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The Sixth International Conference

COMPETITIVENESS OF AGRO-FOOD AND ENVIRONMENTAL ECONOMY

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FORWARD

Enhancing competitiveness has become, over the last decades, a primordial coordinate of socio-economic development strategies of most countries in the world. Sustainable development provides a framework for communities, where they can effectively use resources, create efficient infrastructures, protect and improve the quality of life and create new commercial activities to strengthen their economy. The relative importance of agriculture varies from one country to another, but it remains the main branch of the national economy in all the states, including the developed ones. The experience of the last decades has shown that the problems of the world economy can't be solved by abstracting from agriculture. In most cases, agricultural production has effects on the environment, especially because of the modernization of this sector, which is why a positive relationship between agriculture and environment is necessary.

It is necessary to continuously improve the management of agriculture and food industry, while maintaining the parameters of an optimal environment for human survival. Current policies and scientific literature highlight this need because at this moment we are facing a desirable future as natural resources are continually decreasing while the population continues to grow.

In this context, the sixth edition of the Competitiveness of Agro-Food and Environmental Economy conference (CAFEE 2017), organized by the Faculty of Agro-food and Environmental Economics, at The Bucharest University of Economic Studies from Romania, addressed various topics in the area of sustainable development, agriculture, food industry and environmental economy. Specialists in the field have contributed to the organization and the development of CAFEE conference during the years. Among these, we will like to give special thanks to Professor Diego Begalli, Marek Wigier, Adam Wasilewski and Dimitre Nikolov for their exceptional contributions. Also, the scientific intake of foreign delegations: Polish, Serbian, Bulgarian, English, Italian, as well our Romanian colleagues, are giving the rise to increasingly debates with a multi-disciplinary approach and with different perspectives on the development of agriculture.

So, this international scientific event provides support for the decision makers, business owners and experts by emphasizing the knowledge and the good practices on efficient consumption of natural resources, social agriculture, rural development, competitiveness, transfer of knowledge, innovation policy, food market, legislative framework and history in agriculture, environmental protection, women in rural areas, agricultural cooperatives, organic products and effects of financial crisis.

CONTENTS

THE TRANSFER OF KNOWLEDGE AS A SOURCE OF FUTURE DEVELOPMENT

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Abstract:
In all developed countries, innovative enterprises are part of the economic environment, contributing actively to increasing employment, supporting competitiveness in global, European and regional markets, improving the quality of life. This is possible because innovation was based on the main mechanisms of knowledge transfer (TCS) represented by: the development of the network system; enhancing education and continuing education efforts; consulting practice; supporting partnerships in the field of scientific research; developing licensing practices; encouraging entrepreneurial actions, etc.
The present paper addresses the factors and mechanisms of knowledge transfer, trying to advocate the initiation of coherent actions to overcome the present state of Romania as a modest innovative country compared to other EU member states. Also, it is not to be neglected that Romania is competitive from the point of view of the low costs of production, the capacity of the use of communication and computing technology, but in the absence of targeted, financially supported and constantly updated actions, this advantage will be diluted.

Keywords: innovation; transfer of knowledge; the global innovation index; Common Agricultural Policy.

1. Common Agricultural Policy in adapting to innovation

From 2003, and then in 2013, to the Cork Conference on Common Agricultural Policy (CAP), the European Commission underlined the importance of rural development, which was considered a European priority. Today, as a result of the creation of the European Innovation Partnership on Productivity and Sustainability of Agriculture (PEI-AGRI), a new impetus was created for the creation and sharing of knowledge. However, further efforts are still needed to facilitate farmers' access to knowledge in order to support the main axes of the CAP: diversification of economic and social activities; supporting environmental protection; landscape conservation and natural and cultural heritage; diversification of financial instruments used; increasing the efficiency and administrative capacity of the European Union (EU) Member States; reducing agricultural subsidies in the face of the global market; enhancing farmers' proscriptions to meet the demands of a variety of consumers (and hence emphasizing the importance of standardization, including organic products); reducing production costs; intensifying access to local or niche markets. These constant concerns in the CAP policy are complemented by those of stepping up and identifying new ways of diversifying land use, precisely in order to create additional sources of income for agricultural producers.

The Structural Analysis At the same time, a new knowledge-based economy that integrates sustainable development objectives and represents a new stage of human civilization that allows widespread access to information will also induce a new way of working in the European rural area - and each EU Member State and knowledge, speeding up economic globalization and increasing social cohesion. The support of the new knowledge-based society is the result of the development of RDI activities on the support of information technology, communications, as well as the production of digital content (applications), which through conception and diversity not only generated new areas of study, but also beyond physical / territorial boundaries of use.

In this context, the priorities of the European Commission for Innovation[1] are, in fact, the synthetic expression of the needs expressed in the documents of the EU Member States, so also of Romania, and refers to:

- Support the development of innovation in priority areas and SMEs, mainly through the Horizon 2020 Program;
- Fostering the widening of the marketing of innovation in the EU, including through: public procurement for innovation; implementing innovation projects; developing appropriate policies to stimulate demand for innovation; expanding innovation in the public sector; the development of social innovation;
- Developing and implementing public socio-economic policies for goods and services as well as social innovation policies both for the purpose of modernizing Europe and accelerating the market penetration of essential generic technologies;
- Establishing "key methodologies" that take into account the results of specialized surveys and the recommendations of the specialized institutions - the European Innovation Observatory – on: the innovation process; access to finance; the socio-economic transformations induced by digitization; the existence of the European single market; intellectual property; standards;
- Supporting cluster development and cooperation to stimulate innovation across all business categories.

The effects expected from the EC are those specific to any modern economy where innovations are applied and disseminated, both in terms of committed workforce and outputs. Thus, at the EU and EU level, the attributes of a modern economy can be materialized, referring to: a stronger connection with the service sector; generalization of network economics (Internet, computers, telecommunications - ICT); the predominance of highly qualified workforce in society; targeting policies of any kind towards innovation and productivity; Stronger support for entrepreneurs and SMEs to create the most jobs.
Generally speaking, the understanding of how innovation can support the modernization of the rural economy has a special role to play in avoiding obstacles. Thus, *the OECD Study[2] on Regional Innovation Capacity and Shock Resistance emphasizes the role of human capital quality "... it is hard to imagine a region committed to a sustainable technological development without an abundant supply of skills (labor – nn)". For rural areas, it is crucial: to bring in the force of innovation and entrepreneurship; the existence of a critical mass of people and financial capital, by entrepreneurs to stimulate innovation.*

[1] In June 2014 the Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG Internal Market, Industry, Entrepreneurship and SMEs).

[2] OECD (2014), Innovation and Modernising the Rural Economy, OECD Rural Policy Reviews, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264205390-en.

Table 1. Scores for factors and obstacles to economic growth in 2014. Percentage

Innovation models	Thematic areas of innovation models	Economic Growth Factors Score	Obstacle score
1.	Policies	13	13
2.	Human capital	12	11
3.	Innovation	7	13
4.	Infrastructure connectivity	11	8
5.	Institutions	8	9

Source: OECD (2014), Innovation and Modernising the Rural Economy, OECD Rural Policy Reviews, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264205390-en; pg.50

At the same time, the OECD study[3] points to innovation models based on the underlying factors of their constitution – five models are identified (Table 1) which can allow deciding evaluations of their own development policies.

The "OECD Innovation Strategy: Getting a Hard Start on Tomarrow" study[3] is also in support of decision-makers interested in or transferring knowledge, which analyzes possible innovation models as follows: (i) new forms of innovation in the market related to the old generation of technologies (RDI and internal / in-house patenting); (ii) innovative products with market launch costs; (iii) upgrading processes through equipment expenses, sometimes through the development of external partnerships to the enterprise; (iv) major innovations that have been generated as a result of the existence of organizational and market innovation strategies; (v) Network innovation where companies seek to attract external sources of knowledge, sometimes from public knowledge bases and from official collaborations. Each of these innovation models represents as many possibilities for development, absorption of the new.

At present, the challenges facing the rural area – from the development of commercial operations, knowledge transfer management, cultural heritage conservation, environmental and climate resources to local community action – have the role of "homogenizing" the interests of those who have a tangency with these areas of Europe in general and of Romania in particular. This state is, in fact, reflected in the programs and policies at European level for the current programming period. In addition, *innovation is introduced in the 2014-2020 National Rural Development Program (NRDP) as a cross-cutting theme* – giving priority to the innovative contributions to be made in measures that finance cooperation and advice and animation. Thus, *in the 2014-2020 NRDP, a special measure – M.16 – "Cooperation"[3], which aims at strengthening the links between agriculture, food production and forestry, on the one hand, and research and innovation, on the other hand, in order to better manage the environment and / or achieve improved environmental performance.* Developing pilot projects, innovative products, practices, processes and technologies – in the agricultural, food and forestry sectors, creating and strengthening interactions between researchers, farmers, forest owners and processors - will be directly supported through *Sub-measure 16. 1. – "Support for the establishment and operation of*

[3] M.16- „Cooperare” (Art. 35 din Regulamentul (UE) nr. 1305/2013 al Parlamentului European și al Consiliului din 17 decembrie 2013 privind sprijinul pentru dezvoltare rurală acordat din Fondul European agricol și pentru dezvoltare rurală (FEADR) și de abrogare a Regulamentului (CE) nr. 1698/2005 al Consiliului) din PNDR 2014-2020) dedicată cooperării

operational groups, for the development of pilot projects, new products, practices, processes and technologies in the agricultural, food and forestry sectors".

Europe-wide knowledge transfer programs and policies for the current programming period were based on the EC Innovation Survey (CIS), which aimed at identifying the innovation model of the EU MS, implicitly of that in Romania. The Innovation Survey (CIS) included three major categories of enterprises (innovative enterprises, enterprises with incomplete or abandoned innovations, non-innovative enterprises) and on the basis of a wide variety of collected information, the types of innovations implemented (Table 2) while allowing EU MS to know their stage of development.

Table 2. Types of innovative enterprises in the European Union *)

	Innovative businesses (including abandoned / suspended or in-service innovation activities)	**Enterprises with innovative products**	**Enterprises with innovative processes**	**Enterprises with innovative organizational structures**	**Enterprises with innovative marketing**
UE-28	**48,9**	**23,7**	**21,4**	**27,5**	**24,3**
Belgium	55,6	31,5	31,1	29,3	21,9
Bulgaria	27,4	10,8	9,3	12,4	14,2
Czech Rep.	43,9	25,3	24,0	20,5	22,4
Danemark	51,1	24,8	22,9	32,2	29,4
Germany	66,9	35,8	25,5	32,2	34,4
Estonia	47,6	20,7	23,8	21,7	21,9
Ireland	58,7	27,8	25,9	21,8	35,7
Greece	52,3	19,5	25,6	30,2	36,8
Spain	33,6	10,5	15,1	19,4	13,2
France	53,4	24,2	24,1	34,2	25,4
Croatia	37,9	16,4	19,0	22,9	23,5
Italy	56,1	29,1	30,4	33,5	31,0
Cyprus	42,1	20,9	28,2	26,2	29,5
Latvia	30,4	10,4	12,7	16,9	16,5
Lithuania	32,9	11,6	13,1	17,5	19,3
Luxemburg	66,1	30,3	32,8	46,8	32,4
Hungary	32,5	10,6	8,3	16,5	19,7
Malta	51,1	23,9	26,4	34,7	32,6
Holland	51,4	31,9	25,9	27,3	23,2
Austria	54,4	26,6	28,7	36,4	29,5
Poland	23,0	9,4	11,0	10,4	10,6
Portugal	54,6	26,0	33,5	32,8	32,8
Romania	20,7	3,4	4,6	14,1	13,8
Slovenia	46,5	23,6	22,5	26,3	28,5
Slovakia	34,0	14,4	13,5	18,6	19,3
Finland	52,6	31,0	29,3	29,7	26,5
Sweden	55,9	31,5	23,9	25,3	30,4
Great Britain	50,3	24,0	14,1	34,2	16,8

***)** The survey covers the period 2010-2012.

Source: Eurostat (online data code: inn_cis8_type);
http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database

A brief analysis of the innovation situation in 2010-2012 at the EU-28 level reveals that out of the total of the existing enterprises, almost half (48.9%) were innovative entities (including abandoned / suspended or innovation – but the number of them was 3.9 pp below the 2008-2010 level – a phenomenon due to the economic and financial crisis of 2008. Most innovative enterprises were in Germany (66.9% of the total) Luxembourg (66.1%), Ireland (58.7%) and Italy (56.1%). The number of innovative enterprises in Romania, between 2010-2012, was the smallest of EU-28 MS respectively 20.7% of the total, 6.7 percentage points (pp) below the level of Bulgaria (which had 27 , 4% innovative enterprises in total) and 2.7 percentage points below that of Poland (23.0%)[4].

