduced in increasing production and economic efficiency estimation of the ratio of the effort made and the effect obtained. Indicators are taken into consideration for the characterization of the economic efficiency of production technologies, new or better must reflect the results achieved compared to a basic or initial technology.

Of the main indicators of economic analysis of production technologies are:

1 total production (\$/hectare total output, total production lei/a worker and lei/year; total production to 1000 lei fixed costs, the total output of 1000 lei production expenditures; the total output to 1000 lei material expenses; the share value of cargo in total production output);

2 material costs (material costs to total production 1000 lei, expenditure materials to 1000 lei material expenses; main production to 1000 lei material expenses freight production per unit of product);

3 primary production (the main production lei/lei per hectare and per year; the main production to 1000 lei fixed costs; the share of the main products in total);

4 labour costs ( labour costs per hectare and year, expenditures with the labour force in the total cost of production);

5 total costs of production (total expenditure per hectare and per year, total expenditure on production to 1000 lei total production total production expenditures; the 1000 lei cargo production);

6 cost of production (production cost per unit produced (tone, kg, PCs);

7 ROI (profit per hectare; profit from 1000 lei production expenditures; the profit to 1000 lei fixed costs, the rate of profit);

8 labor productivity (output per worker overall or total workers; the total production per unit of time worked; a worker's main production; the profit per unit of time worked), etc.

To be able to compute the schedules listed above, it should be known the expenditure, revenue and profit, the unit's accounting statements, in order to assess its profitability.

### **Farm income**

In the analysis of distinction between the two categories: income from farm income from agriculture. This differentiation reveals that at the level of a holding can be deployed and non-agricultural activities that can increase total revenue, having positive effects on the viability of the farm. In terms of income from agriculture, it should be noted that their size depends on: the production obtained, the level of prices, costs of production factors, interest from contracted credits, if any, policies for supporting agriculture by the State, as well as a host of other natural and economic factors that influence the biological productivity and farm incomes.

### **Farm expenses**

The expenditure accounts for the consumptions of labor and material in any kind of activity. In agriculture, the costs for the establishment of agricultural and livestock products, the

unit of area (ha) in plant production and livestock or product in the animal production.

### **Farm profit**

Nationally defined and interpreted in various forms. The notion of profit is regarded as accepted and understood differently by economists in the light of the overall concept, as a result of the economic effort (cost of production) and the effect resulted in proceeds. To gain profit, in all situations where total revenue should be greater than the total expenditure. Looking at it this way, "the profit can be defined as a surplus of receipts over costs", he is "positive difference between income derived through the sale of assets made by a trader and their cost, regarded as an expression of economic efficiency." Profit is "part of the selling price of the goods or services of the company; the final price is determined by the margin (share) profit accepted. "The common aim of all economic operators are obtaining profit, which is one of the most used indicators of the economic activity of enterprises.

### **Economic efficiency indicators of the agricultural farm**

a. Indicators reflecting the net profitability of the agricultural farm. They allow an analysis of profitability only in the total activity of the unit:

- Net income calculated as a difference between gross profit and income tax. He remains available to the economic unit to be allocated according to the destinations specified;

b. The net rate of return of the total activities of the farms, which are determined according to the resources consumed (total expense), income from total activity and resources used considered that effort (manpower, Land Fund, fixed assets, current assets, the capital). Indicators that reflect gross profitability of agricultural holdings. They allow an analysis of the profitability of both the total activity of the unit and on the types of activities or the entire Department's organizational structures, as well as on each product:

- Gross profit is calculated as the difference between total revenue and total expenditure (without being included in the corporate income tax);
- Gross rate of return calculated as ratio between gross profit and resources taken into account (including the revenue unit).
- Indicators which reflect the overall profitability of farms:
- net profit and net rate of return of the total activity of the agricultural holding;
- gross profit and gross rate of return of the total activity of the agricultural holding;
- gross profit and gross rate of return by types of activities (operational, financial activity and exceptional);
- gross profit and gross rate of return on the organizational structures;
- gross profit and gross rate of return on various products.

On the basis of this indicator system can identify organizational structures, areas of activity and products where there has been a dynamic period of profitability or a favorable dynamic, but not up to the level of competitiveness required by internal and external market, giving the possibility of taking measures to increase the profitability of the entire economic and financial activities on a higher rung. Profile of a complex agricultural enterprises (vegetable, livestock and industrial) as well as the organizational structure of these units (farms and fields, bins, etc.) make it necessary to trace the contribution of each branch of production and organizational links to the profitability of the enterprise.

## **CONCLUSIONS**

For Romania, agriculture is an absolute priority, because it is a sector with considerable

potential, traditionally occupied an important place in the structure of the Romanian economy. It is an important factor of social stability and the maintenance of ecological balance, being the branch which provides food for the population and significant amounts of raw materials for the food industries and other non-food industries.

Agricultural development cannot be purely economic, based on the principle of maximum profit-profit immediately that cannot be designed in the absence of access to information-but we will have to become a sustainable development, able to find the most suitable criteria to optimize report-resource needs, taking into account four factors: population, natural resources and the natural environment, industrial production and pollution. Agricultural activity must be conducted on principles which should govern the farms producing agricultural goods and services in agriculture, resources used, costs and revenues, including educational management necessary for both those who produce, but also for those who sell and consume goods and services in question.

As human activity, specialized agriculture encompasses both the production and distribution of agricultural goods and services, and is considered by some economists a "vital sectors" of socio-economic life. The commercial component increases as share in total agricultural production, the agriculture will be more efficient and more integrated Romanian agriculture in domestic and international economy.

Boosting the agriculture sector as well as to farmers as participants in achieving economic and social equilibrium cannot be sustained only by a national effort, legislative and financial.

## BIBLIOGRAPHY

1. Anghel I., Marketing, Editura ASE, București 2000;
2. Berca M., Agricultura in tranziție, Editura Ceres, București 2001;
3. Blaciotti S., Definirea interesului național prin identificarea capacităților reale de producție agricolă, Universitatea Națională De Apărare „CAROL I”, Centrul De Studii Strategice De Apărare Și Securitate, Colocviu Strategic Nr.11/2009;
4. Bold I., Exploatația agricolă – organizare, dezvoltare, exploatare, Ed. Mitron, Timișoara;
5. Bold, I., Rus Gh., Strategii pentru agricultura românească, Editura Mitron, Timișoara, 2003;
6. Dragomir V., „Proiectarea unui sistem de tip holding, prin intermediul asocierii pentru produsele agricole de origine vegetală din județul Călărași”, Teză de doctorat, București, 2008;
7. Enache E., Analiza economico-financiară, Editura Independența Economică, Brăila, 1998;
8. Tofan Al., Dimensiunea economică a exploatațiilor agricole, Analele Științifice ale Universității Alexandru Ioan Cuza Iași, vol LII/LIII, Științe Economice, 2005/2006.

## THE ECONOMIC EFFICIENCY OF BEEF CATTLE IN EXTENSIVE SYSTEM

IURCHEVICI LIDIA<sup>1</sup> CHETROIU RODICA<sup>2</sup>

**Abstract:** *In Romania there are large areas of unused pasture, which are well suited for the meat breeds and the geo-climatic conditions are favorable for beef. The beef breeds are more profitable than the milk ones. They have a yield of 65-70% cut, the meat quality is very good and the animals are not at all pretentious for food, they consume all plant debris. One advantage is that the growth rate of animals is faster, a calf, for example, can reach in 15-20 months at a weight of 550-650 kg.*

**Keywords:** *cattle, meat, meadow, efficiency*

### INTRODUCTION

The livestock sector in Romania has passed and still passing through a difficult situation, due to rising of production costs, to competition generated by imports, increasing prices for forages necessary to feed animals, rising prices for energy, fuel and other utilities. Currently, the beef breed is not very common in Romania, livestock being around 29,000 heads, meaning no more than 2.3% of the total number. Romania has a total area of 5 million hectares of pastures and meadows, and the implementation of the systems of raising beef breeds is possible in all areas of the country, including the mountain.

On the other hand, the demand for beef cattle increased and is still growing, while the deficit is increasing from year to year. The solution to reduce the deficit of the beef on European market is transforming grass from Romanian pastures in beef of very good quality.

With the disappearance of milk quotas starting the next year, Romanian farmers are turning to beef breeds, especially because the demand on market increased and consumers have begun to conscious more about the quality of this product, although the beef remains the more expensive. So, in Romania is a real need of raising beef cattle. If until now, most of those who have established beef cattle farms were oriented toward mixed breeds, particularly effective is Aberdeen Angus cattle breed that arouses the interest for many farmers in Romania. Beef, especially from specialized categories, is considered a meat considered as medicine, containing special amino acids and is correspondent in Omega 3 with salmon meat. One advantage is that the growth rate of animals is faster, a calf, for example, can reach in 15-20 months at a weight of 550-650 kg.

The purpose of this paper is to promote the cattle breed Aberdeen Angus that are well suited to pasture, thus naturally achieving a beef production of top quality, with a minimum of concentrates feed.

### MATERIAL AND METHOD

The paper is based on estimating the economic efficiency and profitability of raising Aberdeen Angus beef cattle breed, extensive operating system. This breed is more profitable than domestic mixed breeds, the beef quality is very good, has an efficiency of 65-70% cut, the ratio meat / bone is 5: 1 and the animals are not at all pretentious for food, they eat all the vegetal debris. The ideal place for raising beef cattle is hilly mountain area and where the owners of agricultural land do not cultivate these areas.

---

<sup>1</sup> Eng. Iurchevici Lidia – Scientific researcher III, Research Institute for Agriculture Economy and Rural Development, e-mail: lidia.iurchevici@iceadr.ro

<sup>2</sup> Eng. Chetroiu Rodica – Scientific researcher, Research Institute for Agriculture Economy and Rural Development, e-mail: rodica.chetroiu@iceadr.ro

## RESULTS AND DISCUSSIONS

The establishment of farms for raising and fattening cattle from mother cows specialized for beef is a profitable activity, which contributes to increased income from this activity, when seeking to obtain the greatest possible quantity of meat in a short time, with high quality and at a lower production cost.

Calculations have studied a module of 50 head of steers, obtained from mother cows of Aberdeen Angus breed, whose fattening take place on pasture reseeded and plotted, with addition of concentrate fodder with PVM, ensuring the achievement of weight gain of about 1200 g / day / head and a delivery weight of 550 kg / head. The start of fattening is at a weight of about 200 kg / head, until this weight the calves growing near mothers (approx. 5-6 months), all production of milk being used only for breastfeeding. Along with feeding with mother's milk, the daily ration of calves are gradually introduced different kinds of feed (concentrate, fiber, green forage), in accordance with age. During this period is given food ad libitum, consisting of 20% chopped hay, 50% juicy feed and 30% combined feed. The completing of the food is made with a protein - vitamin - mineral supplement introduced into mixture. In the success of fattening an important role is of proper feeding of calves with mixed feed administrated ad libitum, providing fresh water, salt and microelements bricks for licking.

Fattening in extensive system can take place in several variants: only on pasture, on pasture with addition of green forage from conveyor, on pasture with addition of concentrated supplements, on green forage cut with addition of concentrates etc. Whichever chosen variant, will meet daily some methodological indications:

- daily ensuring the mineral supplement required in food, consisting of calcium and salt;
- providing water sources on pasture, bowers and troughs needed to ensure the supplement of concentrate food;
- grouping animals on pasture on sex and lots, parceling pastures (grazing a plot not being indicated more than 7 days, and during the day of 12-14 hours). Raising is profitable only if the farm has enough land for grazing, but it should be noted that the pasture is not sufficient without over-seeding with clover, trefoil and grasses like fescue, Lolium etc.

On a cultivated pasture, the daily gain may be between 1 and 2 kg. In these conditions, feeding costs have the largest share of the cost of meat, about 64% of total expenditure, while the remaining costs are represented by the value of biological material (22.8%) and other expenses with inputs (medicine, energy and fuels). It is worth noting that, of the total, about 3.9% is the labor costs, since this operating system does not require special care of animals (Table 1).

**Table 1 – The estimate of costs of Angus beef breed**

SPECIFICATION	QUANTITY		Average production 1200 g/day	
			COSTS	
	M.U.	M.U./head Quantity	Lei/head/year	
			Price lei/M.U.	
1. Fodder costs				3636
Hay	kg	1665,00	0,40	666
Green forages	kg	6300,00	0,1	630
Juicy forages	kg	4500	0,2	900
Concentrates + PVM	kg	1200	1,2	1440
2. Biologic material	kg	200	6,5	1300
3. Energy and fuel, of which				94,2
Energy	kW/year	60	0,57	34,2

Fuel	l/year	10	6	60
4. Medicines and sanitary materials, of which:	lei			16,00
Mandatory actions	lei			10,00
Necessity actions	lei			6,00
5. Other material costs	lei			20,00
6. Supply rate	lei			123,8
7. Insurances	lei			45,5
<b>TOTAL VARIABLE COSTS</b>	lei			<b>5235,5</b>
8. Labour costs	lei			200
9. General costs	lei			101,3
10. Interests for credits	lei			80
11. Depreciation	lei			70
<b>TOTAL FIXE COSTS</b>	lei			<b>451,3</b>
<b>TOTAL COSTS</b>	lei			<b>5686,8</b>

In order to farm become economically viable, it is necessary to raise at least 50 head, the income obtained from beef cattle being more encouraging when receive subsidy. Thus, since 2012, the farmers from deprived areas have benefited of a financial support of 300 euros per animal, for the breeds with a certificate of origin. At the same time, the steers for fattening may be delivered out generally in countries such as Spain or Greece, at a price of over 3.5 euros per kilogram live that is the price of beef in Romania stores. The local producers could benefit from the deficit of beef on the European market (300,000 tones per year). In addition, it might find a place on the local market, where about 80% of consumption is ensured by imports. The estimates in this study show that the activity of breeding beef cattle from Angus breed is profitable (Table 2).

**Table 2 – The budget of beef with subsidies for deprived areas**

INDICATORS	Average production 1200 g/day		Lei/farm
	Lei/head	Lei/kg	50 heads
<b>A. VALUE OF PRODUCTION</b>	7270	13,2	363500
A1. Of which, main production	7150	13,0	357500
<b>B. SUBSIDIES</b>	1320	2,4	66000
<b>C. GROSS PRODUCT</b>	8590	15,6	429500
<b>D. TOTAL COSTS</b>	5686,8	10,3	284341,2
D1Of which for main production*	5566,8	10,1	278341,2
<b>I. VARIABLE COSTS</b>	5235,5	9,5	261775,0
1.Fodder costs	3636	6,6	181800
2.Biologic material	1300	2,4	65000
3.Energy + fuel	94,2	0,2	4710
4.Medicines and sanitary material	16,00	0,0	800
5.Other materials + water	20,00	0,0	1000
6.Supply rate	123,8	0,2	6190,0
7.Insurance	45,5	0,1	2275
<b>II. FIXED COSTS</b>	451,3	0,8	22566,2
-Labour costs	200	0,4	10000
-General costs	101,3	0,2	5066,2
-Interest on credits	80	0,1	4000
-Depreciation	70,0	0,1	3500
<b>E.TAXABLE INCOME</b>	1583,2	2,9	79158,8

Taxes and duties	253,3	0,5	12665,4
F. NET INCOME + subsidies	2649,9	4,8	132493,4
G. TAXABLE INCOME RATE (%)	28,4	28,4	28,4
H. NET INCOME RATE + subsidies (%)	47,6	47,6	47,6
COST OF PRODUCTION	5566,8	10,1	278341,2
PREDICTIBLE PRICE ON INTERNAL MARKET	7150	13,0	357500

The economic efficiency calculations reveal the beef cost and the profit that farmer can get for developing this activity, during a production cycle. Analyzing the data in Table 2, it can be seen that for a steer of 550 kg is spent 5566.8 lei / year and receive 7150 lei and taxable income obtained is 1583.2, which means a rate of taxable profit of 28.4%. By giving subsidies of 300 euro / fattening cattle (equivalent to 1320 lei), the net profit rate increases to 47.6%. Thus, for a 50 head farm, the net income plus subsidy is 132,493.4 lei / year. If the subsidy is only 450 lei / capita, net income plus subsidy is just, 88993.4 lei / head (Table 3).

**Table 3 - The budget of beef with subsidies for other areas**

INDICATORS	Average production 1200 g/day		Lei/farm
	Lei/head	Lei/kg	50 heads
A. VALUE OF PRODUCTION	7270	13,2	363500
A1. Of which, main production	7150	13,0	357500
B. SUBSIDIES	450	0,8	22500
C. GROSS PRODUCT	7720	14,0	386000
D. TOTAL COSTS	5686,8	10,3	284341,2
D1Of which for main production*	5566,8	10,1	278341,2
I. VARIABLE COSTS	5235,5	9,5	261775,0
1.Fodder costs	3636	6,6	181800
2.Biologic material	1300	2,4	65000
3.Energy + fuel	94,2	0,2	4710
4.Medicines and sanitary material	16,00	0,0	800
5.Other materials + water	20,00	0,0	1000
6.Supply rate	123,8	0,2	6190,0
7.Insurance	45,5	0,1	2275
II. FIXED COSTS	451,3	0,8	22566,2
-Labour costs	200	0,4	10000
-General costs	101,3	0,2	5066,2
-Interest on credits	80	0,1	4000
-Depreciation	70,0	0,1	3500
E. TAXABLE INCOME	1583,2	2,9	79158,8
Taxes and duties	253,3	0,5	12665,4
F. NET INCOME + subsidies	1779,9	3,2	88993,4
G. TAXABLE INCOME RATE (%)	28,4	28,4	28,4
H. NET INCOME RATE + subsidies (%)	32,0	32,0	32,0
COST OF PRODUCTION	5566,8	10,1	278341,2
PREDICTIBLE PRICE ON INTERNAL MARKET	7150	13,0	357500

Comparing the two variants, it can see a noticeable difference in terms of net income plus subsidy rate of nearly 32%, greater when granting 300 euro / per head, compared to areas where only grants 450 lei / head.

## CONCLUSIONS

- Aberdeen Angus beef breed has the best growth potential in Romania (better than the country of origin -Scotland) in the context of drought and lack of forages. Cattle fattened on pasture are a good alternative to conventional fattening (fattening by feeding in the stable).
- The extensive fattening of cattle reduces effort, the cattle management is simpler and lower cost compared to usually intensive growth.
- Angus cattle have an increased degree of transformation natural forage, high average daily gain (up to 2 kg / day / head), high yield at slaughter (65-70%) and highly appreciated meat.
- Also, the breed is well adapted to grazing, achieving a production of the highest quality meat naturally, with a minimum of concentrated forage. It is a long-live breed, living on average 19 years, which means 17 calves. Investments for maintenance and breeding are small, because it is a breed accustomed to adversity.
- Raising Angus cattle can be an interesting opportunity for land owners who do not cultivate the land.
- Given the need to increase meat production in our country, Angus cattle breed can be used with great efficiency in industrial crosses with our breeds, the disadvantage would be that they can not give the same subsidies (€ 300), as in the case of an animal with certificate of origin.
- These grants are awarded following animal identification and registration in the schemes and support measures for farmers in Romania in disadvantaged areas (Annex 4A-PNDR).
- The specific support is provided in the form of additional annual payment under the following conditions: holding is entered in the National Register of Holdings (RNE), farmer to have a document certifying the meat breed / hybrid breed eligible and animals must be held in the farm of the beneficiary of financial support, at least a period of 8 months (individual farm register R1760 / 2000).

## BIBLIOGRAPHY

1. Proiect ADER 211 - Faza 9 - Studiu privind conservarea eficienței economice a producției vegetale și animale, în condițiile intervențiilor pentru creșterea performanțelor de mediu, București, 2014;
2. Raport tehnic-operativ asupra situației din zootehnie, 31 martie, 2014;
3. Revista Ferma, Creșterea taurinelor în fermele organice și în conversie, 09.02.2010;
4. Revista Ferma, Aberdeen Angus sprijină fermierii pentru dezvoltarea acestei rase și hibridii obținuți, 14.04.2014;
5. Stanciu Gavril și colaboratorii, Tehnologia creșterii bovinelor, Editura Eurostampa, Timișoara, 2005.

## ECONOMIC EFFICIENCY ANALYSIS OF VEGETABLE PRODUCTION SYSTEMS DURING 2011-2014

ANA URSU<sup>1</sup>

**Summary:** *Economic efficiency plays an important role in the foundation and farm level decisions, constituting a basic criterion in assessing the level of economic activity and development prospects. The study aimed to analyze the economic efficiency of crop production systems, measured through indicators that contribute to an overall picture of the actual conditions of economic efficiency for the analyzed period. For this study were quantified following indicators: income from operations, operating costs, labor productivity and rate of return on different types of farms of different sizes. The analysis concluded that indicators production year 2013-2014 has showed a lower level of economic efficiency compared with 2011-2012 production year; comparison of the two production systems that irrigated production system provides a rate of return of about 9-10% higher than non-irrigated system. Comparing labor productivity in terms of value (lei / Man-hour) the types of farms of different sizes that hourly labor productivity increases with economic size of holding and decreases as the number of man-hours to 1000 lei incomes increase.*

**Keywords:** *economic efficiency, production systems, labor productivity, profitability*

### INTRODUCTION

The concepts of efficiency is treated in economic theory and practice various forms of manifestation of the results of economic agents, such as profitability, productivity of factors of production, capital efficiency, reduced costs, etc. Economic efficiency is closely related to the use of resources in the economy and its essential feature is the causal effort / effect. Doing a conceptual treatment summarizing the opinions of economic efficiency can conclude that economic efficiency is a complex economic category expressed in the most comprehensive results are obtained in an activity. The scale is expressed by farm labor productivity, profitability, unit production cost. A high efficiency is obtained with a modern technology that makes the most of raw materials and energy, providing high quality products at low cost.

### MATERIAL AND METHOD

The methodology chosen for this study was to design plant production systems adapted plains, in different shapes and sizes of farm, level indicators and sub-indicators.

For economic efficiency analysis were performed technical and economic projections for 2011-2014 holding module 20 hectares (irrigated and non-irrigated), 200 hectares (irrigated and non-irrigated), and 1,000 hectares (irrigated and non-irrigated). These projections are based on technological estimates and budgets of income and expenses for each crop, how to farm and year of production.

The average yields set out to achieve, are in accordance with "study to determine potential areas, geographical areas and unitary standard gross margins" for proiectele under Measure 3.1. "Investments in agricultural holdings" of the SAPARD program, developed by the ASAS-ICPA and ICEADR 2004.

Getting set production can be achieved through proper management of inputs, based on scientific rules determinare.