At EU-28, on average, enterprises with innovative products accounted for 23.7% of the total. The Member States with the largest number of enterprises with innovative products were: Luxembourg (30.3% and 6.6% above the EU-28 average respectively); Finland (31.0%, 7.3 percentage points above the EU-28 average); Sweden and Belgium (31.5% each MS, respectively 7.8pp above the EU-28 average); Netherlands (31.9%, 8.2 pp); Germany (35.8%, with 12.1pp compared to the EU-28 average).
Romania with 3.4% enterprises with innovative products out of the total held the weakest place in EU-28. Immediately after our country was Poland (with 9.4% of all investigated enterprises).

Enterprises with innovative EU-28 processes held 21.4% of all surveyed enterprises – the first places were Italy (30.4%), Belgium (31.1%), Luxembourg (32.8%) and Portugal (33.5%). Romania holds the last place in the number of enterprises with innovative processes (4.6% of all investigated enterprises). Also, low weights for enterprises with innovative processes are Hungary (8.3%) and Bulgaria (9.3%).

Innovative enterprises in the EU-28 accounted for 27.5% of all surveyed enterprises. Most enterprises with innovative organization are in France and the UK (34.2% in each MS), Malta (34.7%), Austria (36.4%) and Luxembourg (46.8%). Romania has an ante-penultimate place in the number of enterprises with innovative processes (14.1% of all investigated enterprises); under our country were Bulgaria (12.4%) and Poland (10.4%).

Innovative enterprises in the EU-28 hold 24.3% of all surveyed enterprises. Most companies with innovative marketing activities are in Luxembourg (32.4%), Malta (32.6%), Portugal (32.8%), Germany (34.4%), Ireland (35.7%), as well as in Greece (36.8%). In the EU-28, are Poland (10.6% of total surveyed enterprises), Spain (13.2%), Romania (13.8%) and Bulgaria (14.2%).

At the main indicators that characterize innovation, innovative enterprises, Romania's place in the EU is modest. At the EU level, the overall ranking shows that performers in this area – Sweden, Denmark, Germany, Finland – are recognized not only at European level but also internationally, with the countries concerned having the best and most balanced living conditions. So, it can be said that indirectly a high level of innovation also generates the well-being of a society.

[4] Results of the Community Innovation Survey, 2012 (CIS 2012)

Depending on the degree of innovation achieved, the *European Commission's Innovation Report of 2015 divides the EU-28 Member States* into four categories: Leaders of Innovation / Innovation Leaders; innovation experts; moderate / moderate innovators; modest innovators / modest innovators[5].

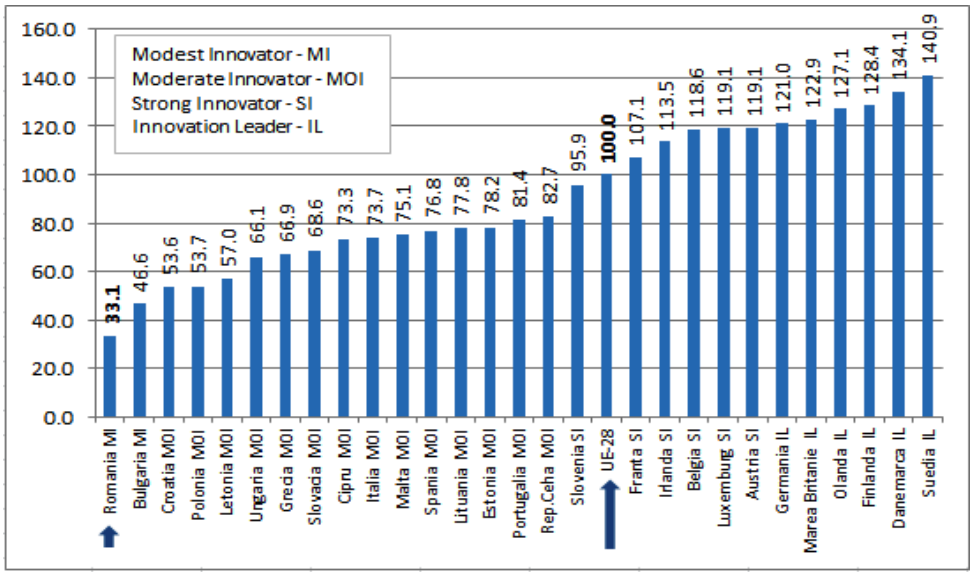

Chart 1. Global Innovation Scoreboard in EU-28, 2017 / European Innovation Scoreboard 2017. Percentage. EU-28 = 100

Source: Processing by: European Innovation Scoreboard 2017 Database – Relative performance compared to EU in 2016 + performance groups

The pace of innovation pace in EU MS over the period 2008-2012 on the four categories of the European Commission's Innovation Report 2015 can be correlated with the countries' economic growth categories as follows: sustained growth; with moderate rhythm; with slow growth (Table 3).

[5] EU-28 Member States on the four distinct categories according to the degree of innovation: (i) Leaders of Innovation – Sweden, Germany Denmark, Finland; (ii) Inovation followers – the Netherlands, Luxembourg, Belgium, Great Britain, Austria, Ireland and France – above the EU average – Slovenia, Cyprus, Estonia – under EU average; (iii) With moderate innovation – Italy, Spain, Portugal, Czech Republic, Greece, Slovakia, Hungary, Malta, Lithuania; (iv) With modest degree of innovation – Poland, Latvia, Romania, Bulgaria

Table 3. Innovation rate in the EU-27, 2008-2012. Percentages

The degree of innovation achieved by the EU MS		Sustained innovation pace	Moderate innovation pace	Slow pace of innovation
Innovation Leaders	1.8%	Denmark (2.7%)	Finland (1.9%) Germany (1.8%)	Sweden (0.6%)
Innovation Experts/ Followers	1.9%	Estonia (7.1%) Slovenia (4.1%)	Holland (2.7%) France (1.8%) Great Britain (1.2%) Belgium (1.1%) Luxemburg (0.7%) Austria (0.7%) Ireland (0.7%)	Cyprus (-0.7%)
Moderate Innovators	2.1%	Lithuania (5.0%)	Malta (3.3%) Slovakia (3.3%) Italy (2.7%) Czech Rep. (2.6%) Portugal (1.7%) Hungary (1.4%) Spain (0.9%)	Greece (-1.7%)
Modest Innovators	1.7%	Latvia (4.4%)	**Romania (1.2%)** Bulgaria (0.6%)	Poland (0.4%)

Source: EC, Dashboard of Innovation in the European Union, 2008-2012; Taken from http://cursdeguvernare.ro/tabloul-de-bord-al-inovarii-in-unea-europeana-2014-romania-pe-locul-26-din-28.html

Romania is in the group of countries with a modest level of innovation; although after 2011 the innovation capacity has increased, after which it has declined. The level of the innovation index, the expression of relative performance in 2007 compared to 2014, decreased from 46% to 37%.

Table 4. Relative performances of the main variables of the EU-28 Global Innovation Index and Romania in 2015. EU = 100

Pillars and main variables of the Global Innovation Index [1)]	Romania's relative performance in 2015 compared to EU-28, %	The rate of increase in Romania's performance in 2015 compared to 2014,%
Pillar: Human resources	**79**	**5.1**
New PhD graduate	100	6.0
Population with full university education	62	9.1
Young people with full secondary education	98	0.5
Pillar: Excellence research systems, open	**21**	**3.0**
International scientific co-publishing	52	12.0
The most coveted scientific publications	32	3.2
Non-EU doctoral students	8	-5.1

Pillars and main variables of the Global Innovation Index [1)]	Romania's relative performance in 2015 compared to EU-28, %	The rate of increase in Romania's performance in 2015 compared to 2014,%
Pillar: Funding and support	**26**	**-12.0**
Expenditure on CDs in the public sector	38	-2.0
Risk capital investments	13	-20.0
Pillar: Enterprise Investments	**18**	**-11.0**
Expenditure on R & D in the private sector	9	-5.6
Expenses for investments in non-innovative CDs	43	-17.0
Pillar: Relationships and Entrepreneurship	**9**	**14.0**
Innovative SMEs in the interior	37	-7.3
Innovative SMEs in collaboration with other entities	12	-12.0
Co-publications scientific public-private	13	14.0
Pillar: Intellectual assets	**27**	**12.0**
Patent Cooperation Treaty (PCT) patent applications	5	1.5
Patent Cooperation Treaty (PCT) patent applications in the field of societal change	5	-1.1
Community Trademarks	32	22.0
Community Design	17	29.0
Pillar: Innovators	**31**	**-8.8**
SMEs with product / process innovation	17	-17.0
SMEs with innovations in marketing / organization	50	-9.1
Enterprises in rapidly growing innovative sectors in the number of employees	89	0.7
Pillar: Economic effects	**54**	**-0.9**
Intensive knowledge activities for employees	47	2.2
Medium and high-end export	96	4.5
Export of intensive knowledge services	99	2.1
Share of sales of new innovations	30	-21.0
Abroad revenues from the sale of licenses and patents	10	10.0

[1)] The Global Innovation Index (GII) reflects the degree to which nations or regions respond to the challenges of innovation. This indicator was developed by INSEAD – The Business School for the World as well as World Business in 2007. The Global Innovation Index is comprised of 84 variables that are grouped into eight pillars; these, in turn, are divided into five input pillars and three pillars of outputs. as follows: (i) input pillars – are factors that improve innovation capacity: institutions and policies; human capacity; infrastructure; technological complexity; business and capital markets; (ii) output pillars – are the results of successful innovations: knowledge; competitiveness; the wealth generated by innovation (Editing by: Jean-Eric Aubert (editor) (2010), Innovation Policy: A Guide for Developing Countries.

Note: The total number of enterprises in the EU-28 in 2015 was 27,832,293 entities, of which 13,117 units (0.05% of the total) participated in the Innobarometer 2015; The total number of enterprises in Romania in 2015 was 516,314 entities, of which 500 units (0,10% of the total) participated in "Innobarometer 2015";

Source: European Union, Innovation Union Scoreboard 2015; Flash Eurobarometer 415 "Innobarometer 2015 – The innovation trends in EU enterprises", ISBN 978-92-79-47769-0, 2015.

The level of the innovation index, the expression of relative performance, places Romania below the EU average for all indicators considered. The worst performance was recorded in the size and entrepreneurship indicator. Also, poor relative performance was also seen in the PCT Patent Applications as well as the PCT Patent Claims Indicator on Societal Challenges[6].

At European level, Romania is still competitive in terms of low production costs. It should also be mentioned that in some areas – such as IT and IT (ITC) – this advantage has begun to be diluted, with foreign investors preferring new investments to new zone (Table 3). In this context, a sustained national effort is needed to bring together both public institutions and private companies to make innovation a national interest objective in order to preserve and / or even increase the competitive advantage.

In 2015, Romania is at a similar level to the EU-28 average for a series of indicators, in particular, for the new PhD graduates[7]/variables, Exports of Intensive Knowledge Services[8], and for Youth with Higher-level Studies secondary (license) [9].

In 2015 as compared to 2014, about half of the indicators used to characterize the innovation dimension show that the performances of the Romanian enterprises have increased; in particular, the "Relation and Entrepreneurship" pillar, as well as the "Intellectual Assets" pillar, have been noted. Also significant increases are found in the "Community Design" (29%) and the "Community Brand" (22%) indicators under the "Intellectual Assets" pillar.

The strongest declines in innovation performance of enterprises in Romania in 2015 compared to 2014 were recorded in the "Share of new innovation sales" ratio (-21%) in the "Economic Effects" pillar, as well as the "Investment with risk capital "(-20%) from the" Financing and support "pillar.

2. Research-development-innovation expenditures in Romania

One of the explanations for the relatively low performance of the main variables of the Global Innovation Index in Romania is also explained by the low level of R & D expenditures (RDI). In 2016, RDI spending was EUR 24.055 million, representing 21.4% of the EU-28 average. In terms of the share of GDP in RDI in Romania in 2016, they represented 0.48% compared to 2.03% in EU-28 (Table 5).