Estimated recovery prices for crops production structures studied:

- For the year 2011-2012: 1.1 lei / kg for wheat, 0.99 euro / kg in corn, 0.875 lei / kg barley 1.95 lei / kg sunflower, 4.0 lei / kg beans, 2.15 lei / kg soybean, 1.8 lei / kg Rape, 0.30 lei / kg of sugar beet
- For the year 2013-2014: 0.77 euro / kg for wheat, 0.98 euro / kg in corn, 0.685 lei / kg barley, 1.9 lei / kg sunflower, 3.5 lei / kg beans, 1.8 lei / kg soybean, 1,750 lei / kg rape, 0.275 lei / kg of sugar beet

---

<sup>1</sup> PhD, Researcher II - Research Institute for Agricultural Economics and Rural Development, ursu.ana@iceadr.ro

## RESULTS AND DISCUSSION

### Economic efficiency analysis modules designed holding

Module 20 ha (table 1) is specific households and has been developed in two production: irrigated and non-irrigated system. **The irrigation system** four production activities are summarized wheat, corn, sunflowers, beans, sugar beet and **irrigated** also appears barley activity formed in the two ha of the total 20 hectares. Corn is grown on the largest area in this way, and accounts for 30% of the total area. The production value is obtained from corn but only 35.8% of the value obtained at farm level, because lower profitability per hectare recorded in this culture, to an average of 4800 kg / ha. Sugar beet is cultivated although only 10% of farmland has the largest contribution to production value obtained 19.2% of the value obtained in farm irrigated and non-irrigated system by 21%.

**Table 1: Economic efficiency indicators**

Nr. Item	Indicators	UM	Module 20 ha irrigated		Module 20 ha non-irrigated	
			2011	2014	2011	2014
One	Total revenue	lei	109858	97932	72372	64409
February	Income from primary production	lei	103794	91868	68148	60185
Three	Crude product	lei	121454	113362	84926,2	79839
4	Total expenditure	lei	96161	86146	68795,4	61926,5
5	Expenditure on primary production	lei	90097	80172	64571,4	57702,5
6	Raw materials	lei	37340	33485	30521,0	27400,6
7	Permanent labor expenses	lei	10545	10545	6582,7	6931,5
8	Total time spent working	man-hours	2287		1556,8	
9	Working time consumed on average per 1 ha	man-hours	114,4		77,8	
10	Labour productivity (Wm)	lei / man-hour	45,4	40,2	43,8	38,7
11	Labour productivity (Wm)	man-hour /1000lei	22,0	24,9	22,8	25,9
12	Labor costs 1000 lei prod. value	lei	101,6	118,6	96,6	115,2
13	Expenditure on valuable products 1,000 lei	lei	360	364	448	455
14	Production expenses 1,000 lei Home	lei	868	873	948	959
15	Gross profit	lei	13697	11696	3577	2482
16	- Tax 16%	lei	2192	1871	572	397
17	Net profit	lei	11506	9825	3004	2085
18	Gross profit rate	%	15,2	14,6	5,5	4,3
19	Net profit rate	%	12,8	12,3	4,7	3,6
20	Gross profit + grants	lei	25293	27216	16131	17912
21	- Tax 16%	lei	4047	4355	2581	2866
22	Net profit + grants	lei	21246	22862	13550	15046
23	Gross profit rate + grants	%	26,3	31,6	23,4	28,9
24	Net profit + rate subsidies	%	22,1	26,5	19,7	24,3

Source: *Own calculations*

**Analysis of revenue:** the total activity, revenue recorded a decrease of 1.13 times in 2013-2014 compared to 2011-2012. The decrease in revenues was driven by lower selling prices of production. Revenues are irrigated with 1.52 times higher than in non-irrigated system, the decisive contribution in this regard starring increase yields per hectare. The correlation coefficient between the index of income and expenditure index is greater than one, the pace of decline of revenues ranging from 1.05 (irrigated) and 1.15 (irrigated) in 2013-2014 to 1.04 (neirgat) and 1, 14 (irrigated) in 2011-2012. Reducing income reflects directly on the indicator expenses 1,000 lei income.

**Expenditure Review:** the total activity costs have been reduced by 1.11 times (irrigated system) and 1.12 (irrigated) in 2013-2014 compared to 2011-2012 this reduction, attesting first

reduction index inflation of 3.2% (2011-2012) to 2.8% (2013-2014) according to the National Weather Institute.

**1000 lei revenue expenditure** a slight increase from 868 lei (2011) 873 lei (2014) - irrigated and 948 lei (2011) to 959 lei (2014) - sitem neirgat, which means that the farmer in this module covers all costs Operation and get a small benefit, as evidenced and **Rate taxable income** which is between 14.6% and 15.2%, irrigated, compared to only 4.3% and 5.5% in irrigated system.

**Labour productivity** was calculată wide activities, total farm modules. Total work time spent (effort) with production values obtained (effect) reveals the degree of economic efficiency of labor exploitation modules designed. It can be appreciated that in the period 2011-2014, labor productivity based on value of production at farm level and fund time varies as follows: the irrigated labor productivity ranges from 22.8 man-hours to 1000 lei production value (2011) to 25.9 man-hours to 1000 lei production value (2014), and the irrigated labor productivity ranges from 22.0 man-hours to 1000 lei production value (2011) to 24.9 man-hours to 1,000 lei production value. It follows that labor productivity declined as working time consumed to 1000 lei production value in 2014 increased compared to 2011 with 3.1 man-hours to 2.9 hours non-irrigated and irrigated-man which means a reduction in economic efficiency of the labor front of 2011-2012. The results were in line with available created by holding the level of competitiveness in labor productivity related to the corresponding production.

### Module 200 ha

Module 200 ha (table 2) has an economic dimension top and were designed farmers organized into family associations being developed in two productions: irrigated and non-irrigated system. **The irrigation system** production seven activities are summarized wheat, corn, barley, sunflower, soybean, sugar beet, oilseed rape. Corn is grown on the largest area in this way, and accounts for 33% of the total area of 200 ha. Revenues highest level of activity but how are obtained from sugar beet, which although only 5% of cultivated area, has a 10.3% contribution to total value of production from the farm. Activity barley also provides a good return, 22.7% of taxable income rate, while significant subsidies granted to the sunflower crop this activity lies third place (12%) in terms of income per hectare made the farm. **In irrigated system are** contained the same activities as irrigated system, but different cultures share in the structure of production. Soy Lowers surface half (5% to 10% as they were in irrigation system) and increase in rapeseed area to 13% (compared to 4% in irrigation system). A lower yield obtained in this production system achieves an output value 33.3% lower than the irrigation system. Activity wheat has the highest share both in size (32% of the total 1000 ha) but the production value obtained (26.5% of total production) is lower than that obtained from corn (30%) in the system.

Activity sugar beet is the most effective in the module, **rate taxable income** (Gross profit) was 21.5% in this culture.

**Table 2: Economic efficiency indicators**

Nr. Item	Indicators	UM	Module 200 ha irrigated		Module 200 ha non- irrigated	
			2011	2014	2011	2014
1	Total revenue	lei	1205320	1072020	831160	735110
2	Income from primary production	lei	1126960	993660	780680	684630
3	Crude product	lei	1321280	1226320	947120	889410
4	Total expenditure	lei	1050359	908062	759949	672210
5	Expenditure on primary production	lei	971999	857693	709469	621730
6	Raw materials	lei	358297	317722	314357	277210
7	Permanent labor expenses	lei	94929	94929	55282	55282
8	Total time spent working	man-hours	20851		13163	
9	Working time consumed on average per 1 ha	man-hours	104,3		65,8	
10	Labour productivity (Wm)	lei / Man-hour	54	48	59	52

11	Labour productivity (Wm)	Man-hour / 1000 lei	18.5	21.0	16.9	19.2
12	Labor costs 1000 lei prod. value	lei	84.2	95.5	70.8	80.7
13	Expenditure on valuable products 1,000 lei	lei	318	320	403	405
14	Expenses 1,000 lei main prod	lei	862	863	909	908
15	Gross profit	lei	154961	135967	71211	62900
16	- Tax 16%	lei	24794	21755	11394	10064
17	Net profit	lei	130167	114212	59817	52836
18	Gross profit rate	%	15,9	15,9	10,0	10,1
19	Net profit rate	%	13,4	13,3	8,4	8,5
20	Gross profit + grants	lei	270921	318258	187171	217200
21	- Tax 16%	lei	43347	50921	29947	34752
22	Net profit + grants	lei	227574	267337	157223	182448
23	Gross profit rate + grants	%	25,8	35,0	24,6	32,3
24	Net profit + rate subsidies	%	21,7	29,4	20,7	27,1

Source: *Own calculations*

**Analysis of revenue:** the total activity, revenue recorded a decrease of 1.14 times in 2013-2014 compared to 2011-2012. The decrease in revenues was driven by lower selling prices of production. Revenues are irrigated with 1.45 times higher than in non-irrigated system, the decisive contribution in this regard starting increase yields per hectare. The correlation coefficient between the index of income and expenditure index is greater than one, the rate of decrease of income over expenditure ranging from 1.10 (irrigated) to 1.16 (irrigated) in 2011-2014.

**Expenditure Review:** the total activity costs have been reduced by 1.14 times (irrigated system) and 1.13 times (irrigated) in 2013-2014 compared to 2011-2012 this reduction, attesting first reduction index inflation of 3.2% (2011-2012) to 2.8% (2013-2014) according to the National Weather Institute.

**1000 lei revenue expenditure** no differences between the two production systems, lower costs 1.05 times irrigated (863 lei to 1000 lei income) from non-irrigated (908 lei lei 1000 revenue). Comparing the two modules holding non-irrigated and irrigated system operated at 200 ha irrigated module, work on the farm is less profitable, as evidenced rate and taxable income (10%) to 200 ha irrigated module that has a income rate of 15.9%, but allow the resumption of production and allocation of funds for development profit (recommended 50%) to achiziției of new agricultural machinery and equipment required for the farm. Comparând two study periods 2013-2014 to 2011-2012, the modules do not show significant diferenței to mark the two periods of production.

**Labour productivity** was calculată wide activities, total farm modules. It can be appreciated that in the period 2011-2014, labor productivity based on value of production at farm level and fund time varies as follows: **the irrigated.** Labor productivity ranges from 18.5 man-hours to 1,000 lei production value (2011) to 21.0 man-hours to 1000 lei production value (2014), and **for irrigation,** labor productivity ranges from 16.9 man-hours to 1000 lei production value (2011) to 19.2 man-hours to 1,000 lei production value. It follows that labor productivity declined as working time consumed to 1000 lei production value in 2014 increased compared to 2011 with 3.5 man-hours to 2.3 hours non-irrigated and irrigated-man which means a reduction in economic efficiency of the labor front of 2011-2012. The results were in line with available created by holding the level of competitiveness in labor productivity related to the corresponding production.

#### **Module 1 000 ha**

Module 1000 ha (table 3) has a large economic size and was designed for agricultural companies with legal personality, being developed in two productions: irrigated and non-irrigated system. **The irrigation system** production seven activities are summarized wheat, corn, barley, sunflower, soybean, sugar beet, oilseed rape. Corn and wheat have together accounted for 53% of the total at the module level. These cultures also provide 55.4% of the recorded production at farm level. Activity crop barley and sugar beet culture presents the highest return per ha.