Table 5. RDI expenditures in Romania and EU-28, between 2007 and 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
A. Public spending on research, millions of euros										
UE-28	**3159, 914**	**3281, 868**	**3199,861**	**3252, 730**	**3338, 540**	**2996, 441**	**3088, 769**	**2996, 962**	**3136, 486**	**3146, 628**
Returns on average on SM	**112, 854**	**117, 210**	**114,281**	**116, 169**	**119, 234**	**107, 016**	**110, 313**	**107, 034**	**112, 017**	**112, 380**
Romania	29, 743	50, 016	27,737	59, 518	38, 822	30, 005	14, 573	16, 244	22, 978	24, 055

[6] Patent Cooperation Treaty
[7] Patent Cooperation Treaty
[8] From the Economic effects pillar
[9] From the Human resources pillar

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
% RO din UE	0,94	1,52	0,87	1,83	1,16	1,00	0,47	0,54	0,73	0,76
RO/Average UE-28 Report	**26,4**	**42,7**	**24,3**	**51,2**	**32,6**	**28,0**	**13,2**	**15,2**	**20,5**	**21,4**
B. Public spending on research,% of GDP										
UE-28	1,77	1,84	1,93	1,93	1,97	2,01	2,02	2,03	2,04	2,03
Romania	0,51	0,55	0,45	0,46	0,50	0,48	0,39	0,38	0,49	0,48
Public expenditure on research by sector of activity,% of GDP										
B.1. Business sector										
UE-28	1,12	1,16	1,19	1,20	1,24	1,27	1,28	1,3	1,31	1,31
Romania	0,21	0,17	0,18	0,18	0,18	0,18	0,12	0,16	0,21	0,27
B.2. Gvernmental/ public sector										
UE-28	0,23	0,24	0,26	0,25	0,25	0,25	0,25	0,24	0,24	0,23
Romania	0,17	0,22	0,16	0,17	0,21	0,20	0,19	0,16	0,19	0,16
B.3. University research sector										
UE-28	0,4	0,42	0,46	0,47	0,46	0,47	0,47	0,47	0,47	0,47
Romania	0,12	0,16	0,11	0,11	0,11	0,10	0,08	0,06	0,09	0,05
B.4. Non-public private research sector										
UE-28	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
Romania	0,01	0	0	0	0	0	0	0	0	0

Source: Eurostat

In the main sectors of activity in Romania, compared with the EU-28 average, the level of expenditures for RDI in 2016 was significantly lower (Table 5), as follows:

- the business community (private sector) held in the EU-28 a share of RDI spending in GDP of 1.31% compared to 0.27% of GDP for Romania;
- the public sector of research received funds of 0.23% of GDP on average at EU-28 level and in Romania only 0.16%;
- Universities and scientific research units in the public and private sectors have averaged 0.47% of GDP in the EU-28 and only 0.05% in Romania.

We appreciate that the size and evolution of the financing of RDI activities in Romania is not such as to increase their importance and role, human capital or intangible (intangible) assets needed in the process of accelerating globalization and, ultimately, welfare, in general, and that of rural space in particular. Given Romania's level of economic development as well as its position on R & D spending, we believe that priority should be given to promoting effectively the transfer of scientific and technological knowledge from the outside, as decades ago "Asiatic Tigers" (Japan, China and India), which have created a basis for further development of original creativity.

3. Factors supporting the process of knowledge transfer

The entire knowledge transfer process (TCS) is supported by a series of factors such as: the level of involvement of the business sector; facilitating the marketing and transformation of TCS into revenue for those who have produced them; the modalities

adopted and practiced by targeting know-how between institutions, sectors and individuals; the adequacy of sources of public, private, domestic and foreign funding; identifying and matching the needs of rural space (including agriculture, forestry, the environment, and cultural heritage) with existing and prospective academic research and policies. It is also important to note that there are a number of obstacles in the TWS process, which may be: (i) general obstacles (eg lack of adequate networks and inadequate level of complexity); (ii) Obstacles related to the state of rural infrastructure (eg: poorly available technology, institutional systems that are reluctant to transfer technology, lack of adequate work space, state of road infrastructure, degree of isolation of some of the rural localities, etc.) (iii) Organizational-institutional obstacles (such as lack of adequate TSS assessment methods, incentives and prizes, Managerial environment, Poor direction of knowledge specific to rural areas, Costs of achieving TSS, protection of intellectual property, etc.); (iv) the level of workforce qualification addressed to TCS (eg self-motivation, lack of confidence, etc.). These obstacles ultimately affect the effectiveness of the deployment of TCS mechanisms, which are often based on the development of joint public-private partnerships.

Table 6. Transfer of knowledge and measuring instruments

Mechanism of TCS	Quantitatively measurement instruments of TSC	Qualitatively measurement instruments of TSC
Networks	Number of people participating in events generating TCS activities.	Share in total communication events of those who watched TCS.
Continuing professional development, continuing education	Income from courses held to raise the professional level. Number of people and participating businesses.	Share of returning companies and customer feedback.
Consultancy	Value / Income from consultancy contracts - as a share of total RDI revenues, market share of the counseling institution, duration of the relationship with the client.	Share of returning firms, client feedback from the consulting company, customer importance for the entity.
Partnerships and collaborations in the field of research	Value of contracts, market share, share of revenues from collaborations in total revenues, duration of relationship with the client.	The share of companies in partnerships and collaborations in the field of research, customer feedback, the share of successful products achieved in such activities.
License activities	License Income, Licensed Products.	Customer feedback, the quality of the business from which the license was purchased, the share of licenses that generate revenue.
***Spin*-off*)**	Number of spin-outs, generated revenue, induced external investments, outgoing market value (Initial Public Offer)	Survival rate of created spin-outs, investor quality, investor or customer satisfaction, economic growth rate of the new entity.

Mechanism of TCS	Quantitatively measurement instruments of TSC	Qualitatively measurement instruments of TSC
Specific university education	The share of graduates in total students, the employment rate registered among graduates.	Student satisfaction (after employment), the employer's satisfaction with the quality of the student employed.
Other TCS mechanisms	Migration of students with specific training to other fields, publications made – as a measure of research	Enrollment in specialized databases

***)** A spin-off is a type of corporate restructuring. Spin-cars occur when a corporation unwinds parts or divisions to form a new corporation. The new company, which is estranged, brings with it some of the assets and equipment of the parent company. The European System of Accounts (ESA) defines an entity as a spin-out when the parent company participates in the capital of the newly formed enterprise.

Source: Processing-https://www.investopedia.com/terms/s/spinout.asp#ixzz53FRzf0pZ

4. Mechanisms for the transfer of knowledge

We appreciate that today, in Romania, the efficiency of public-private partnership is often hindered, sometimes even stopped, by a series of failures in the functioning of market mechanisms such as:

- *inability of the market to internalize externalities* (positive and negative) generated by the still low number of rural-specific financial instruments (eg subsidies, taxes, micro-credits, etc.);
- the complexity of intellectual property rights, which exceeds the ability to effectively resolve TCS, which also has a good public-quality character to be recognized - sooner or later;
- the informational asymmetry to which the inhabitants of the rural area are subjected, implicitly to small agricultural producers, and which could be mitigated by public intervention; in this context, we mention as a positive fact the inclusion in the two National Rural Development Programs of measures and conditionalities aiming to improve the general and specific degree of knowledge transfer, information of different categories of households / stakeholders;
- the inability of market mechanisms to: (i) develop an overall view that allows for the formation of a "critical mass" for the development of a knowledge-based economy; (ii) Induce an impact on potential entrepreneurs through public intervention considered by specialists as a sine qua non factor to avoid suboptimal use of the determinant mechanisms of TCS.

Among the main mechanisms for ensuring the transfer of knowledge (TCS) – which are also practiced in Romania but on a small scale – are the development of the network system; enhancing vocational education and continuing education efforts; consulting practice; intensifying partnerships in the field of scientific research; developing licensing practices; encouraging entrepreneurial actions, including the development of spin-outs, etc. (Table 6).

The EU Innovation Status Survey of 2017 is developed on the mechanisms of knowledge transfer. For Romania, the latest evaluations (2016 according to the European Innovation Scoreboard 2017) are presented in Table 7.

Table 7. Global Innovation Scoreboard for Romania / European Innovation Scoreboard 2017*)

	Performance relative to EU/		Change 2010-2016/. pp
	2010	2016	
Summary Innovation Index	**47.9**	**33.8**	**-14.1**
Human resources	**42.3**	**49.8**	**7.4**
New doctorate graduates	100.0	44.1	27.0
Population with tertiary education	17.1	44.1	27.0
Lifelong learning	2.1	0.0	-2.1
Attractive research systems	**23.4**	**30.0**	**6.5**
International scientific co-publications	23.4	47.6	24.2
Most cited publications	31.1	40.1	9.0
Foreign doctorate students	12.3	9.0	-3.4
Innovation-friendly environment	**74.9**	**89.8**	**14.9**
Broadbrand penetration	122.2	144.4	22.2
Opportunuty-driven entrepreneurship	41.5	51.2	9.7
Finance andsupport	**52.6**	**18.1**	**-34.6**
R&D expenditurein the public sector	27.1	21.8	-5.3
Venture capital expenditures	84.8	13.3	-71.5
Firm investments	**64.4**	**11.9**	**-52.5**
R&D expenditurein thebusiness sector	13.3	15.9	2.6
Non-R&D innovation expenditures	209.4	21.3	-188.1
Entreprises providing ICT training	0.0	0.0	0.0

Innovators	**38.5**	**0.0**	**-38.5**
SMEs product/process innovators	26.4	0.0	-26.4
SMEs marketin/organizational innovators	50.8	0.0	-50.8
SMEs innovating in house	38.0	0.0	-38.0
Linkages	**52.3**	**29.4**	**-22.9**
Innovative SMSs collaborating with others	10.7	5.8	-4.9
Public-private co-publications	39.3	15.0	-24.3
Private co-funding of public R&D exp.	97.5	61.1	-36.4
Intellectual assets	**15.9**	**24.9**	**9.0**
PCT patent applications	21.1	26.7	5.6
Trademark applications	16.6	31.3	14.8
Design applications	8.5	17.5	9.0
Employment impacts	**21.0**	**37.0**	**16.0**
Employment in knowledge-intensive activites	3.8	19.2	15.4
Employment fast-growing enterprises	33.6	50.0	16.4
Sales impacts	**84.8**	**62.2**	**-22.7**
Medium and high tech product exports	87.1	93.4	6.4
Knowledge-intensive services exports	56.0	34.7	-1.3
Sales of new-to-market/firm innovations	115.9	33.2	-82.7

***)** Note: This table shows minor differences in the structure of indicators used to determine the Global Innovation Index used in Table 4. The relative performance of the main variables of the EU-28 Global Innovation Index and Romania in 2015. EU = 100.

Source: http://ec.europa.eu/docsroom/documents/23936

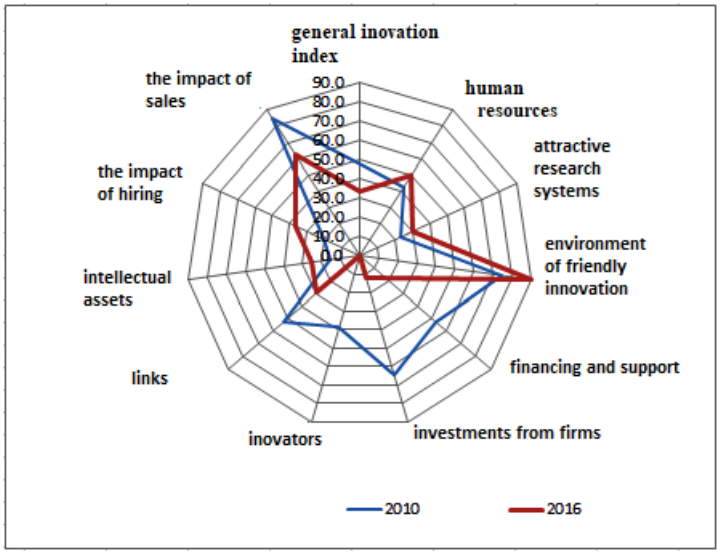

Chart 2. Global Innovation Scoreboard for Romania / European Innovation Scoreboard 2017

Source: Processing by: http://ec.europa.eu/docsroom/documents/23936

Coming to the level of the main indicators, 2016 by 2010, the overall innovation index decreased by 14.7 percentage points (from 47.9% in 2010[10] to 33.8% in 2016[13]). The largest reductions were recorded for the following indicators: -52.5 pp for investments in firms (from 64.4% in 2010 to 11.9% in 2016); with -38.5 pp on the number of innovators (from 64.4% to 11.9%); with -34.6 pp on funding and support (from 52.6% to 18.1%); with -22.9 pp at links / partnerships / partnerships (from 52.3% to 29.4%); with -22.7 pp on sales impact (from 84.8% to 62.2%).

There were positive developments in four indicators, but they could not compensate for the losses. The innovation index has increased for the following indicators: the employment impact increased by 16.0 pp (from 21.0% in 2010 to 37.0% in 2016); with 14.9 pp on the existence of a friendly innovation environment (from 74.9% to 89.9%); with 9.0pp on intellectual assets owned by enterprises (from 15.9% to 24.9%); with 6.5pp in attractive research systems (from 23.4% to 30.0%).

These results registered by Romania at the global index of innovation continue to keep it in the category of "modest innovators". Changing the status of agricultural and forestry research and knowledge transfer in the coming period are the main groves our country faces. At the same time, the CAP – through the NRDP – has to take on the role of "engine" in the modernization of TSC, changing the country's current position in the Commission's assessments.

[10] UE=100

5. Conclusions

A. In the future, as the globalization process becomes stronger, society will be under pressure from growing demand for agri-food products, climate change, environmental protection and cultural heritage, and improving the knowledge transfer situation.

B. The key to farming performance is how the knowledge transfer market is configured on all its components, namely: offer; application; vectors or mechanisms linking supply and demand for scientific knowledge. In essence, TCS vectors / mechanisms are the ones that convey the process of transmitting information from the producer (the research, university and company / firm environment) to the beneficiaries (agricultural workers, regardless of their professional or legal status, the other inhabitants of rural areas).

C. In increasing the effectiveness of TCS, different RDI policies, as well as the modality, constancy and intensity of public and private interventions designed to remove / reduce obstacles to TCS through measures such as training, facilitating the placement of graduates with higher education on the labor market; providing start-up support and spin-offs created; supporting the emergence and development of investment funds; developing incubator systems and creating centers of excellence and research networks; implementing TCP actions through partnerships based on standards and protocols; the creation of product and equipment presentations and technologies, and venture capital firms.

D. In Romania, the links between academia (including academia) and business in R & D & I (RDI) and TCS are very weak, sometimes non-existent, except for large private companies. Some of the effects of this reality are felt, directly and / or indirectly, in the current work as well as in the EC's periodic evaluations, such as:

- It is almost impossible to validate the assumptions of academic research results on the markets in the absence of the functionality of adequate institutional structures;
- The speed of implementation of innovations is delayed;
- As a result of the absence or weak link between academic RDI and the business environment, the cost of RDI activities decreases from year to year;
- There are many cases where the prototypes provided by the academic RDI sector no longer correspond to the technology imports / acquisitions, including IT, made by the business sector;
- Mentality and attitude towards innovation in the public and private sectors is different;
- It is noted that in the Romanian environment, although there is no general strategy for RDI, it is still lacking in regular evaluations and updates. The need to periodically update the "General Strategy for RDI" is explained by the very high speed of putting into practice the achievements in the field of IT technology. It should also be stressed that large companies have their own RDI strategies and

they are currently practicing the system of assessing and updating their own strategic objectives;

- There is a need for a change in the management system of innovation, the transfer of knowledge and the general attitude towards it, which could induce the acceleration of the added value creation in the RDI system, in enterprises, as well as the emergence of some positive effects;
- The lack of practicing methods of assessing the efficiency of TCS (evaluation of knowledge transfer) has not only a theoretical-methodological importance but, above all, practical. Thus, in assessing the effectiveness of TCS, the strong point is to establish the quantitative and qualitative impact, and in turn it is the one that provides decision makers with real / credible arguments for future actions;
- The lack of consensus among experts on the evaluation of the effectiveness of TCS should be transformed into research direction for establishing standardized (quantitative and qualitative) instruments as well as institutionalization procedures.

E. At European level, Romania is still competitive in terms of low production costs, as there are still areas with such an advantage (for example, ICT / Information and Communications Technology (ITC)), but in the absence of concerted actions to increase the effectiveness of TCS, this temporary advantage will be diluted.

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EFFICIENCY OF EU FINANCIAL SUPPORT IN TERMS OF RURAL ECONOMIC DEVELOPMENT

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Abstract
The main objective of the research was to assess the efficiency of selected instruments of entrepreneurship development in the rural areas, using a multi-criteria approaches. The study of policy efficiency involved descriptive and comparative analysis of the state and changes of private and micro-enterprise number in rural counties' as well as the simple regression analysis, utilized for the assessment of the impact of financial support scale on the county budget revenues and creation of new businesses and jobs. The above analyses were made for previous programming periods and use the based on CSO data and Local Data Bank for 2004-2013 for 1,529 rural counties. The structural and regional policies focused on the use of financial instruments generally have no positive impact on reducing inequalities in local development. But, does not mean the absence of the process of reaching the state of long-term equilibrium by counties with lower levels of development. All this data are presented on the context of macroeconomics changes in the whole economy.

Key words: EU policy, efficiency, policy measures, rural development, business development

Introduction

The professional literature contains a wide range of definitions of the term policy [Murzyn 2010], which depend on the approach applied, i.e. official and legal, behavioural, functional, rational or post-behavioural. However, it generally means the exertion of influence on various areas of human activity by specific public authority organs. In the case of the policy supporting business activity development, this is the intervention of the state and the European Union in the area of the production of private goods. According to the mainstream economists' opinion, this is an undesirable situation, since the only regulating factor should be the market. Due to the functioning market failures, such as externalities, information asymmetry, unemployment and lack of equilibrium, the European Union adopts the approach of active participation in the public sector in the development of business activity, particularly the sector of small and medium-sized enterprises. The official justification for the construction of the strategy and initiation of specific measures in this area is the equalisation of the conditions of competition. The key element of strategies to reduce poverty and create income and employment opportunities in rural areas is

multifunctional development and entrepreneurship development. Entrepreneurship is often conceived as innovation, creativity, the establishment of new organizations or activities, or some kind of novelty [Klein et al, 2010]. Entrepreneurship can be a vehicle for leveraging existing community strengths and diversifying local economies, while also challenging existing businesses to be more efficient and innovative.

Entrepreneurship in rural areas is finding a unique blend of resources, either inside or outside of agriculture. This can be achieved by widening the base of a farm business to include all the non-agricultural uses that available resources can be put to or through any major changes in land use or level of production other than those related solely to agriculture. Thus, a rural entrepreneur is some one who is prepared to stay in the rural area and contribute to the creation of local wealth. Moreover, the economic goals of an entrepreneur and the social goals of rural development are more strongly interlinked than in urban areas and relatively has large impact on a rural community [Nandanwar, 2011].

In general, the theoretical considerations suggest that any form of intervention, which may also include EU direct financial support to SMEs, slow down the efficient allocation of resources. Nevertheless, they can be a key driver for economic growth, as was the case in China. In accordance with Murrell [2005], the dual economy model plays such a role. As a matter of fact, the use of different intervention forms strengthens "marginal" efficiency. In relation to the New Institutional Economics, this means a temporary approval for a set of informal rights allowing for sub-marginal production. However, it provides social protection for entities which would lose the most due to reforms, i.e. transition to a purely market economy [Lau, Quian, Roland 2000]. As a matter of fact, the result is a slowdown in the said reallocation, but – according to neo-institutionalists, it allows to gain time to develop protection mechanisms for market transactions. Given the social aspect of the dual economy, it can be said that certain solutions can be applied also in Poland. In fact, the use of such mechanisms is well-founded in the Constitution of the Republic of Poland, which defines the state economic system as a "social market economy". Therefore, the main objective of the paper was to introduce come section of the efficiency assessment of selected instruments of entrepreneurship development in the rural areas, using an multi-criteria approaches. In this case it was the assessment of impact of EU financial support on the local economy.

1. Methodical approach

The efficiency of regional and structural policy instruments to support the development of non-agricultural economic activities was assessed in respect of financial transfers from the EU budget through the Regional Operational Program (ROP), Innovative Economy Operational Program (IEOP), Human Capital Operational Program (HCOP) and others. While assessing the efficiency of financial support, both direct and indirect non-refundable support, which influenced the development of SMEs, was examined. Furthermore, the assessment of these instruments received by far the most attention in the study. However, such an approach was taken, because the EU budgetary period had finished, thus a need to assess the effects of the policy pursued in various aspects. The study of efficiency involved descriptive and comparative analysis of the state and changes of private and micro-enterprise number in rural counties' in various aspects determined by the scale of EU financial support for the development of entrepreneurship. To assess the external efficiency, also the method of the Stochastic Frontier Approach has been used (SFA). The analysis is also focused on the relationships between this support and the employment and unemployment in rural counties. The criterion for grouping was the median and quartile value of the support per one inhabitant in working age. Finally, the correlation and simple

regression analysis were utilized for the assessment of the impact of financial support scale on the county budget revenues and creation of new businesses and jobs.
The above analyses use the data from Central Statistical Office (CSO), Local Data Bank, for 2004-2013 for 1,529 rural counties. The population of this group of counties was without the units with own income in excess of the average value of income by more than 3 standard deviations. These were mainly counties obtaining substantial income from compensation for mining damage and those of typical tourist profile.

2. Literature review

Active state policy [Landreth, Colander 2005] for the development of entrepreneurship, based on the use of a wide range of instruments [Wasilewski 2011], is justified primarily by market failures [Stiglitz, 2004] which result from under-utilisation of labour resources. This is unemployment which makes state institutions intervene in the allocation of resources by means of measures, such as support for training and career counseling or direct subsidies for running or launching own economic activity [Gancarczyk, 2010], etc. Furthermore, failure resulting from asymmetric information is important as regards support to SMEs. In the event of these failures, state intervention involves the reallocation of some resources from one group of entities to the other. Instruments for such transfer are taxes on the one hand, and on the other hand direct subsidies or subsidies in the form of public goods. In theory, such transfers are justified, given the decreasing marginal utility of goods.
If the transfer of funds deteriorates one's situation, Pareto efficiency does not improve. However, Kaldor-Hicks efficiency may improve. This approach aims at maximising the allocation of wealth or welfare expressed in money [Stringham 2001]. A general increase in welfare is justified, even if the situation of a certain group of persons deteriorates. Regardless of the approach to efficiency improvement, the benefits resulting from transfers should outweigh the costs. In general, the resulting net benefits are a measure of the efficiency of given allocation. However, the state making a social choice in the allocation of resources, which is not accompanied by Pareto efficiency improvement, must also take into account the loss of certain individuals or groups.

The assessment of the specific policy, including support for the development of the sector of small and medium-sized enterprises, may also be carried out in terms of the decentralisation of power, which is also one of the issues raised in the New Institutional Economics. The representative of this trend, Weingast, states, by adopting Hayek's assumptions on the significant importance of diversified information [Weingast, 2005] that authorities of the lower administration level have the better information about local conditions or preferences than the central government. For this reason, political decisions made at lower levels are better adapted to local needs. Admittedly, the author considers these relationships on the example of federalism and refers political decisions to the issue of the production of public goods, but his observations may be applied also to the assessment of the policy supporting the development of small and medium-sized enterprises in Poland. Some instruments of this policy such as, e.g. infrastructure development are a typical example of support by producing public goods. It also seems that support for the production of private goods, as a result of the policy pursued, will correspond to local needs to a larger extent.

To the issue of the assessment of the specific policy, the public choice theory also applies. Unfortunately, according to Clark and Lee [2013], who are the representatives of this trend, now in the economic studies we may notice a tendency to emphasise market failure and to conclude on this basis that this failure is a sufficient justification to take corrective action

by the government. Widely ignored is the issue of public choice. According to the above-mentioned authors, the reasons for market failure also result in government failure. The policy pursued by the government may therefore lead to the improved economic performance, but it may also be harmful to the economy. In this aspect, the assessment of the policy, and even suggestions regarding pursuing a particular policy should take into account, on one hand, a possibility of revising market failure and, on the other, negative effects to which the process of its implementation may be exposed as a result of government failure to implement its process, or, in a broader sense, of state failure. Such formulation of the problem of the possible impact of the state on the market is, however, a kind of negation of the approach applied by behavioral economics [Clark, Lee 2013]. The economists of this trend assume that from a certain moment people start behaving irrationally [Ariely, 2008], due to which they cannot effectively pursue their interests in relations with the market without support on the part of the state. The public choice theory assumes that if we accept a thesis on the irrationality of market entities, before choosing a specific policy, it should be confronted with a thesis on the irrationality of entities of this policy.

3. Macroeconomic situation

Polish integration with the EU structures was a milestone which affected the acceleration of structural transformations in the entire national economy. The dynamics of this process resulted from, inter alia, the adoption in Poland of new solutions and regulations in the field of the economic policy, including the agricultural and trade policy, access of more than 505.7 million consumers to the market, inflow of public financial resources from the structural funds, cohesion policy and the CAP policy or the free movement of persons, goods and services.