**Table 3: Economic efficiency indicators**

Nr. Item	Indicators	UM	Module 1000 ha irrigated		Module 1000 ha non - irrigated	
			2011	2014	2011	2014
1	Total revenue	lei	7099340	<b>6374760</b>	4847560	975691
2	Income from primary production	lei	6681940	5957360	4579700	3982780
3	Crude product	lei	7679140	7146260	5427360	5022140
4	Total expenditure	lei	5853145	5099756	4196684	3674960
5	Expenditure on primary production	lei	5435745	4830046	3928824	3407100
6	Raw materials	lei	997574	997574	1409044	1550737
7	Permanent labor expenses	lei	468289	468289	266341	267991
8	Total time spent working	man-hours	104257		62070	
9	Working time consumed on average per 1 ha	man-hours	104,3		62,1	
10	Labour productivity (Wm)	lei / man-hour	64	57	74	64
11	Labour productivity (Wm)	man-hour / 1000 lei	15,6	17,5	13,6	15,6
12	Labor costs 1000 lei prod. value	lei	70,1	78,6	58,2	67,3
13	Expenditure on valuable products 1,000 lei	lei	149	167	308	389
14	Expenses 1,000 lei main prod	lei	813	811	858	855
15	Gross profit	lei	1246195	1127314	650876	575680
16	- Tax 16%	lei	199391	180,370	104140	92109
17	Net profit	lei	1046804	946944	546736	483572
18	Gross profit rate	%	22,9	23,3	16,6	16,9
19	Net profit rate	%	19,3	19,6	13,9	14,2
20	Gross profit + grants	lei	1825995	2046504	1230676	1347180
21	- Tax 16%	lei	292159	327441	196908	215549
22	Net profit + grants	lei	1533836	1719063	1033768	1131632
23	Gross profit rate + grants	%	31,2	40,1	29,3	36,7
24	Net profit + rate subsidies	%	26,2	33,7	24,6	30,8

Source: *Own calculations*

**Analysis of revenue:** the total activity, revenue recorded a decrease of 1.15 times and 1.12 times irrigated irrigated during the 2013-2014 to 2011-2012 production. The decrease in revenues was driven by lower selling prices of agricultural products. Revenues are irrigated with 1.46 to 1.50 times higher than in non-irrigated system, the decisive contribution in this regard starting increase yields per hectare. The correlation coefficient between the index of income and expenditure index is greater than one, the rate of decrease of income over expenditure ranging from 1.17 (irrigated) to 1.23 (irrigated) in 2011-2014.

**Expenditure Review:** the total activity costs have been reduced by 1.15 times (irrigated system) and 1.13 times (irrigated) in 2013-2014 compared to 2011-2012 this reduction, attesting first reduction index inflation of 3.2% (2011-2012) to 2.8% (2013-2014) according to the National Weather Institute.

**1000 lei revenue expenditure** no differences between the two production systems, lower costs 1.05 times irrigated (813-811 lei lei 1000 revenues) compared to non-irrigated (858-855 lei lei 1000 revenue). Comparing the two modules holding non-irrigated and irrigated system operated at 1000 ha irrigated module, work on the farm is less profitable, as evidenced rate and taxable income (16.6% - 16.9%) compared to module 1000 ha irrigated which has a 22.9% rate of income - 23%, but allows resumption of production and profit allocation of funds for development (50% recommended) to achiziției of new agricultural machinery and equipment required for the farm. Comparând two study periods 2013-2014 to 2011-2012, the modules do not show significant diferenței to mark the two periods of production.

**Labour productivity** was calculated wide activities, total farm modules. It can be appreciated that in the period 2011-2014, labor productivity based on value of production at farm level and fund time varies as follows: **the irrigated**. Labor productivity ranges from 13.6 man-hours to 1,000 lei production value (2011) to 15.6 man-hours to 1000 lei production value (2014), and **for irrigation**, labor productivity ranges from 15.6 man-hours to 1000 lei production value (2011) to 17.5 man-hours to 1,000 lei production value. It follows that labor productivity declined as working time consumed to 1000 lei production value in 2014 increased compared to 2011 with two man-hours in non-irrigated and irrigated 1.9 man-hours in which which means a reduction in economic efficiency of the labor front of 2011-2012.

## CONCLUSIONS

Considering the above, the analysis of economic efficiency of crop production systems in the period 2011-2014, and the following conclusions:

- Comparing the two periods of production, total activity, revenues in 2013-2014 showed a reduction of 1.13 times compared to 2011-2012 due to the volatility of agricultural prices;
- Comparing the two production systems, irrigated and non-irrigated, irrigation system proceeds are greater than those obtained in irrigated systems;
- Determination of variation of income that enables us according to all natural and economic factors affecting production structure to choose crops with the highest stability (lowest coefficient of variation). Income stability is a necessary condition for self-management of farmers who have to cover from own revenues and profits.
- Production flexibility program seeks permanent adaptation of production to local natural and economic conditions to achieve maximum profitability. It removes the risk of losses caused farmer as a result of cyclical changes or perspective that it operates in the production structure based on the advantages that it offers a culture or another.
- Comparing labor productivity in terms of value (lei / Man-hour) the types of farms of different sizes, that labor productivity increases with economic size of holding and decreases as the number of man-hours to 1000 lei incomes increase.
- The economic results of small farms can improve the diversification of agricultural activities (vegetable, livestock) and for large farms, the results can be improved by investing in tractors and related equipment.
- Analyses of economic efficiency achieved by designing modules have a high economic viability in terms of obtaining yields scheduled.
- Variety and factors leading causes of deviations on the size indicators requires equally diverse solutions. Other examples as comprehensive as can not provide general solutions, but suggest methods of interpretation of situations.
- Background economic decisions primarily on efficiency criteria in this context, primarily through cost management are a basic requirement.

## REFERENCES

- [1] Budică Elias (1998), "*Short and long-term profitability*" Economic Tribune, Bucharest;
- [2] C. Cojocaru Constantin (2000) "*Economic and financial analysis of farm and forestry*" Second edition, Economic Publishing House, Bucharest
- [3] Joseph George (2000) "*Economic and financial analysis company in food*", Economic Tribune Publishing House, Bucharest
- [4] Ana Ursu, Dinu Toma, Mihai Nicolescu (2008) "Guide economic and technical management in the crop production system", University Publishing House, Bucharest
- [5] ADER Project 211/2011

# STUDY ON GROWTH / CONSERVATION ECONOMIC EFFICIENCY OF PRODUCTION PLANT GROWTH ARRANGEMENTS REGARDING ENVIRONMENTAL PERFORMANCE

ANA URSU<sup>1</sup>

**Summary:** *The study aimed to identify growth prospects / preservation of economic efficiency in terms of interventions to increase performance and in shaping the directions in which this objective can be. For the study started from two methodological premises: vegetable production systems design adapted plains, different shapes and sizes, which were performed simulating economic efficiency indicators for 2011-2014; second methodological premise was to identify needs for intervention and funding by increasing economic efficiency. After analyzing the efficiency and SWOT analysis concluded that modules are designed viable farm, while the yields observed scheduled and have the ability to invest in modern agricultural techniques to increase environmental performance. Under RDP 2014-2020, have been identified four priority areas of intervention: competitiveness of agricultural holdings, organization of food chains, agri-climate.*

**Keywords:** *economic efficiency, environmental performance, holdings*

## INTRODUCTION

"Most of the consulted in the development of this work show that the determinants of plant exploitable increase economic efficiency in different sizes. We can not talk about economic efficiency in the long term, without entering into discussion continued growth of labor productivity and profitability. So the key word when talking about growth is productivity efficiently. Thus the question "what are the determinants increase economic efficiency?" Turns into "what are the factors that increase productivity?". The answers to this question converge *investment physical capital, human capital, natural resources and technology*".

"The strategic directions of rural development policy aimed at increasing environmental performance relates to improving the competitiveness of the agricultural sector (restructuring needed to implement environmental sustainability implies a continuing challenge to increase economic performance of farms with the introduction of environmental protection measures and social development of rural areas) *improving land* (combining agricultural activities with environmental services); *increasing the quality of life in rural areas and encouraging diversification of economic* (local development strategies will play an important role in this direction); *training of labor* Local able to contribute to diversification of rural and structural changes necessary. To achieve the objectives mentioned measures are needed to reduce costs, increase the size of farms, promote innovation, market orientation, investment in physical and human capital, diversification of economic activities, obtaining quality products, environmentally friendly use of cleaner technologies; ensuring sustainable use of agricultural land improvements, to preserve and protect the natural landscape or as to enable EU priorities such as combating climate change, enhancing biodiversity and water quality, reduce the risk and effects of natural disasters [5]".

## MATERIAL AND METHOD

The methodology chosen for this study was to design plant production systems adapted plains, in different shapes and sizes of farm, level indicators and sub-indicators. This was the most important methodological premise. The second methodological premise aimed to provide an objective criterion for prioritization of measures to increase / conservation economic efficiency by identifying and funding necessary intervention to increase economic efficiency. Of course, this

---

<sup>1</sup> PhD, Researcher II - Research Institute for Agricultural Economics and Rural Development, [ursu.ana@iceadr.ro](mailto:ursu.ana@iceadr.ro)

assumption implies some limitations conditioned by the RDP measures supporting agricultural competitiveness.

**Method** Optimal sizing used farm is **method variants**. Which was to design alternatives for a specific size or type of firm specializes holding for which we calculated a system of production and economic indicators. Depending on the level of these indicators and the objectives envisaged to choose the optimal size.

### Methodological approach

In determining priorities were reviewed "national strategic framework for sustainable development of the agri-food sector and rural areas in the period 2014-2020-2030" and RDP 2014-2020. In this context, we use the basic document RDP 2014-2020. It was a natural choice: if the EU will allocate resources according to the RDP, Romania should be comparable and consistent priorities, to access European funds. According to that document, they identified three priority areas of intervention: competitiveness of agricultural holdings, organization of food chains, agri-climate.

## RESULTS AND DISCUSSION

Technical and economic projections for the year 2013/2014 production in irrigated and non-irrigated crop system, based on technology and budget estimates of revenue and expenditure for each crop. For your own optimum manufacturing process, taking into account the criteria of economic efficiency, crop structure was established following:

- Module 20 ha (irrigated / non-irrigated) wheat (5 ha / 6 ha), corn (6 ha / 7 ha), barley (2 ha / 0 ha), fl. - Sun (4 ha / 3 ha), beans (1 ha / 2 ha), sugar beet (2 ha / 2 ha);
- For module 200 hectares (irrigated / non-irrigated) wheat (60 ha / 48 ha), corn (54 ha / 66 ha), barley (10 ha / 18 ha), fl. - The sun (30 ha / 30 ha), beans (10 ha / 20 ha soybean), sugar beet (10 ha / 10 ha), rape (26 ha / 8 ha);
- Module 1000 ha (irrigated / non-irrigated) wheat (320 ha / 200 ha), maize (250 ha / 330 ha), barley (50 ha / 90 ha), fl. - The sun (150 ha / 150 ha), soybean (50 ha / 100 ha), sugar beet (50 ha / 50 ha), rape (130 ha / 80 ha).

### SUMMARY STATEMENT SUMMARY OF INDICATORS

Profile: grain crops

Production System - non-irrigated

Nc.	INDICATORS	MODULE 20 ha		Module 200 ha		How 1000 ha	
		lei	€ = 4.5 lei	lei	€ = 4.5 lei	lei	€ = 4.5 lei
1	The value of primary and secondary production	64409	14313	735110	163358	4250640	944587
2	Subsidies	15430	3429	154300	34289	771,500	171444
3	Crude product (1 + 2)	79839	17742	889410	197647	5022140	1116031
4	Total expenses, D.C.:	61927	13761	672210	149380	3674960	816658
4.1	- Variable costs	52593	11687	577767	128393	3231868	717907
4.1.1	- Specific variables	28709	4265.8	292595	65021	1635756	363501
4.2	- Fixed costs	9334	2074	94443	20987	443092	98465
5	Net profit 3- (4 + 16% tax)	15046	3344	182448	40544	1131632	251474
6	Net profit ratio (5: 4x100) (%)	24,3	x	27,1	x	30,8	x
7	Standard Output (Reg.CE 1242/2008)	55749	12388,7	536588	119242	2692334	598296
8	European size class	x	IV	x	VIII	x	X
9	Development Fund (60% -50% of profit + depreciation)	9820	2182	95604	21245	585816	130181
10	Investment opportunities credits (9 x 5 years)	49100	10911	478,020	106227	2929079	650,906
11	Funds for the resumption of production (15% of profits)	2257	502	27367	6082	169745	37721
12	Funds for labor and management (5% - 10% of profit)	752	167	18245	4054	113163	25147

13	Funds for capitalization (20% -25% of profit)	3009	669	45612	10136	282908	62868
14	Total equity to production (FDP + row 11)	50483	11218	560972	124660	3069336	682075
15	Loans for production (Cp) *	13700,3	3045	138605	30801	775368	172304
16	Consumption of work (thousand hours / year / holding)	1,5	x	13,1	x	62,0	x

\* Credits production covers 50% of the costs of inputs

### Conclusions:

- The financial resources required to cover the total costs are: 77.9% and 22.1% Cp FDP (20 ha); FDP 79.4% and 20.6% CP (200 ha); FDP 78.9% and 21.1% CP (1000 ha);
- Module shows a net profit rate of 24.3% and provides an average profit of 752.3 lei / ha; 27.1% and provides an average profit of 912.2 lei / ha; 30.8% and provides an average profit of 1131.6 lei / ha
- Total Standard Output (SO) expresses "the monetary value of agricultural production which includes sales, valued at farm gate prices": IV (20 ha); VIII (200 ha); X (1000 ha)
- Development Fund constituted makes it possible investment in the purchase of agricultural equipment for purchase through loans of almost the entire set of equipment needed tractor 65 HP (20 ha) - 95 hp (200 ha) - 100 PS (1000 ha).
- Modules can be achieved by designing economically viable given that yields are obtained and there will be programmed to increase the coefficient of efficiency concerns of equity, profit and turnover to ensure prudent financial policy designed to rationalize costs and achieve competitive prices.