In 2007-2013, a macroeconomic situation in the Polish economy was relatively stable (Table 1). In the same period, the GDP grew. Indeed, the world economic crisis of 2008 caused a slowdown, but GDP developments were positive throughout the period considered. The nominal GDP per capita grew by over 50% to reach about PLN 41 thousand in 2012. In the first half of 2014 Poland's GDP increased by 3.3% compared to the same period of previous year. At the same time, domestic demand grew by 5.1%. These data show an economic recovery when compared with the tough last year, when GDP grew by 1.6% (year/year) in the entire year and domestic demand dropped by 0.2% [Wigier 2014, pp. 41-55].

The growth rate was stabilised by EU structural funds and domestic demand. Since Poland's accession to the European Union in 2004 the country has come a long way. A strong support in this process has been and continues to be provided by the inflow of structural funds granted in the framework of the EU's cohesion policy. In the EU's 2007-2013 budget, the subsidies for Poland amounted to nearly EUR 68 billion, the highest sum among the EU funding beneficiaries. According to the Regional Development Ministry's data as of September 30 2014, since the launching of EU subsidies programs of the 2007-2013 framework, authorities and beneficiaries signed 103,370 contracts for the total sum of PLN 409.7 billion of qualified expenses, including co-funding on the part of the EU amounting to PLN 284.6 billion.

The factors stabilising the development rate were high investments, at the level of about 13-17% of the GDP value, inflow of financial resources from the structural funds, foreign direct investments (FDI) and internal demand. Poland has so far stood out in terms of FDI

among the CEE countries. Strong internal demand and solid private consumption used to be named by economists as strengths of the Polish economy, helping the country to retain its economic growth even in the face of difficult conditions on international markets. The unemployment rate gradually decreased, from about 15-19% in the period preceding integration with the EU to about 10% in 2013. The inflation rate oscillated around the inflation target designated by the Government (from 1 to 4%). Poland is now the sixth-largest economy in the EU. Living standards more than doubled between 1989 and 2013, reaching 62% of the level of the prosperous countries at the core of Europe.

Table 1. Selected macroeconomic indexes in 2007-2013

Specification	2007	2008	2009	2010	2011	2012	2013
GDP value in PLN billion (fixed prices of 2012)	1,349	1,420	1,443	1,500	1,566	1,595	1,603
GDP *per capita* (current prices in PLN thousand)	30.8	33.5	35.2	36.8	39.7	41.4	43.0
Dynamics of GDP changes [previous year = 100]	106.8	103.8	102.9	105.0	103.2	101.6	101.3
Share of investments in GDP [in %]	16.3	17.0	16.3	15.3	15.9	14.9	13.9
Inflation (CPI) [previous year = 100]	102.5	104.4	103.0	102.2	104.8	103.7	100.9
Unemployment rate [%]	11.2	9.5	8.2	9.6	12.5	10.1	10.3

Source: Own elaboration based on the CSO data. Statistical Yearbook of the Republic of Poland, CSO, Warsaw, subsequent years and www.stat.gov.pl, access date 20.08.2014.

4. Efficiency of subsidies at local level

In the chapter dedicated to the methodology, it has been stressed that the subject of the study was 1,529 rural communities. In the years 2007-2013, those communes received about PLN 13.1 billion under various projects through the Regional Operational Programmes (ROP), Operational Programme Human Capital (OPHC), Innovative Economy (OPIE) and other programmes. Most of the funds were, however, transferred through the Regional Operational Programmes. For the measures of those programmes, which included both direct support for the development of economic activity as well as indirect support through infrastructure projects, nearly 63% of the total funds from the European Union budget were spent, allocated for the analysed rural areas.

In 2004, i.e. at the time of Poland's accession to the European Union, over 545 thousand private sector economic entities (employing at least 10 workers) operated in the examined area. Their number increased steadily until 2013, in which it reached nearly 712 thousand. Nonetheless, enterprise growth rates in rural areas in 2007-2013 and 2004-2006 were similar. It should be noted, however, that some instruments to support the development of economic activities in rural areas were also used in 2004-2006. Therefore, comparing certain economic changes during these two periods would, in principle, bring little to the analysis of the local efficiency of EU policy instruments. For this reason, the economic changes observed were analysed depending on the level of the support received. For this purpose, the counties were divided into quartiles, the boundaries of which are shown in the previous paragraph.

While analysing an increase in the absolute number of economic entities in county groups with different levels of financial support (Fig. 1), it can be concluded that the relative level of financial transfers from the EU budget played an important role in launching economic activities by physical persons. In 2007-2013, i.e. the effective period of the financial instruments concerned, a larger increase in the number of economic entities was observed in county groups with a greater level of support. Quartiles 1 and 4 are significantly different. Throughout the effective period of support, the number of these entities in the latter increased by as much as 6 percentage points more. At the same time, it should be noted that the number of economic entities grew more in county groups, in which the initial number of the entities was higher. Having regard to the increase in the number of private economic entities, EU financial support can be considered as a quite efficient instrument.

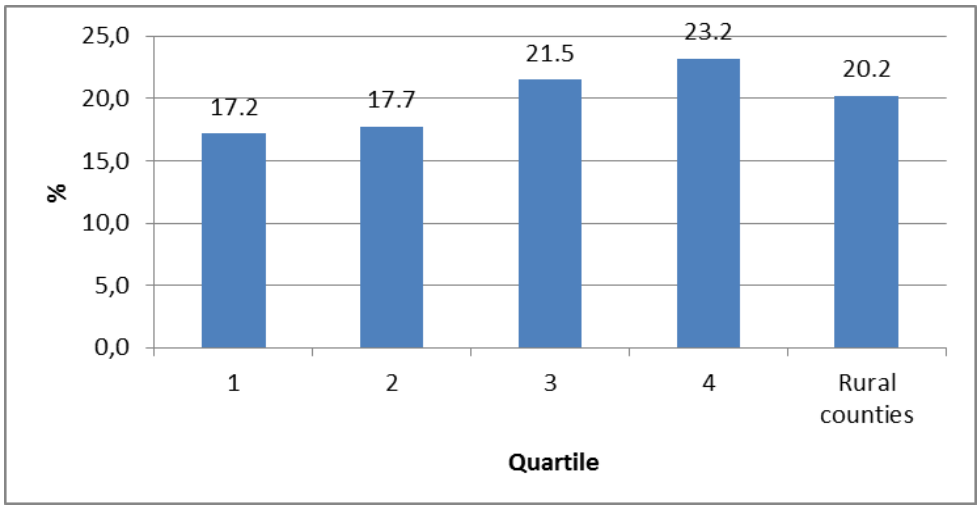

Figure 1. Increase in the absolute number of private economic entities in 2007-2013, in county groups with different levels of EU support per capita of working-age population

Source: Own calculations based on CSO data.

In 2007-2012, the share of the employed in the total number of working-age population decreased. However, in absolute terms, employment in rural areas increased by 10.7% (Fig. 2). This employment growth was observed in all county groups, regardless of the level of support. Nevertheless, it was greater in counties with a higher level of EU support. Research shows that the difference between extreme, in terms of the relative level of support, county groups was as much as 11 percentage points, meaning that public funds were a relatively strong driving force for the recruitment of new staff, although they were insufficient to create conditions, in which these growing labour resources would be fully utilised. It should also be emphasised that the fastest growth in employment was observed in counties, in which its level was higher. In view of the above, it can be concluded that the diversity of rural areas in terms of the utilisation of labour resources increases. Nonetheless, the criteria used to distribute public financial support foster a kind of rural economic polarisation.

During Poland's membership in the European Union, two characteristic periods in unemployment changes can be distinguished. In 2004-2008, there was a systematic and quite dynamic drop in the share of the unemployed in the total number of working-age rural population. In 2009, the financial crisis brought the upward trend that lasted until 2013. The unemployment rate increased relatively in all counties, regardless of the level of the support obtained from the EU budget. Furthermore, there were no significant differences in the level of unemployment among county groups with different levels of EU assistance. However, it was noted that the smallest increase in the share of the unemployed in 2007-2013 was observed in counties with the highest level of financial support. This would suggest that only a high level of EU funds slowed down unemployment growth. Therefore, the use of direct and indirect financial support as an instrument to reduce unemployment can be efficient, but it cannot be applied on a wider scale at both EU and national levels due to budgetary constraints. However, it can be a spot-intervention instrument.

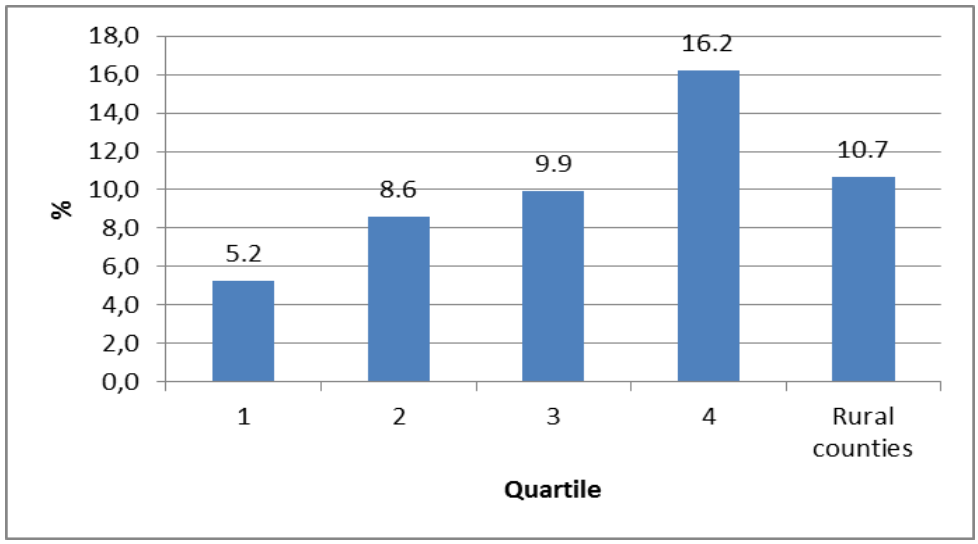

Figure 2. Changes in the number of the employed in 2007-2012, in county groups with different levels of EU support per capita of working-age population

Source: Own calculations based on CSO data.

Analyses show that the relative level of the support obtained significantly contributed to increasing municipal budget revenues from both real property and income taxes in relative and absolute. Own real property tax revenues per capita in county groups with the highest level of support increased by as much as 7.6 percentage points more than in counties in which this support reached the lowest level. As regards personal income taxes, these relations were also observed, but the difference was only 4.2 percentage points. Even greater differences between extreme county groups were reported in terms of revenue growth in absolute terms. In fact, real property tax revenues in county groups with the highest level of support increased by as much as 13.1 percentage points more than in the group with the least resources secured. As regards an increase in personal income tax revenues, this difference was slightly smaller, but still reached as much as 8.2 percentage

points. On these grounds, it can be concluded that the larger level of EU funding accelerates the growth rate of own municipal real property tax and personal income tax revenues.

The impact of the level of support on the level of own revenues is also confirmed by research carried out using the correlation and regression analyses. The correlation coefficient between the level of funds transferred to counties in 2007-2013 and municipal real property tax revenues obtained in 2013 was 0.35. As for municipal personal income tax, it was 0.32. Indeed, both correlation coefficients are not too high, but the tests carried out confirmed their significance at 0.05. In turn, simple regression models, developed in both cases, revealed that the support used resulted in a measurable increase in income tax revenues. The models show that every PLN 1 of gained support led in 2013 to an increase in real property taxes by PLN 0.04, while in personal income tax revenues – by PLN 0.05. Both determination coefficients reached just 0.1, but were statistically significant. Thus, the models developed explain this increase in revenues thanks to EU support only in 10%. Nevertheless, they confirm the important role of this support in improving the economic situation.

The correlation analysis and simple regression models were also used to examine the relations between the level of support and an increase in the number of economic entities in rural areas. Correlation coefficients between the level of support in 2007-2013 and the number of private economic entities, the number of micro-enterprises and the number of the employed in 2013 stood at 0.33 and were significant in all cases. In turn, the simple regression models developed explained an increase in the number of private enterprises, micro-enterprises and the number of the employed as a result of the transfer of EU funds at a very similar level as in the case of real property taxes or personal income taxes. These models were used to estimate amounts of support, which gave rise in 2013 to an additional private economic entity, micro-enterprise or encouraged the employment of an additional staff member. In accordance with these estimates, the greatest amount of support was crucial to the establishment of an additional private economic entity (over PLN 150 thousand). Over PLN 20 thousand less was necessary to launch a new micro-enterprise, as a result of using the policy instruments concerned. However, the creation of an additional job with the help of public funds required spending nearly PLN 67 thousand.