## SUMMARY STATEMENT SUMMARY OF INDICATORS

PROFILE: grain crops

Production System - irrigated

Nc.	INDICATORS	MODULE 20 ha		MODULE 200 ha		MODULE 1000 ha	
		lei	€ = 4.5 lei	lei	€ = 4.5 lei	lei	€ = 4.5 lei
1	The value of primary and secondary production	97932	21763	1072020	238227	6374760	1416613
2	Subsidies	15430	3429	154300	34289	771500	171444
3	Crude product (1 + 2)	113362	25192	1226320	272516	7146260	1588058
4	Total expenses, D.C.:	86146	19144	908062	201792	5099756	1133279
4.1	- Variable costs	72104	16023	750478	166773	4288761	953058
4.1.1	- Specific variables	45279	4265.8	338735	75274	1072469	238326
4.2	- Fixed costs	14042	3121	157584	35019	810995	180221
5	Net profit 3- (4 + 16% tax)	22862	5080	259343	57632	1670680	371262
6	Net profit ratio (5: 4x100) (%)	26,5	x	28,6	x	32,8	x
7	Standard Output (Reg.CE 1242/2008)	56852	12633,9	539102	119800	2710444	602321
8	European size class	x	IV	x	VIII	x	X
9	Development Fund (60% -50% of profit + depreciation)	14756	3279	136,041	30231	867190	192709
10	Investment opportunities credits (9 x 5 years)	73779	16395	680206	151157	4335950	963544
11	Funds for the resumption of production (15% of profits)	3429	762	38901	8645	250,602	55689
12	Funds for labor and management (5% - 10% of profit)	1143	254	25934	5763	167068	37126
13	Funds for capitalization (20% -25% of profit)	4572	1016	64836	14408	334,136	74252
14	Total equity to production (own + Fd rd 11) *	72832	16185	788102	175134	4851571	1078127
15	Loans for production **	16742,6	3721	158861	35302	498787	110842
16	Consumption of work (thousand hours / year / holding)	2,3	x	20,8	x	104,0	x

\*\* Loans production covers 50% of the costs of production factors

### Conclusions:

- **Financial resources** necessary to cover the total costs are: 80.6% and 19.4% FDP Cp (20 ha); FDP 82.5% and 17.5% Cp (200 ha); FDP 90.2% and 9.8% Cp (1000 ha);
- The modules show a **net profit rate** 26.5% and provides an average profit of 1143 lei / ha (20 ha); 28.6% and provides an average profit of 1296.7 lei / ha (200 ha); 32.8% and provides an average profit of 1670.7 lei / ha (1,000 ha);
- **Development Fund** up makes it possible investment in the purchase of agricultural equipment for purchase through loans almost the whole set of equipment needed tractor 65 HP (20 ha) - 95 hp (200 ha) - 100 PS (1000 ha).
- The modules made by design have high economic viability in terms of obtaining yields scheduled

**Farm budget**  
**Simulation of key economic indicators, 2011-2014 - Draft version**

Lowlands

*Profile of "grain crops"*

Indicators	Periods, harvest, year	U.M.	MODULE					
			20 ha Non - Irrigated	20 ha Irrigate	200 ha Non - Irrigated	200 ha Irrigate	1000 ha Non - Irrigated	1000 ha Irrigated
<i>Total income</i>	2011/2012	lei	72372	109858	831160	1205320	4847560	7099340
	2013/2014	lei	64409	97932	735110	1072020	4250640	6374760
Increases or decreases	Δ	lei	-7963	-11926	-96050	-133 300	-596 920	-724 580
<i>Subsidies</i>	2011/2012	lei	11596	11596	115960	115960	579800	579800
	2013/2014	lei	15430	15430	154300	154300	771500	771500
Increases or decreases	Δ	lei	+3834	+3834	+38340	+38340	+191700	+191700
<i>Total expenditure</i>	2011/2012	lei	68795,4	96160,8	759949,4	1050358,9	4196684	5853145
	2013/2014	lei	61926,5	86145,9	672210,1	908062	3674960	5099756
Increases or decreases	Δ	lei	-6868,9	-10014,9	-87739,3	-142296,9	-521 724	-753 389
<i>Gross profit + grants</i>	2011/2012	lei	16131	25293	187171	270921	1230676	1825995
	2013/2014	lei	17912	27216	217200	318258	1347180	2046504
Increases or decreases	Δ	lei	+1781	+1923	+30029	+47337	+116,504	+220509
<i>Net profit + grants</i>	2011/2012	lei	13550	21246	157223	227574	1033768	1533836
	2013/2014	lei	15046	22862	182448	267337	1131632	1719063
Increases or decreases	Δ	lei	+1496	+1616	+25225	+39763	+7864	+185227
<i>Net profit + rate subsidies</i>	2011/2012	%	19,7	22,1	20,7	23,4	24,6	26,2
	2013/2014	%	24,3	26,5	27,1	29,4	30,8	33,7
Increases or decreases	Δ	%	+4,6	+4,4	+6,4	+6,0	+6,2	+7,5

Source: Own calculations

SWOT Analysis				
COMPONENT	STRENGTHS	WEAKNESSES	OPPORTUNITIES	RISKS
<b>Resources</b>				
<b>Natural</b>	Production systems and favorable climatic conditions allowing crop diversification Crop rotation and crop structure framed in specific rotations plain area	Households show a high degree of under-utilization of production potential given natural conditions;	Opportunities exist within national and European programs support the development and diversification of holdings îmbunătățind their competitive position;	Maintaining a small farm, with implications for performance and viability
<b>Fixed</b>	Crop diversification ensures uniform operation of the means of production	Material and technical facilities necessary to ensure environmental developing performance is poor Low level of equipment with modern	Investment in physical capital	Higher investment costs Reduced access to credit
<b>Raw materials - Current assets</b>	Capacity supply inputs necessary resuming production	-	Strengthening the position in relation to suppliers	Failure of crops
<b>Financial Resources</b>	Farms have adequate capital	Financial resources necessary to cover the	Improving mechanisms for stimulating production	The volatility of agricultural prices.

	and production loans;	total costs are provided at a rate lower than the irrigation system; Development Fund constituted creates fewer opportunities for investment in agricultural machinery and modernize the production process in the medium term;	farms carrying freight and stimulate internal and external market of agricultural products	
<b>Relations</b>				
<b>Competition</b>	Competitive production scale is small average exploitable	Decreased performance Low prices of agricultural recovery, reduces capitalization fund.	Integration of proper storage facilities	The intervention of specialized intermediaries
<b>Media Relations</b>	-	Unresolved problems of pollution and waste recovery	Using funds provided by international organizations	Insufficient investment sources for remediation
<b>Activities</b>				
<b>Organization</b>	Agricultural activities are conducted in organizational structures with legal status; Fall in European typology of economic size;	Production activities in households provides low profitability compared with the activities associative system or company	Introduction of related services relevant determinant for ensuring continuity and long-term business profitability Diversification of agricultural activities (vegetable cultivation, livestock)	The rising cost of agricultural inputs (fuel, fertilizer and chemicals for treatment) and the cost of bank loans. Create competitive disadvantages fair participants
<b>Technology</b>	Increasing the share of high value added products	-	Attracting investment in high technology and adaptation of export production to the requirements of foreign markets Installation of the farm products processing, so that farmers earn more from the value-added farm products	Lack of financial resources for a policy of investment in research and development Getting the lower grade if not respected production technology
<b>Results</b>				
<b>Income</b>	The increase in operating revenue growth faster than operating expenditures	Low production yields		Input prices increase due to inflation
<b>Gross profit</b>	Increase due to higher crude SAPS subsidies	Increasing the supply of products on the market		Price volatility
<b>Effectiveness</b>				
<b>Development Fund</b>	Increased possibility of buying credits	-	Investment in tractors and related equipment	Lack of own sources of funding High interest

## CONCLUSIONS

Given the above, farms must build real prospect of growth / preservation *economic efficiency of plant and animal production in terms of interventions to increase environmental performance* in two directions

- Management structural changes
  - Concentration (critical mass size farms);
  - Cooperation (working together to supply inputs, mechanical works and the efficient execution of products);
  - Integration (bottom-up approach by developing local partnerships and networking cluster);
- Competitive improving management (horizontal policies)
  - Investment in agricultural exploațiile
  - Technology and innovation in environmental
  - Human capital development

In full accordance with the RDP 2014-2020, the growth priorities / conservation economic efficiency of crop production in terms of interventions to increase environmental performance are:

- **P2:** Increasing farm viability and competitiveness of all types of agriculture and promoting innovative agricultural technologies;
- **P3:** Promoting food chain organization, including processing and marketing agricultural and risk management in agriculture;
- **P4:** Restoring, preserving and enhancing ecosystems that are related to agriculture;
- **P5:** Promoting resource efficiency and supporting the shift towards a low carbon economy more resilient to climate change in agriculture and food sector.

Analysis of the current situation, based on national priorities identified in the structure of the RDP 2014-2020, emphasized the necessity to act on the directions above. On the other hand, between these priorities and between their respective indicators requires a shift from hierarchical factors for investments, according to the state of the plant competitive agricultural sector.

## REFERENCES

- [1] Budică Elias (1998), " *Short and long-term profitability*" Economic Tribune, Bucharest;
- [2] C. Cojocaru Constantin (2000) "*Economic and financial analysis of farm and forestry*" Second edition, Economic Publishing House, Bucharest
- [3] Joseph George (2000) "*Economic and financial analysis company in food*", Economic Tribune Publishing House, Bucharest
- [4] Ana Ursu, Dinu Toma Mihai Nicolescu (2008) "*Guide economic and technical management in the crop production system*" University Publishing House, Bucharest
- [5] New perspectives for EU rural development, European Communities, 2004 [www.europa.eu.int](http://www.europa.eu.int)
- [6] Proiect ADER 211/2011
- [7] [Good agricultural and environmental - GAEC](#)
- [8] Order no. 212/361 /2014 on amending the Annex to [...study performance the protection environmental ...](#) [www.unece.org/env/epr/epr\\_studies/moldova%20II%20m.pdf](http://www.unece.org/env/epr/epr_studies/moldova%20II%20m.pdf)
- [9] [www.madr.ro](http://www.madr.ro)

## THE MAIN CROPS ECONOMIC INDICATORS ANALYSIS IN THE SOUTH-WEST OLTENIA REGION

Necula Diana<sup>1</sup>

**Executive Summary:** *The agriculture is an important resource for South West Oltenia, with over 1 million hectares used for the cultivation of cereals (mainly maize and wheat), oil plants (especially sunflower), vegetables (tomatoes, cabbage, onions) and fruits (apples, watermelons, melons, grapes), potatoes, sugar beet, good quality wine production. In this study are analyzed indicators on the evolution of cultivated surfaces, yields and prices for main crops: the average annual rate of growth, deviations in absolute size. The research method used is quantitative analysis of statistical data series in 2007-2013. Using regression function we obtained trends of the indicators used.*

**Keywords:** *production, prices, dynamics.*

### INTRODUCTION

The South-West Oltenia Region falls in the Romanian Danube area, with an area of 29,212 km<sup>2</sup>, representing 12.3% of the total area of the country.