From the Stochastic Frontier Analysis (SFA) carried out, in which transfers to rural communes under the ROP, OPIE and OPHC were used as inputs and outputs were newly established enterprises run by natural persons, it results that the technical efficiency of support was quite low (Table 2). With the transferred funds, only less than 37% of entities were established, which, in theory, could have been established with that scale of transfers. An improvement in the technical efficiency could be contributed by a significant increase in the scale of transferred support. The efficiency of scale is, in fact, slightly more than 63%. Nevertheless, financial support from the EU budget has a significant positive impact on the formation of new entities. The efficiency of its use in this direction, however, is quite diversified in terms of communes. The coefficient of the variability of technical efficiency is in fact almost 68%. The obtained results of estimating technical efficiency should be treated as an indication of the insufficient use of the potential associated with EU aid funds in creating entrepreneurship in rural areas.

Table 2. Descriptive statistics of technical efficiency measures and scale of support from the European Union budget (SFA).

Variable	Mean	Standard deviation	Max	Min	Median	1 quartile	3 quartile
Technical efficiency measure	0,367	0,249	0,996	0,081	0,268	0,190	0,445
Scale efficiency measure	0,631	0,175	1,000	0,280	0,604	0,504	0,752

Source: Wasilewski, A. (ed.). 2014. Efektywność instrumentów polityki regionalnej i strukturalnej wspierających rozwój pozarolniczej działalności gospodarczej na obszarach wiejskich. Prace Programu Wieloletniego no 108, IERiGZ-PIB, Warszawa.

Conclusions

Allocating resources by means of policy is negatively assessed, in particular since these funds are obtained, according to theorists, primarily by rent seekers, rather than efficient entities. Nonetheless, as representatives of certain economic trends believe, allocating resources by means of policy may also have positive consequences. This view is shared especially by dual economy proponents. In their view, all forms of interventionism, which include subsidies for the activities of enterprises, slow down the allocation of resources to the most efficient economic entities. Nevertheless, they thus provide time for the weakest entities to adapt to market requirements.

However, based on empirical research on the impact of EU funds, which can be classified as instruments to directly or indirectly support the development of entrepreneurship in rural areas in 2007-2013, on economic processes, it is difficult to set a timeframe within which they will be reallocated to the most efficient entities. As a point of fact, they bring both measurable and positive economic effects in the current period. Analyses show that the higher level of support from the EU budget accelerates an increase in the number of private enterprises, micro-enterprises and the number of the employees. Moreover, it slows down the processes of growth in the number of the unemployed. Nonetheless, the economic situation in a particular area can be improved thanks to the transfer of a given amount of public funds. Based on regression analyses, it can be said, for example, that the establishment of an additional private economic entity in a rural municipality takes nearly PLN 154 thousand acquired under different operational programs. As regards a micro-enterprise, it is almost PLN 132 thousand, while the creation of one job requires spending nearly PLN 67 thousand of public funds.

The positive impact of financial support from the EU budget on the local economy is also proved by an increase in municipality's local revenues. In fact, municipalities obtaining relatively higher support enjoyed a larger increase in real property tax and personal income tax. In other words, the transferred funds generated a rise in both local community assets and population incomes, thus increasing the said municipal tax revenues. Regression analyses reveal that every PLN 1 of public support, gained in 2007-2013, led in 2013 to an increase in municipal real property tax revenues by PLN 0.04, while in the case of municipal personal income tax revenues – by PLN 0.05.

When considering the possibility of using public financial support as an instrument for rural economic development, certain negative aspects should be kept in mind. In 2007-2013, relatively higher financial resources were transferred to more economically developed municipalities. Although they had positive effects, i.e. they accelerated economic development, their distribution under the same conditions can lead to the further diversification of rural municipalities in terms of both the level and rate of development. Thus, the distribution criteria applied neither foster the implementation of balanced rural development, nor promote bridging the gap in this development. However, they can be retained if another national development concept is pursued, such as establishing the so-called central units or growth poles. What is more, the positive effects of public financial support can be observed in the short term, i.e. during the period of transfer. In accordance with the existing theory, their positive impact on the local economic situation is supposed to weaken in the long run. Having ceased the use of this form of assistance, other instruments under policy to support the development of entrepreneurship are to play a greater role. In this case, fiscal policy and reduced bureaucracy can gain importance.

From the Stochastic Frontier Analysis (SFA) carried out, in which transfers to rural communes under various operational programmes financed from the EU funds were used as inputs and outputs were newly established enterprises run by natural persons, it results that the technical efficiency of support was quite low. With the transferred funds, only less than 37% of entities were established, which, in theory, could have been established with that scale of transfers. An improvement in the technical efficiency could be contributed to by a significant increase in the scale of transferred support.

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THE STRUCTURAL ANALYSIS OF PORK PRODUCTION IN THE ENTITIES OF REPUBLIC OF MOLDOVA IN TERMS OF FOOD SECURITY

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Abstract
In the Republic of Moldova, pork is the most important type of meat, accounting for about half of the total meat production, pig breeding being the sector with the largest share in animal husbandry. For consumers, consumption of pork is a tradition and accounts for about 50% of the annual meat consumption. After 1989, the total number of pigs, as they diminished permanently. Only in recent years has it started to feel a slight increase. During the period 2011-2016 the number decreased by 25.3 thousand heads. This indicator on the number of pigs registered in agricultural holdings weighing on livestock is slightly increasing by about 46 thousand heads. This trend is due to foreign investment in meat processing units across the country. The elaboration of this study used the monographic method, the grouping method, the situation analysis and forecasting method. As a result of the papers, it was determined that most of the cattle population is registered in territorial units, most of them being in the districts around Chisinau.

Key words: branch of livestock, livestock, animal species, dynamic, trend, improvement.

Introduction

The stock of livestock in the structure by households is basically reversed. If at the beginning of the 1990s about 75% of the cow flock was in the state or corporate administration, then by the end of 2015 93% of the population is in the households. Per branch, the distribution of livestock by categories of households shows a significant concentration of about 89%, in households. It is known that the zootechnical branch cannot have an efficient development under primary conditions of maintenance management and its staff and structure is one of the basic elements that would ensure it. The reduction in livestock has caused more problems in: providing domestic livestock production to the population and processing enterprises, partial and even complete destruction by categories of animals of the genetic pool, reducing the number of jobs but also other (Șumanschi, A.; Focșa, V., 2007).

In the Republic of Moldova, pork is the most important type of meet, with about half of it, pig-breeding being the sector with the highest share in. For consumers, consumption of pork is a tradition and accounts for about 50% of the annual meat consumption. After 1989, pig herds diminished permanently. Only in recent years has it started to feel a slight increase.

During the period 2011-2016 the number decreased by 25.3 thousand heads. This indicator on the number of pigs registered in agricultural holdings weighing on livestock is slightly increasing by about 46 thousand heads. This trend is due to foreign investment in meat processing units across the country. The problem of pigs in the complexity of the

development of this sector is essential. Solving this problem will in large part contribute to the development of the sector.

1. Bibliography

The factual material used in this elaboration is based on the official statistical data provided by the National Bureau of Statistics, the scientific works in the field of the native and foreign scholars. Additionally, periodical publications in the field were used, the publications of the governmental institutions responsible for the problem approached.

In this paper, we used the monographic, mathematical, statistical and economic methods to obtain the expected results.

2. Analysis of the flock of pigs

In this chapter, we will analyse the peculiarities of the number of pigs distributed among the entities in the country, the number of the flock by type of organizational-juridical units etc. The purpose of this analysis is to identify the problems in reducing the total number of heads per country and the increasing trends in specialized pig production units. In this study, all institutions with a legal personality who have swine suckers and households with a minimum number of 50 pig heads were considered.

2.1. Distribution of pigs by general criteria

This sub-stage presents the results obtained from the analysis of the sheep flock to the agricultural entities in the country according to the organizational-legal nature of the entities and the territorial-administrative units. The systematization of the flock of pigs according to the organizational-legal type of the entities is presented in Table 1.

Table 1. Characteristics of the flock of pigs according to the organizational-legal form of the enterprises in the field

Types of entities	Total effectiv, heads	SShare, %	Number of entities	Actual average, heads	Maximum effective, heads	Minimum effective, heads
A	**1**	**2**	**3**	**4**	**5**	**6**
Agricultural Cooperative	2530	1,47	12	211	707	16
Kolkhoz	257	0,15	1	257	-	-
Peasant Farm	3200	1,85	39	82	380	16
Sole Proprietorship	3717	2,15	36	103	550	6
State Owned Enterprise	3178	1,84	2	1589	3119	59
Natural Person	360	0,21	3	120	180	60
Joint Stock Company	537	0,31	6	90	116	53
Limited Liability Company (Ltd)	158699	91,91	87	1824	49156	17
Experimental Entity	185	0,11	1	185	-	-
Total	**172663**	**100,0**	**187**	×	×	×

Source: Developed by the authors based on the information gathered on the ground with the support of the scientific project "Strategies for modernization of the zootechnical sector in the context of food security and regional economic integration".

From the data obtained in the above table, we find that the number of swine registered in specialized units is about 172 thousand heads, at country level, in fact this indicator is much bigger – approx. 453 thousand, so only 37% are in agricultural enterprises and households specialized in their growth. On the other side, 63%, is in households up to 50 head per household.

91% of the flock is registered in Ltd. Such a significant proportion indicates that most of the swine-breeding entities are of this type. The average number of the herd in an entity is 1824 heads, the maximum number is 49156, and the minimum is 17. The number of these entities is 87. The Ltd is the most universal organizational-legal form in the breeding farms. It also offers opportunities to attract foreign capital in the development of the respective sub-sector. Compared to Ltd, the other types of entities have an insignificant share in the total number of pigs managed for growth and fattening. Here we can only mention that the Peasant Farm and Sole Proprietorship have a share of approx. 2% as in total and 39 and 36 units respectively in this subheading.

Distribution of livestock is a scientific interest not only in the organizational-legal form but also in the territorial aspect. Most agricultural enterprises, especially those specializing in animal husbandry, were set up based on former state entities (kolkhoz, state owned farm, farm etc.). At the same time, the animal product market has diversified and is constantly changing in recent years, new businesses have emerged according to the sales market, production capacity and consumer requirements.

At the next stage, we analyse the distribution of the flock of pigs in the regional aspect. Table 2 shows the structure of the population by territorial-administrative districts.

Table 2. Distribution of the territory of territorial pigs by territorial-administrative units

Territorial-administrative unit	Total effective, heads	Share, %
A	**1**	**2**
Anenii Noi	59656	34,55
Bălți	507	0,29
Basarabeasca	240	0,14
Briceni	1727	1,00
Cahul	8005	4,64
Cantemir	832	0,48
Căușeni	3309	1,92
Chișinău	49	0,03
Cimișlia	505	0,29
Criuleni	28924	16,75
Dondușeni	720	0,42
Drochia	459	0,27
Dubăsari	1008	0,58
Fălești	1444	0,84
Florești	10850	6,28
Glodeni	893	0,52
Hâncești	3682	2,13
Ialoveni	4503	2,61
Leova	4235	2,45
Nisporeni	316	0,18
Ocnița	120	0,07

Territorial-administrative unit	Total effective, heads	Share, %
A	**1**	**2**
Orhei	3708	2,15
Râșcani	4970	2,88
Rezina	691	0,40
Sângerei	1109	0,64
Șoldănești	493	0,29
Soroca	1634	0,95
Ștefan Vodă	1793	1,04
Strășeni	2701	1,56
Taraclia	1680	0,97
Telenești	225	0,13
Ungheni	6038	3,50
UTA Găgăuzia	15637	9,06
Total	**172663**	**100,00**

Source: Developed by the authors based on the information gathered on the ground with the support of the scientific project "Strategies for modernizing the zootechnical sector in the context of food security and regional economic integration".

2.2. Arranging entities by quantitative indices

As mentioned above, meat breeders are increasingly interested in increasing the competitiveness of production, including through the sale price. The livestock act plays a decisive role in solving this problem, firstly by the fact that with the increase in livestock, the entity changes its structure of costs in the ratio of fixed costs / variable costs, there are changes in the technological process of growth etc.

In Table 3, we present the ten, largest, type Ltd systematized by total staff.

Table 3. Top ten largest LLCs by actual

Entity	Total effective, heads
A	**1**
Pucoven	49 156
Porco Bello	28 350
Agroseminvest	21 393
Funny Pig	20 570
Confort	5 250
Elevator KELLY GRAINS	3 169
Vegecom	3 000
Gordanu Grup	2 925
Farm Meat	2 730
Valul Traian	2 200
Total	**138 743**

Source: Developed by the authors based on the information gathered on the ground with the support of the scientific project "Strategies for modernizing the zootechnical sector in the context of food security and regional economic integration".