The main economic branch of the South-West Oltenia region is the agriculture, favored by the large area of agricultural land, favorable climatic conditions and high quality soil.

In the southern the cereal crops occupy large areas in particular in Olt and Mehedinti County and in South.

### MATERIAL AND METHOD

The paper highlights the evolution of data using the indicators studied by analyzing evolutions and increases in the period during each year.

Analysis of the dynamics.

Example: the dynamics of cultivated areas (SC)

Fixed-base indices:  $ISC = (SNA / SC0) * 100$

The formulas used to calculate these indicators are:

For arithmetic mean  $\bar{x} = \frac{\sum xi}{n}$  ;

Where : Xi = average production values on a number of years;

n = the number of years taken into account

The annual growth rate  $= r_{2007-2013} = \sqrt[n]{\prod (p1/ p0) - 1}$  ;

where: r<sub>2007-2013</sub> = annual rate;

$\prod p1 / p0$  = concatenation indicators of growth;

The trends analyzed in the statistical series which were calculated by the method of the quadratic regression equation of the form:

$F(t) = a + bt + Ct^2$ , which is the average annual trend and t is the year.

### RESULTS AND DISCUSSION

The data analyzed in Table 1, it is found that the total cultivated area in 2007-2013 has seen an upward trend with an annual growth rate of 1.4%.

Of the crops studied, the only culture that, in the period under review, the cultivated area with sunflower crop is growing continuously, which in 2013 doubles the number of hectares planted with an annual growth rate of 11.8% .

---

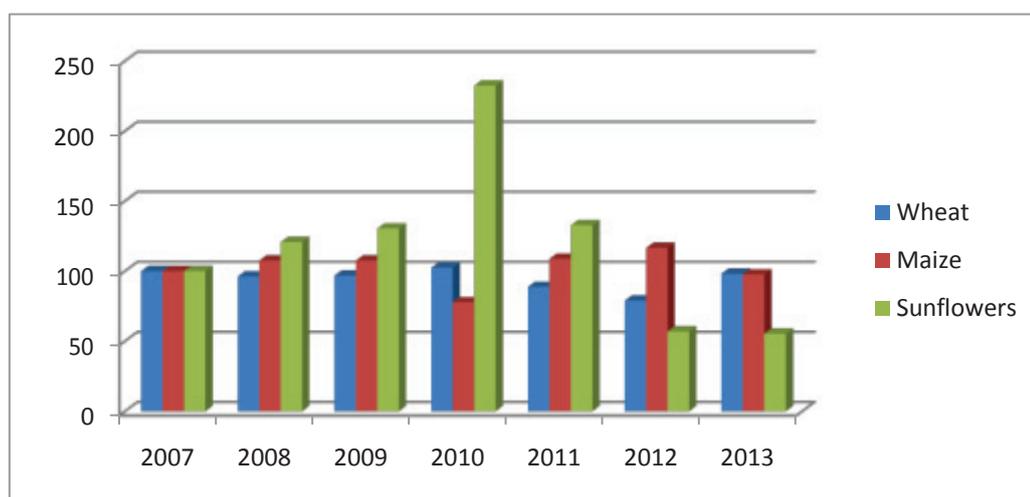
<sup>1</sup> Researcher, Necula Diana, ICEADR, necula.diana@iceadr.ro

**Table 1 The main crops cultivated areas evolution in South West Oltenia Region, 2007-2013**

The main crops	2007	2008	2009	2010	2011	2012	2013	Media	Average rate	Annual rate
	Ha	%	%							
Total	981,675	1031765	1033718	1023571	1050067	1038754	1066502	1032293.1	105.2	1.4
Wheat	394,067	379,227	381,769	403,705	350,049	311,349	387,170	372,476.6	94.5	-0.3
Maize	355,093	382,103	382,342	276,396	386,455	414,269	346,643	363,328.7	102.3	-0.4
Sunflowers	67665	80267	68404	92057	102,380	115,414	132,247	94062	139.1	11.8

Source : own calculations after data from Romanian Statistical Yearbook, 2007-2013 data series, INS

In terms of area planted with wheat, it knows a peak in 2010, with 403,705 ha, but decreases until 2013 to 387,170 ha, with an annual rate of 0.3% in the period. The maize cultivated area, face the same situation as the wheat in 2013 decreased by 2.38% compared to the reference year 2007, with an annual rate of -0.4%.

**Fig.1. The main crops cultivated areas evolution in South West Oltenia Region, 2007-2013**

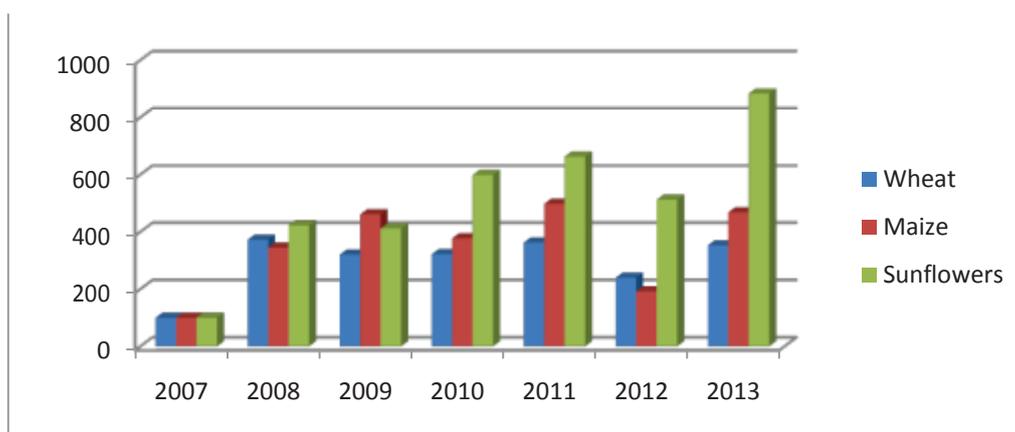
Analysing the production of the main crops in 2007-2013, we find that all cultures studied have experienced an increase in production.

**Table no.2 The main crops total production evolution in the South-West Oltenia Region, 2007-2013**

The main crops	2007	2008	2009	2010	2011	2012	2013	Media	Rhythm med %	Annual rate %
	Tone									
Wheat	310,892	1157996	995,112	1000332	1126897	745,916	1096190	919,047.9	295.6	23.4
Maize	315,235	1086449	1453235	1189394	1569294	604,181	1475745	1099076.1	348.6	29.3
Sunflowers	26887	113,718	110,639	160,944	178,239	137,726	237,429	137,940.3	513.04	43.8

Source: Own calculations after data from Romanian Statistical Yearbook, 2007-2013 data series, INS

In 2013 the wheat crop production is 252.6% higher than the year taken as reference 2007, the maize crop with 368.14% and the highest growth recorded is for sunflower crop of 783.06%.

**Fig.2 The main crops total production evolution in the South-West Oltenia Region, 2007-2013**

The selling price of wheat in South West Oltenia, in the analyzed period, is between 0.49 lei / kg in 2009 and 0.9 lei / kg in 2011 and 2012. In 2014 increases by 17.19 % compared to 2007.

The maize grain price sale knows a peak in 2012 of 0.89 lei / kg, but by 2014 dropped to 1.64 lei / kg, 2.3% lower than the year taken as reference 2007.

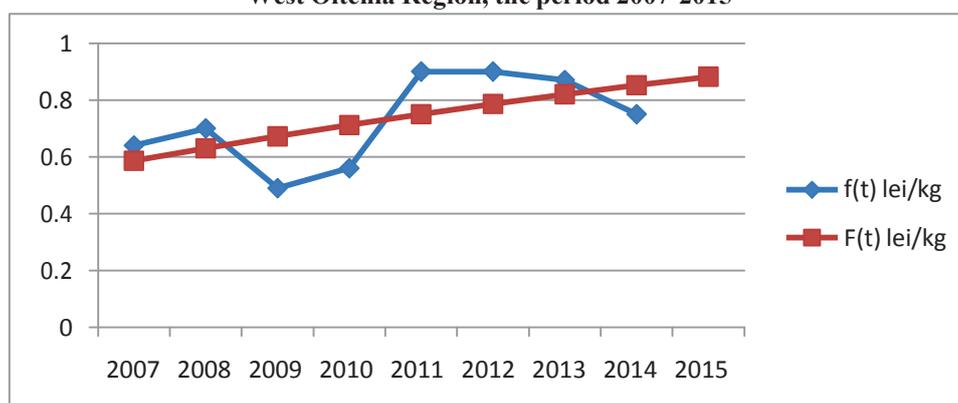
The sunflower crop sales price in 2007 was 0.82 lei / kg, grows by the year 2012 to 1.79 lei / kg, but by 2014 dropped to 0.97 lei / kg, 53.91% compared to 2012.

**Table no. 3 The sale prices evolution of the main crops in South West Oltenia Region, the period from 2007 to 2014 and extrapolation to 2015**

Crops	UM	2007	2008	2009	2010	2011	2012	2013	2014	2015	Rhythm Med %	Annual rate %
Wheat	Lei / kg	0.64	0.7	0.49	0.56	0.9	0.9	0.87	0.75	x	113.48	2.29
	Lei / kg	0.59	0.63	0.67	0.71	0.75	0.79	0.82	0.85	<b>0.88</b>	x	x
Maize	Lei / kg	0.65	0.71	0.42	0.57	0.74	0.89	0.73	0.64	x	102.79	-0.33
	Lei / kg	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.73	<b>0.75</b>	x	x
Sunflowers	Lei / kg	0.82	1.25	0.89	1.32	1.61	1.79	1.67	0.97	x	157.24	2.35
	Lei / kg	0.73	1.06	1.31	1.47	1.54	1.53	1.43	1.24	<b>0.97</b>	x	x

Source: Own calculations after data from Romanian Statistical Yearbook, 2007-2013 data series, INS

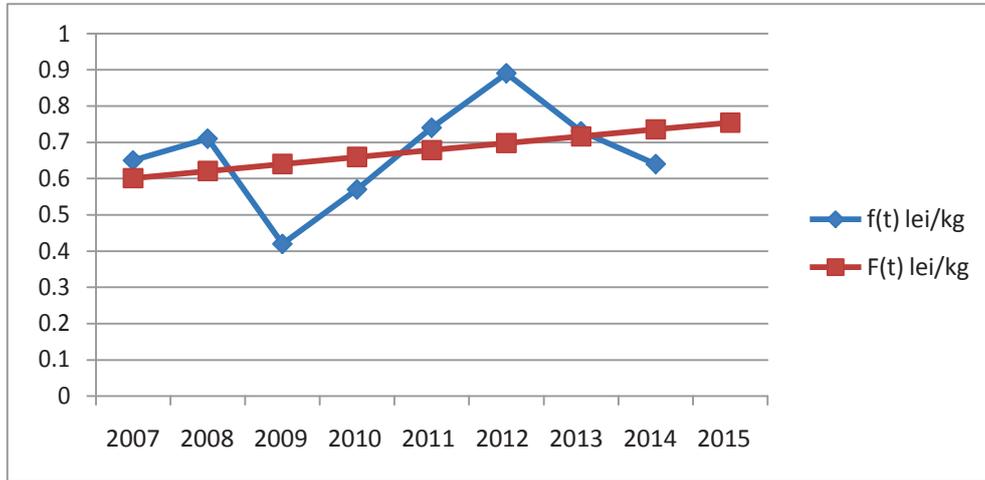
For wheat crop it was calculated the quadratic regression, resulting the function  $F(t) = 0.540179 + 0.047083t - 0.00101t^2$ , the selling prices are rising and the trend extrapolation for 2015 is indicating a selling price of around 0.88 lei / kg.

**Fig. 3 The extrapolation using the quadratic regression for the wheat crop selling prices in South West Oltenia Region, the period 2007-2015**

$$F(t) = 0.540179 + 0.047083t - 0.00101t^2$$

For the maize crop, the trend was calculated by using the quadratic regression, resulting the function  $F(t) = 0.581607143 + 0.019702381t - 0.000059t^2$ , the sale prices trend is upward and the extrapolation for 2015 indicates a selling price of around 0.75 lei / kg.

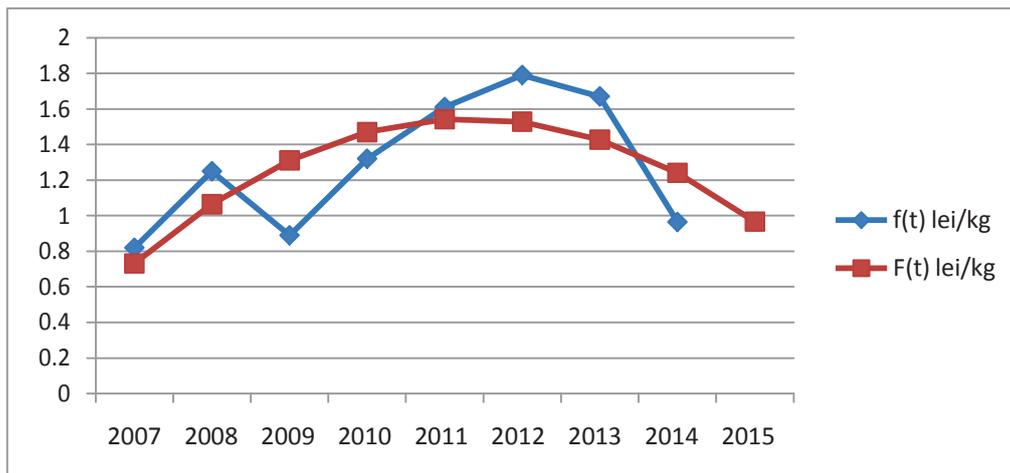
Fig 4 The extrapolation using the quadratic regression for the maize crop selling prices in South West Oltenia Region, the period 2007-2015



$$F(t) = 0.581607143 + 0.019702381t - 0.000059t^2$$

For the sunflower crop it was calculated the trend using the quadratic regression, resulting the function  $F(t) = 0.312767857 + 0.462410714t - 0.043303571t^2$ , with downward trend in sales prices, and the extrapolation for 2015 indicating a selling price located around 0.97 lei/ kg.

Fig.5 The extrapolation using the quadratic regression for the sunflower crop selling prices in South West Oltenia Region, the period 2007-2015



$$F(t) = 0.312767857 + 0.462410714t - 0.043303571t^2$$

## CONCLUSIONS

The data studied in this paper shows that the main crops cultivated areas in the period under review, decrease, the only culture that doubles its surface being the sunflower crop.

The productions are growing in this period, although the cultivated areas are significantly reduced. The largest increase is recorded for the sunflower crop of 783.06%.

Using the method of the quadratic regression equation was calculated trend in sales prices in 2015 for the main crops, as follows: -For the wheat crop we see an upward trend, with a retail price of around 0.88 lei / kg, - the culture of maize is increasing also , and the extrapolation for year 2015 is indicating a selling price around 0.75 lei / kg and the sunflower crop trend is downward , the selling price hovering around the value 0,97lei / kg.

Considering the current state and prospects of agriculture in the South-West Oltenia Region we have identified a problem that affects the future and sustainable development of the region, which can be solved with a long-term vision, strategies, objectives, priorities and concrete and correlated projects.

## REFERENCES

1. Manea Draghici, Raluca Necula, 2014 Course Notes, modeling and simulation of agricultural systems
2. <https://statistici.insse.ro/shop/>
3. <http://performeri.ccib.ro/intranetNEWS/infoFILES/infoNEWS/File/Oportunitati-SVOltenia.pdf>

# COMPUTER SYSTEM FOR FARMS (SITEFA) - AN OPPORTUNITY FOR PERFORMANT AGRICULTURAL MANAGEMENT

ELENA COFAS<sup>1</sup>

**Abstract:** *Any modern agricultural unit, regardless of profile, size, ownership and socio-economic space in which they operate, requires a management style based on flexibility, dynamism and foresight, which is inconceivable without a complex, operative and quality information, to underpin decision making. Therefore, any farmer needs objective, relevant, reliable, timely, useful, concerning: market demand, new products and technologies, the position of competitors, suppliers and customers, their performance, etc., so that their analysis to directly influence and as the competitiveness of the farm in a particular market or market segment. Based on the theme of the "Determination of economic indicators of crop production technologies and animal applied in order to increase environmental performance (costs, productivity, profitability, gross margin)" from the Sector Plan ADER 2020 was developed computer system SITEFA- a product developed and designed program-technical-economic analysis of the performances of farm economic and efficient use of production factors in classical operating conditions.*

**Keywords:** *agriculture, computer system, farm, management, analysis*

## INTRODUCTION

SITEFA is a software developed and produced for technical and economic analysis of the performances of farm economic and efficient use of production factors in classic operating conditions.

The main structural elements of the informatic system SITEFA are:

- technical basis or hardware system, which consists of all technical means for collecting, transmitting, storing and processing data, the central site computer returns electronically.
- Software system, which includes all programs built for operation of the product, according to the functions and objectives that have been preset (profitability analysis and efficient use of factors of production).
- scientific and methodological basis, which consists of mathematical models of economic processes and phenomena, methodologies, methods and techniques for achieving information systems.
- information base, which include data undergoing processing, information flows, systems and nomenclatures codes.

## MATERIAL AND METHODS

From a technical standpoint, SITEFA is an application built on a platform Microsoft Excel using Visual Basic tool because it allows to describe control structures, procedures and user functions. Visual Basic is part of Microsoft's Visual Studio package and, as well as other languages 'visual' Microsoft is focused on component interface of the program is easily possible to create Windows-standard interfaces (windows, buttons, lists etc.), without having to be written source code for this.

Visual Basic as a library of visual components (lists, calendars, menus etc.) whose components (graphics and functional) are already implemented, with the possible introduction and use of its components or realized within other applications. On the basis of information system design SITEFA stayed both elementary functions and special functions (called macros, involving macro-commands and macro-functions), the latter being in the utility of the application Microsoft Excel Visual Basic.

---

<sup>1</sup>Lecturer, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, District 1, 011464, Bucharest, Romania, e-mail: cofasela@yahoo.com

## RESULTS AND DISCUSSIONS

From a functional perspective, the computer system SITEFA has the following functions:

- Generating technology/technology and estimate of revenue and expenditure for each of the types of crops recognized by the system based on the input data.
- Determination economic indicators of crop production technologies.
- Maintenance of all subsystems (lists and tables) used to obtain the results generated by the computer system.
- Function to create/update: the system is equipped with a special feature for creating and updating its constants (maintenance); This function can perform the following:
  - updating /changing information contained in system nomenclatures and tables;
  - adding new records (mechanical works, manual work, materials and equipment, crop types, etc.);
  - deletion of certain information from databases;
  - looking/checking the desired information;
  - nomenclatures listing or other useful information from the system.
- Search functions, location, calculating, extracting information from the database and preparing for listing will be the most important component of the system that will be incorporated algorithms calculation procedure.

### *Description of information flow*

In terms of construction, a computer system includes input into the system (inputs), constant system (information taken from lists and tables) and system output data (outputs or reports).

a. *The input data* is any information entered by the user of the system, according to the objective pursued, for example:

- type of culture,
- production area (plains, hills, mountains) /production system (irrigated, non-irrigated)
- used agricultural surface
- rates mechanical works,
- manual work rates,
- materials and materials prices,
- selling price main production,
- selling price secondary production,
- the subsidy per hectare,
- the proportion of different types of expenses (supplies, labor, with insurance, and general management, with the interest rate)
- values for other expenses (reduction in value on buildings and utilities, taxes and fees)
- opening balance etc.

b. *The constants* are classifications system, internal tables and tables linking the program; system uses the following tables:

- table culture
- table with manual work
- table with mechanical works
- making materials and materials
- making the necessary annual (monthly rations of forage types)
- action table for each crop plant
- table with pesticides (fungicides, herbicides).

These constants can be updated through maintenance (maintenance) nomenclatures and tables used.

c. *The output* are there ports that are generated after charging system input and constants defined, based on algorithms specific to each module design; examples:





	A	B	C	D	E
4	<b>Calculatii pe hectar</b>				
5					
6					
7	Cod: D.01			Sistem: Neirigat	
8	Zona geografica:	Campie		Productia principala (kg)	
9	Potential:	Mediu		Productia secundara (kg)	
10	INDICATORI	U.M	VALOARE		
11			fara arenda	cu arenda in cheltuieli	cu arenda din venit
12	A. VALOAREA PRODUCTIEI	lei	5748	5748	5748
13	A <sub>1</sub> . Din care productia principala	lei	5460	5460	5460
14	B (+) SUBVENTII	lei	771,5	771,5	771,5
15	C (=) PRODUS BRUT	lei	6519,5	6519,5	6519,5
16	D (-) CHELTUIELI TOTALE	lei	4223,5	4743,5	4223,5
17	D <sub>1</sub> . Din care pentru productia principala	lei	3935,5	4455,5	3935,5
18	I. CHELTUIELI VARIABLE	lei	3701,1	3701,1	3701,1
19	1 Cheltuieli cu materii prime si materiale	lei	1849,92	1849,92	1849,92
20	- Sămânță și material săditor	lei	675	675	675
21	- Ingrasaminte chimice	lei	555	555	555
22	- Pesticide	lei	565,9	565,9	565,9
23	- Alte materiale	lei	54	54	54
24	2. Cheltuieli cu lucrari mecanizate	lei	1703,9	1703,9	1703,9
25	3. Cheltuieli cu irigatii	lei	x	x	x
26	4. Cheltuieli de aprovizionare	lei	55,5	55,5	55,5
27	5. Cheltuieli cu forta de munca temporara*	lei	x	x	x
28	6. Asigurari	lei	91,8	91,8	91,8
29	II. CHELTUIELI FIXE	lei	522,4	1042,4	522,4
30	- Cheltuieli cu forta de munca permanenta	lei	62,0	62,0	62,0
31	- Cheltuieli generale si de management	lei	73,4	73,4	73,4
32	- Dobanzi la credite	lei	217,0	217,0	217,0
33	- Arenda**	lei	x	520	x
34	-Amortisment pentru cladiri si utilitati	lei	170	170	170
35	E. (=) VENIT IMPOZABIL	lei	1524,5	1004,5	1524,5
36	(-) Impozite si taxe	lei	243,9	160,7	243,9
37	(-) Arenda**	lei	x	x	520
38	F. (=) VENIT NET+subventii	lei	2052,1	1615,3	1532,1
39	G. RATA VENIT IMPOZABIL (%)	%	38,7	22,5	38,7
40	H. RATA VENIT NET+subventii (%)	%	52,1	36,3	38,9
41					
42	COST DE PRODUCTIE	lei/to	937,0	1060,8	937,0
43	PRET PIATA INTERNA PREVIZIBIL	lei/to	1300	1300	1300
44					
45	* Aceste cheltuieli se regasesc la exploatatile de dimensiuni mijlocii, mari si foarte mari.				
46	** Pana la 600 kg/ha la pretul pietei (400 kg/ha grau X 1,3 lei/kg = 520 lei)				

Fig. 3. Spreadsheet „Budget for revenue and expenditure”

The spreadsheet "Standard gross margin" (Figure 4) enables calculation of standard gross margin (expressed in RON and EUR).