The largest specialized in the country producing swine meat in the country is Pucoven with a staff of about 49 thousand heads. In fact, this entity is also the largest in the country on the sub-breeding of the swine. The first 10 Ltd hold 138743 pig heads from 15,899 heads registered in these types of enterprises, or 87.42% relative size. Therefore, in the first ten Ltd, about 87% of the total number of pigs on such entities is concentrated.

We notice that the subspecies of the swine meat-breeding trend tends to be modernized by concentrating the staff into large entities. This offers a number of opportunities:

1) Reduction of operational costs;
2) Integration of production quality system;
3) Attracting investments and state subsidies for the modernization of technology and equipment;
4) Contracting large-scale meat production to domestic and international operators;
5) Increasing the possibilities for marketing the production to the EU's Single Internal Market;
6) The exploitation of pigs for meat takes place based on specialized breeds.

Some of these entities founded with the participation of foreign capital. Analysing these businesses more deeply, we identify some distinct features. Several enterprises in this group are constituted as pork / meat processing units / departments of meat processing companies (sausages), others as specialized units of grain storage and processing enterprises, thirdly, founding entities by privatizing assets on the basis of state pig breeding complexes. Although the training paths were different, these companies are the most modern in terms of the technology of growth and the equipment with which the maintenance spaces are equipped. The meat production system is of an intensive type, some of which are closed-loop production farms[1].

As shown in the data in Table 1, we see that this type of entity is spread to pig breeding, both by number and by number of entities.

Some of these businesses are actually large, over 500 heads, indicating the formation of a large farm in the field.

In Table 4, we present the top ten largest individual enterprises by actual size.

[1] Closed circuit in swine production – raising and fattening of pigs.

As a proportion of the total number of pigs in the total number two, after Ltd, belongs to the Sole Proprietorship (Table 1). A sole proprietorship as an organizational-legal type is an entity with the status of a natural person and can carry out any type of activity based on the interests of the founder, the individual. The advantage of this type of business is the simple registration procedure. It is recorded on demand by a single individual and can carry out activities in various branches, including agriculture. Thus, for many pig breeders individual enterprise has become the most demanded type of all. As a rule, in this sub-branch, the individual enterprise is a family-type enterprise, and the employees are members of the founder's family.

Table 4. Top ten largest individual enterprises

Entity	Total effective, heads
A	**1**
Bivol Vladimir	550
Vicogrozodeh	493
Scorpion	293
Covalenco T	248
Burlescu S	244
Sărătilă Victor	234
Guțanu Vasile	150
Gornov N.	140
Prisacari	115
Vasilică Victor	89
Total	**2556**

Source: Developed by the authors based on the information gathered on the ground with the support of the scientific project "Strategies for modernizing the zootechnical sector in the context of food security and regional economic integration".

The largest sole proprietorship in the country has a staff of 550 heads. Most have a staff of over 100 heads. In these entities, about 2556 heads out of 3717 of the total staff in this group are concentrated with a share of 68.76%. As we see, the concentration of pigs in these entities is high. Regarding the location of these entities, we cannot distinguish a rule, because most of them are located throughout the country, so that the production obtained is oriented to the regional markets of the country. Most of them sell live mass production to slaughterhouses or animal purchasing entities. Some of them sell their produce to the agricultural markets. We find that most of these entities have sown and boars in the herd structure, so the organization also organizes the process of assembling. This stage of the technological flow provides a cost advantage for the stage of obtaining live produce (piglets).

Although there is a tendency to modernize the technological flow and the maintenance and growth equipment to pig fattening, in most cases the technological process is extensive, the evacuation of manure, the cleaning and decontamination of the pigs' maintenance spaces are not performed at an insufficient level for enterprises of this kind, domestic competition puts pressure on two types:

1) On the part of large producers;

2) From households. There is also competition from imported meat production.

Moldova has become a net importer of pork in recent years. Domestic meat production provides 30-40% of the existing demand. In addition, entities of this type encounter difficulties in accessing state subsidies. From the above mentioned, the individual enterprise is not the most suitable form of activity for the production of pork but also, in general, of livestock farming as an economic activity. In order to become an economically developed entity, product quality and competition, the entity requires organizational and legal changes.

At the next stage of analysis, we will perform the group analysis of the pig herd.

Table 5. Grouping of enterprises according to organizational-juridical form according to the flock

Type of entities	Groups depending on the flock					
	50 ≤	**51 – 200**	**201 – 1000**	**1001 – 2500**	**2501 – 5000**	**5001 ≥**
A	**1**	**2**	**3**	**4**	**5**	**6**
Agricultural Cooperative	2	5	5	-	-	-
Kolkhoz	-	-	1	-	-	-
Peasant Farm	20	17	2	-	-	-
Sole Proprietorship	15	15	6	-		-
State Owned Enterprise	-	1	-	-	1	-
Natural Person	-	3	-	-	-	-
Joint Stock Company	-	6	-	-	-	-
Limited Liability Company (Ltd)	16	36	16	6	4	5
Experimental Entity	-	1	-		-	-
Total	53	84	30	6	5	5

Source: Developed by the authors based on the information gathered on the ground with the support of the scientific project "Strategies for modernizing the zootechnical sector in the context of food security and regional economic integration".

From the data presented in Table 5, most entities are recorded in the group with a 51 to 200 head population. In this group, most entities are of the Ltd type, but also of type Peasant farm and Sole Proprietorship. In fact, these two types of enterprises have the largest share, according to the table in the first group (50 ≤) and the second (51 to 200). For the other groups, the number of these types of entities decreases. Therefore, most Peasant Farms and Sole Proprietorships have up to 200 pig heads. In the group with a total of 201-1000 heads, most of the entities are of type Ltd, the others are Agricultural Cooperative and Sole Proprietorship. In general, most economic entities in the country actually have up to 200 pig heads only 37% of them exceed this number. Only five enterprises in the country actually have more than 5 thousand heads. In the Republic of Moldova, the breeding enterprises are of small size.

Conclusions

1. About 51% of the total number registered in the agricultural entities is concentrated in the Chisinau municipality.
2. The largest Ltd specialized in the production of swine meat is Pucoven with a staff of about 49 thousand heads.
3. The first ten Ltd are concentrated around 87% of the total number of pigs on such entities.
4. The largest Sole Proprietorship in the country has a staff of 550 heads.
5. In these entities, about 2556 heads out of 3717 of the total staff in this group are concentrated with a weight of 68.76%.
6. Sole Proprietorship not is the most suitable form of activity for pork production.
7. Most entities are recording in the group with a staff of 51 to 200 heads.
8. Most Peasant Farm and Sole Proprietorship holdings have up to 200 pig heads.
9. The majority of the economic entities in the country actually have up to 200 heads of pigs only 37% of them exceed this number.

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BENEFITS, OPPORTUNITIES, COSTS AND RISKS (BOCR) MODELS AND CONTINGENCY VALUATION FOR ESTIMATING THE PROVISION OF PUBLIC GOODS IN BULGARIAN AGRICULTURE: SOUTH CENTRAL PLANNING REGION

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Abstract

This paper builds a multi-criterial model in the special template of the Benefits, Opportunities, Costs and Risks (BOCR) using Analytic Network Processes (ANP) rtechnique having as alternatives three main public goods in Bulgarian agriculture: South Central Planning Region. The specific construction of the model allows it to further articulate on specific Bulgarian policy considerations derived from the European Union's Common Agricultural Policy (CAP) and to design policy recommendations so that one specific public good –if wanted-is stimulated. Sensitivity analysis concluding the paper provides an insight over the derived relative importance of public goods on particular directives in the CAP. Also, all the methodology and particular surveys administrated in Bulgaria could be easily replicated in context countries and determine specific and effective policies mix to enforce, for example, significant improvements in the Public Goods' (PG) provision in agriculture across EU's countries as well as to determine more precise monetary values associated with these improves.

Key words: public goods, multi-criteria analysis, analytic network processes, contingency valuation

Introduction

Public good is an item whose consumption is not decided by the individual consumer, but by the society as a whole. A public good (or service) may be consumed without reducing the amount available for others and cannot be withheld from those who do not pay for it. The OECD, in its analysis of public goods in farming and forestry suggests using various ways to ensure adequate provision of public goods according to the social norms and the level of private provision. The public financing is just one of them. Other authors have found similarity between PGs and private goods. They include both tangible goods and less tangible services demanded by society. A previous large survey conducted in the South Central Planning Region of Bulgaria prior to this study identified the most important three public goods delivered within regional agricultural activities, on both supply and demand side. These three goods are Food Safety, Water Quality and Scenery and Recreation. Further on, a large-scale survey was conducted with the participation of the stakeholders in

the South Central Planning Region and results were individually inputted in the direct mode in the model. Weights of importance for the alternatives were weighted and in the end what was delivered from the experts was averaged with what was delivered from the stakeholders. Contingency valuation was also included in the survey designated for the stakeholders and this allowed to determine monetary value for Food Safety in the context of the three public goods considered. The specific construction of the model allows this model to articulate it on further up specific Bulgarian policy considerations derived from the EU's CAP and to design policy recommendations so that one specific public good –if wanted-is stimulated. Results show that the monetary value associated to the improvement with one unit of the existent Food Safety conditions is of approximately 22 BGN, sensible equal to the one associated with the other two public goods considered, only if in the policies designed to promote these public goods emphasize twice more Benefits of Food Safety then the costs associated with it (comparing 0.526, the weight of importance for Benefits with 0.2785, the weight of importance for Costs) while Risks in achieving one unit in improving the Food Safety should almost be left aside when presented to the public. Depending on the participants to the survey, the same estimations are intended to be performed with the suppliers of public goods and results to be compared. Regarding the contingency valuation, this model emphasizes the dependence on the various importance granted to the generic benefits, opportunities, costs and risk.

1. Literature review

The integrative approach of both tangible and intangible effects of any productive activity in agriculture regarding the public goods provision of the Analytic Hierarchy and Network Processes (AHP,ANP) methodology as a multi-criteria decision making tool is acknowledged in several European international projects as well as significant research. Several such projects, where AHP/ANP models were constructed and combined with other techniques in order to assess various aspects in the creation and valuation of the public goods in agriculture are mentioned below:

- PROVIding smart DElivery of public goods by EU agriculture and forestry (01 September 2015-31 August, Topic: ISIB-01-2014,Call: H2020-ISIB-2014-2, Funding Scheme: Research and Innovation Action (RIA));
- CLAIM – Supporting the role of the Common agricultural policy in LAndscape valorisation: Improving the knowledge base of the contribution of landscape Management to the rural economy (2012-01-01 to 2014-12-31, Topic: KBBE.2011.1.4-04 – The CAP and landscape management, Call: FP7-KBBE-2011-5, Funding Scheme: CP-FP – Small or medium-scale focused research project);
- AWARE – How to achieve sustainable water ecosystems management connecting research, people and policy makers in Europe (2009-06-01 to 2011-11-30, Topic: ENV.2008.4.2.3.2. – Enhancing connectivity between research and policy-making in sustainable development, Call: FP7-ENV-2008-1, Funding Scheme: CSA-CA – Coordination (or networking) actions);
- SECOA - SOLUTIONS for ENVIRONMENTAL CONTRASTS in COASTAL AREAS (2009-12-01 to 2013-11-30, Topic: ENV.2009.2.1.5.1 - Sustainable development of coastal cities, Call: FP7-ENV-2009-1,Funding Scheme: CP-IP-SICA – Large-scale integrating project for specific cooperation actions dedicated to international cooperation partner countries (SICA);

- TDSEXPOSURE (Total Diet Study Exposure) (2012-02-01 to 2016-01-31, Topic: KBBE.2011.2.4-02 – Pan-European Total Diet Study, Call: FP7-KBBE-2011-5,Funding Scheme: CP-IP – Large-scale integrating project)

Acknowleging the need of political decision in the provision of pubic goods (PG's) in the agriculture, (Villanueva, A.J., Gómez-Limón, J.A., Arriaza, M., & Nekhay O. 2014) establish a complex classification of factors and their interdependencies as basis of the proper management of farming systems and public goods as externalities associated . Following on the previous research, the agricultural farms' multifunctionality under various agricultural policies is analyzed following an extended survey with 400 farmers according to the AHP methodology in (Torres, C.C., Parra-López, C., Hinojosa-Rodríguez, A., & Sayadi, S. 2014). The conclusion that the economic performance is compatible with social objectives including employment in agriculture is compatible with the similar objectives enforced by the European Common Agricultural Policy (CAP). Building on the multifunctionality dimension of the agricultural sector (Kallas, Z., Gómez-Limón, J.A., & Barreiro-hurle, J. 2007) show how contingent valuation can augment the AHP technique for determining the monetary value associated with the demand side for the provision of several PG's specific to individual farmers. The correspondence between the agricultural policy and stakeholders 'preferences, without a clear distinction between the demand and supply side is studied in the context of the AHP methodology and PG's provision in (Miškolci, S. 2013). The role of the developing countries in setting current problems in agricultural research is confirmed by the conclusions of this paper. The AHP technique embedded in a multi-criteria resource allocation tool proved to be an efficient method in coping with a large set of complex factors in a forestry management unit, as in (Šegotić K., & Posavec S. 2007).Adding value to the literature regarding the renewable natural resources as forestry is, Šegotić K., & Posavec S. (2007) illustrate the scientific foundations of determining forest value –as a significant public good.