For the calculation of standard gross margin were considered direct costs or expenses standardized variables specific crop production such as:

- Seed and planting stock (purchased or produced on the farm)
- Chemical fertilizers,
- The purchase or manure from their own farms,
- Crop protection products,
- Crop insurance
- Water for irrigation,
- Heating,
- Specific marketing costs (cleaning, packaging)
- Other specific costs proportionate.

The specific costs are not included in labor costs, mechanization, buildings with fuels and lubricants, car repairs, depreciation and expenses made by third units. These expenses are highlighted specific cultures of their size unit activity in each culture.

	A	B	C	D	E	F
1	<b>MARJA BRUTA STANDARD-UNITARA</b>					
2	<b>GRAU - Cod. D.01</b>					
3	<b>Zona geografica: Campie; Sistem neirigat; Potential Mediu</b>					
4	<b>Rezultate estimate pentru recolta 2013/2014</b>					
5	<b>CALCULATII PE HECTAR</b>					
6						
7	Productia: <b>Grau boabe (4200 kg) in sol cernoziomic</b>					
8						
9				1 EURO =	4,5383	
10	<b>GRAU neirigat</b>		Kg/ha	Pret livrare -lei/kg-	Lei	Euro
11	Productia medie		4200,0	1,30	5460,0	1203,1
12	Productia secundara		1440,0	0,20	288,0	63,46
13	<b>Produs brut mii lei</b>		<b>pe ha</b>	<b>pe t</b>	<b>euro/ha</b>	<b>euro/t</b>
14			<b>6519,5</b>	<b>1552,3</b>	<b>1436,6</b>	<b>342,0</b>
15	Subventii acordate lei		771,5	0,184	170,0	0,040
16	Cheltuieli variabile lei		1941,7	0,462	427,8	0,102
17	<b>Marja bruta mii lei</b>		<b>4577,8</b>	<b>1090,0</b>	<b>1008,7</b>	<b>240,2</b>
18	<b>Pondere marja bruta in produs br</b>		<b>70,22%</b>			
19						
20						
21						
22	Variatia Marjei Brute in functie de diferite		Media	M.B.S	M.B.S	1 UDE=1200 E
23			kg/ha	lei	euro	
24	Productie medie mare		5040	5669,8	1249,3	1,041
25	Productie medie medie		4200	4577,8	1008,7	0,841
26	Productie medie mica		3360	3485,8	768,1	0,640
27						
28						
29	<b>Cheltuieli variabile</b>		Cantitatea Kg, l	Pret unitar	Total lei	Euro
30	Igrasaminte cu N, kg sa/ha		135	3	405,00	89,2
31	Ingrasaminte. P <sub>2</sub> O <sub>5</sub> Kg sa/ha		60	2,5	150,0	33,1
32	Samanta Kg/ha		250	2,7	675,0	148,7
33	Insecto-fungicid Tonic Plus 2,5 l/to		0,625	183,6	183,6	40,5
34	Erbicid - Bucril universal l/ha		1	90,7	90,7	20,0
35	Fungicid - Evolus l/ha		1	200,9	200,9	44,3
36	Insecticid - Pynrex 25 CS l/ha		1	90,72	90,7	20,0
37	Apa irigatii mii m <sup>3</sup>		x	x	x	x
38	Sfoara Kg/ha		2	27	54,0	11,9
39	Asigurari		1	91,8	91,8	20,2
40	<b>Total cheltuieli variabile</b>		<b>x</b>	<b>x</b>	<b>1941,7</b>	<b>427,8</b>
41						
42						
43	<b>Aportul de ore munca/ha si t</b>					
44	Total:		22,1 ore/ha - 6,3 ore/t			
45	din care:		ore/lucrari mecanice 10.1 ore/ha - 2.9 ore/t			
46						

Fig. 4. Spreadsheet „Standard gross margin”

In the spreadsheet "technical-economic indicators" (Figure 5) are calculated a number of financial indicators:

- Unit cost of production,
- Price recovery,
- Labor costs 1000 lei production value,
- Expenditure on materials lei 1000 production value,
- Profit,
- Rate of return etc.

INDICATORI ECONOMICI DE SINTEZA				
GRAU - Cod. D.01				
Zona geografica: Campie; Sistem neirigat; Potential Mediu				
Rezultate estimate pentru recolta 2013/2014				
	INDICATORI	U.M	VALOARE	4,5383
1	Producția medie la ha	to/ha	4,2	x
2	<b>Valoarea prod. la ha</b>	<b>lei/ha</b>	<b>5748</b>	<b>1266,6</b>
3	Valoarea prod. principale la ha	lei/ha	5460	1203,1
4	Cheltuieli de prod la ha	lei/ha	4223,5	930,6
5	Cheltuieli pentru producția principală	lei/ha	3935,5	867,2
6	<b>Cheltuieli variabile</b>	<b>lei</b>	<b>3701,1</b>	<b>815,5</b>
7	Materii prime și materiale	lei	1849,9	407,6
8	Cheltuieli cu forța de muncă permanentă	lei	62,0	13,7
9	<b>Cheltuieli fixe</b>	<b>lei</b>	<b>522,4</b>	<b>115,1</b>
10	<b>Costul de prod. unitar</b>	<b>lei/kg</b>	<b>0,937</b>	<b>0,2</b>
11	<b>Pretul de valorificare</b>	<b>lei/to</b>	<b>1300,0</b>	<b>286,5</b>
12	Consum de timp de muncă	ore-om/ha	22,0	x
13	Consum de timp de muncă	Z.O/ha	2,8	x
14	Remunerarea la ha pt forța de muncă	lei/ZO	22,5	5,0
15	<b>Productivitatea muncii în expresie fizică</b>	<b>ore-om/tonă</b>	<b>6,3</b>	<b>x</b>
16	<b>Productivitatea muncii în expresie valorică</b>	<b>lei/oră-om</b>	<b>247,6</b>	<b>54,6</b>
17	Cheltuieli cu forța de muncă la 1000 lei prod. val	lei	11,4	2,5
18	Cheltuieli cu materialele la 1000 de lei prod valori	lei	338,8	74,7
19	Cheltuieli la 1000 de lei prod principală	lei	720,8	158,8
20	<b>Profit sau pierdere pe unitatea de producție</b>	<b>lei/ha</b>	<b>1524,5</b>	<b>335,9</b>
21	<b>Profit sau pierdere pe unitatea de produs</b>	<b>lei/to</b>	<b>363,0</b>	<b>80,0</b>
22	Rata rentabilității	%	38,7	x
23	Marja asupra cheltuielilor variabile (MCV)	lei	2046,9	451,0
24	Marja asupra cheltuielilor variabile %	%	35,6	x
25	<b>Pragul de rentabilitate în unitati valorice</b>	<b>lei</b>	<b>1467</b>	<b>323,2</b>
26	<b>Pragul de rentabilitate în unitati fizice</b>	<b>to</b>	<b>1,13</b>	<b>x</b>
27	<b>Rata riscului de exploatare</b>	<b>%</b>	<b>26,9</b>	<b>x</b>
28	Indicele de securitate (Is)		0,731	x
29	Pozitia absoluta fata de PR	lei	3993,0	879,9
30	Pozitia realtiva fata de PR		2,722	x

Fig. 5. Spreadsheet „Technical and economic indicators”

Profitability analysis is important not only for assessing performance in economic unity, but also for choosing the most effective measures on the financing of economic growth, as achieved breakeven junction between industrial and financial strategy.

In the spreadsheet "Breakeven" (Figure 6) are some possible scenarios: increased production by 20%, decreased production value by 20% and 10% decrease in fixed costs.

Analysis of profitability forecasting gross product based on break-even scientifically possible to establish physical volume output is obtained and delivered cost-effective and also indicates the physical volume of output produced and sold (including the structure and its average selling price the recipients subunits, period and quality) in order to achieve a competitive level of gross profitability of domestic and foreign product coming period.

ANALIZA PRAGULUI DE RENTABILITATE						
Simulari de scenarii posibile						
Grau neirigat						
Explicatii	Valori	%	Pragul de rentabilitate RE=0	Rez obtenabil la o crestere a vol prod cu 20%	Rez obtenabil la o scadere a vol prod cu 20%	Mentinea rezultatului initial cand CF se reduc cu 10%
Cifra de afaceri (CA)	5748	100	1467	6898	4598	5601,3
Cheltuieli variabile (CV)	3701	64,4	945	4441	2961	3606,7
Marja asupra cheltuielilor variabile (MCV)	2047	35,6	522	2456	1637	1994,6
Cheltuieli fixe (CF)	522		522	522	522	470,1
Rezultatul brut	1524,5		0	1934	1115	1524,5

Fig. 6. Spreadsheet „profitability threshold”

Also, breakeven analysis serves in making financial diagnosis, ie economic risk analysis of the farm.

## CONCLUSIONS

Analysis of manufacturing activity is based on specific economic and physical indicators which along with accounting packages allow the farmer more analytical records of expenditure and revenue and provide management information needed to plan the best allocation of resources (eg staffing, operational mobility and the amount of resources required) to choose one of several possible or to conduct a study on the impact of the use of certain resources or to compare the results with those planned.

Among the indisputable advantages of this analysis mention:

- allows for production levels that no longer loss or programmed to produce a level of profit;
- highlights correlations between production development revenue and costs, grouped into variable costs and fixed costs;
- allows for utilization of production capacities in terms of obtaining a particular profit program and its growth paths;
- allow the development of hypotheses and simulations on the profits of the company;
- allows optimal sizing decisions on production capacity and make investments for the development and modernization of each company.

## BIBLIOGRAPHY

1. Babu Ramesh A., Singh Y.P., Sachdeva R.K. – *Establishing a management information system*, [www.fao.org/docrep/W5830E/W5830eok.htm](http://www.fao.org/docrep/W5830E/W5830eok.htm)
2. Băduț Mircea – “*Informatica pentru manageri*”, Editura Teora, București, 1999, pg. 41.
3. Banciu Doina, Drăgulănescu Nicolae, Moșu Andrei – “*Întreprinderea competitivă și informația*”, Editura Expert, București, 1999, pg. 9.
4. Basarabescu I. Ciprian – “*De la metodele empirice la folosirea globală a “instrumentelor” Internet*” – *Economistul* 5 aprilie/2002.
5. Benchimol G., Levine P., Pomerol J. Ch. - *Sisteme expert în întreprindere*, Editura tehnică, București, 1993, pg. 19.
6. Boldur-Lățescu Gh. – *Logica decizională și conducerea sistemelor*, Editura Academiei Române, 1992, pg. 27.
7. Castellani X. – “*Méthodologie générale d’analyse et de conception des systèmes d’objects*”.1. L’ingénierie des besoins, Masson
8. Chen P.- “*The entity-relationship model, ALM transaction of database systems*”, 1, 1, mars 1976
9. Constantin Nicoleta și colectiv - “*Managementul proiectelor*”, Ed.INFOREC, București, 2000.
10. odescu Gh., Odăgescu I., Scheianu Ștefania, Năstase Pavel – *Simularea sistemelor*, Editura Militară, București, 1986, pg. 26.