2. Benefits, Opportunities, Costs and Risks (BOCR) Models using Analytic Network processes (ANP) in the context of Multi-Criterial Analysis

Analytic Network Processes (ANP) theory as introduced by Thomas Saaty (see Saaty, 2009) belong to the multi-criterial decision making (MCDM) topic and it is grounded on the mathematical theory of stochastic matrices, eigen values and vectors, graphs and networks as well as on the behavioural economics and decision making. The building blocks in modelling certain decision problem in this context are clusters, nodes and connections. Pairwise comparisons of the nodes are done with respect to certain control criterion and the most linguistic to numerical scale is Saaty's 1-9. In assessing the importance of several alternatives, benefits and costs are difficult to be expressed in monetary terms, especially when tangible aspects must be compared with intangible ones. One of the most complex models within the theory of Analytic Network processes (ANP) is the network with BOCR. A BOCR model will have four separate hierarchies: Benefits hierarchy (B), and similar Opportunities hierarchy (O), Costs hierarchy (C) and Risk hierarchy (R). The importance of criteria in its correspondent hierarchy is pairwise estimated and this process produces relative criteria weights. Synthesis of the alternative priorities in a weighted sum produces conditional alternative priorities for each hierarchy. Using an extra control hierarchy represented by strategic criteria like economic, social and environmental the alternatives under each of the previous four networks are weighted into final ones. A detailed description of the estimation of a BOCR with both advantages and

shortcomings is described in a schematic representation of the BOCR ANP model is shown in the Figure 1, below.

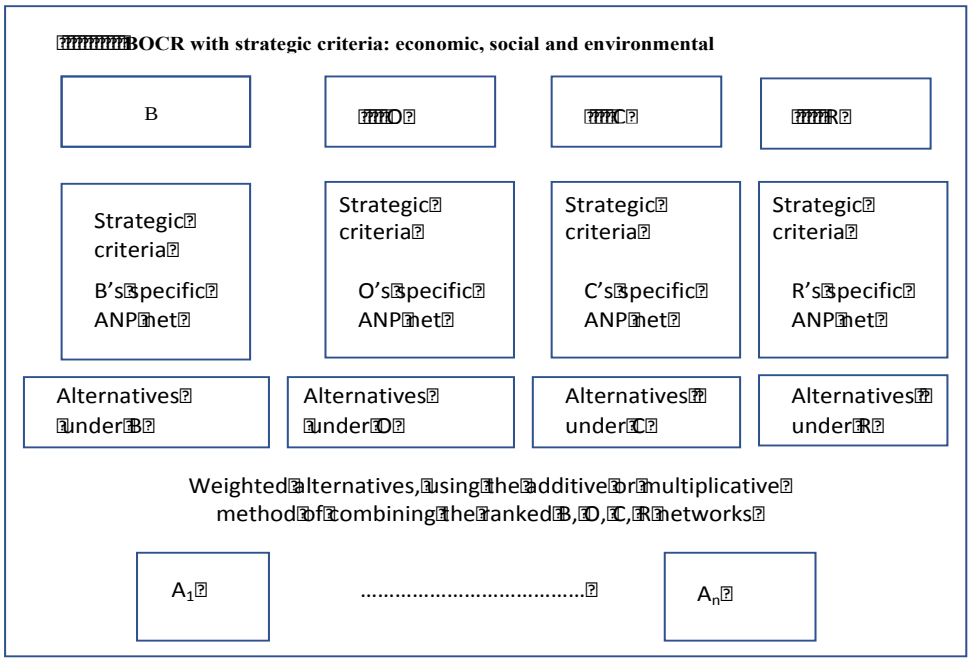

Figure 1. The structure of a BOCR-ANP model

Source: The Authors

The model developed in this paper has the above particular form described in the context of the Figure 1. The strategic criteria are *Social*, *Economic* and *Environment*. Clusters considering categories of influence on the demand side of the previously mentioned three public goods were constructed after a careful literature review. Most influential papers are listed in the references. The decision to consider the three public goods in the alternatives as being the Water Quality, Food Safety and Scenery and Recreation was taken after a large survey on the prevalent public goods in Bulgarian agriculture was conducted. Also, every node considered, as well as the connections in between nodes resulted from the large-scale survey with both experts and representatives of the demand and supply side involved in the delivery and consumption of the public goods presented in (Nikolov D. Mihnea A., Boevsky I., Borisov P., Radev T. (2017)). It is shown in previously cited paper how the required data for estimation of public goods (PGs) were collected by conducting focus groups, during which were discussed in depth study subjects, thanks to the benefits of developing group dynamics and effect. During the discussions by spontaneously thorough discussion of the predetermined range of issues were formulated clear categories and definitions, which helped to better explain and understand quantitative studies of phenomena. The discussions were led by a moderator who put matters to discuss, monitor the equal participation of persons focuses on interesting new guidelines spontaneously expressed by the participants. In leading the discussion moderator uses the following projective techniques: Techniques Association techniques and complementarity.

The discussions attended by 14 people – farmers, representatives of agricultural associations, local public authorities and consultants. The participants were divided into two groups of 7 persons. Each group received natural-geographic map of the area and a list of ten potential PGs. Each participant was asked to determine distribution of public goods in the region using 3 colour sticky notes (red = available; white = neutral; blue = no). As a result, it was found that the most important public goods/bads in the region are: Water Quality, Food Safety and Scenery and Recreation. Nodes in every previous cluster were distributed according to their influence split on the three strategic criteria and separately, benefits, opportunities, costs and risks for each of the three alternatives. Their distribution is shown in the Table 1 below.

Table 1. Node distribution in the BOCR model

Elements		***Water quality***	***Food safety***	***Scenery and recreation***
Benefits	Social	RURAL POPULATION	COOPERATIVES	POTENTIAL TOURIST
	Economic	RURAL POPULATION IN THE HOTSPOT AREA	FOOD CLUSTERS	RURAL POPULATION IN THE HOTSPOT AREA
	Environment	LOCAL AUTHORITIES	COOPERATIVES	POTENTIAL TOURIST
Opportunities	Social	SUBSIDIES	SUBSIDIES	ECO-ROAD
	Economic	POTENTIAL TOURIST	CROP ROTATION	POTENTIAL TOURIST
	Environment	Water	ECO-STANDARDS	HIGH NATURAL VALUE LAND
Costs	Social	SUBSIDIES	SUBSIDIES	SUBSIDIES
	Economic	WATER	ECO-STANDARDS	LAND
	Environment	IRIGATION COSTS	ECO-STANDARDS	SOIL DERGADATION
Risk	Social	SKILLED WORKFORCE	DISEASES AND PESTS	AIR-QUALITY
	Economic	FLOODING	SKILLED WORKFORCE	SOIL EROSION
	Environment	BIO-DIVERSITY	DISEASES AND PESTS	ROAD (INFRASTRUCTURE AND MAINTENANCE)

Source: Authors

The above constructed BOCR model was implemented in the freely available Super Decisions Software where there is a special BOCR template. The appearance of the general structure as it schematic presented in Figure 1 is shown in Figure 2 below.

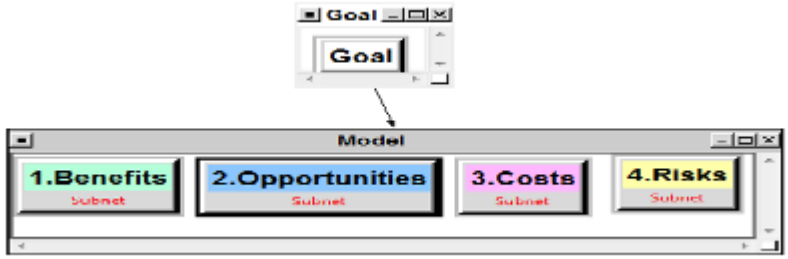

Figure 2. BOCR template in the Super Decisions software

Source: The Authors

In Figure 3 below it is shown how the row containing the node distribution of Opportunities, economic with respect to the alternatives-having only two nodes: Potential Tourist and Crop Rotation is implemented within the BOCR template in the Super Decision Software.

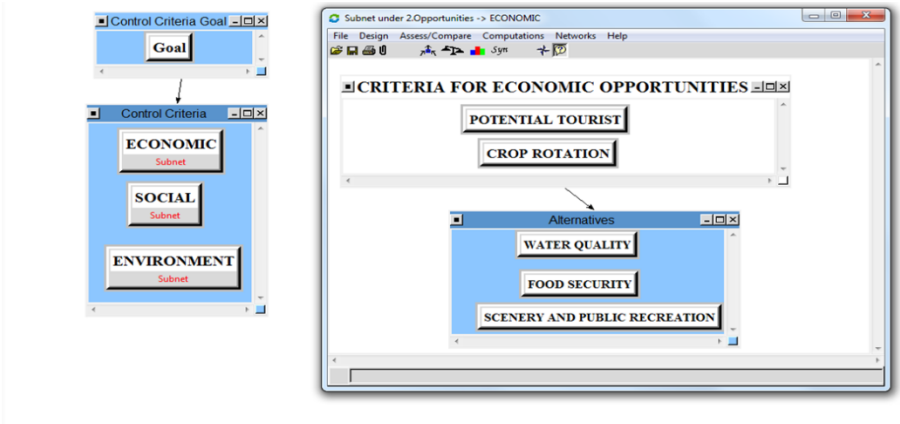

Figure 3. BOCR criteria for economic opportunities

Source: The Authors

3. Conclusions

This paper builds a multi-criterial model in the special template of the BOCR using ANP technique having as alternatives the previously three main public goods. Nodes were considered from the previous studies, as mentioned, while their grouping in clusters, and connections according to the influence were established based on a focus group with experts in agriculture from South Central Planning Region of Bulgaria. Strategic criteria in this BOCR model were Economic, Social and Environmental and every aspect regarding Benefits, Opportunities, Costs and Risk in demanding these public goods was weighted against these three strategic criteria, as well as all the alternatives and the intermediary

nodes. This focus group validated the model and provided estimates of it using the pairwise comparison and the 1-9 Saaty numerical scale according to the usual ANP methodology.

The model was estimated using the Super Decisions Software and individual opinions were aggregated using of the geometrical mean, according to the specific group decision methodology specific to the ANP technique. Further on, a large-scale survey was conducted with the participation of the stakeholders in the South Central Planning Region and results were individually inputted in the direct mode in the model. Weights of importance for the alternatives were weighted and in the end what was delivered from the experts was averaged with what was delivered from the stakeholders. Contingency valuation was also included in the survey designated for the stakeholders and this allowed to determine monetary value for Food Safety in the context of the three public goods considered.
The specific construction of the model allows this model to articulate it on further up specific Bulgarian policy considerations derived from the EU's CAP and to design policy recommendations so that one specific public good –if wanted-is stimulated. More precisely, the results show that under an equal importance granted to the main four aspects, Benefits, Opportunities, Costs and Risks, the weight of importance of the Food Safety is negative, meaning underestimated with 40%. This means that the Costs and Risks are underestimated with respect to Food Safety in Bulgaria and therefore the public is not willing to pay when the demand for this public good was estimated by the stakeholders. If Benefits in the improving with one unit on the Food safety are twice emphasized with respect to the correspondent Costs, then the associated importance of the three public goods become sensible equal and the monetary value associated with one unit of improvement in the Food Safety is about 22 BGN. This show how, using sensitivity analysis within this model a convenient policy mix could be designed so that, in particular, one out of these three public goods will be favoured, in accordance with the national and Eu's CAP. Also, all the methodology and particular surveys administrated in Bulgaria could be easily replicated in context countries and determine specific and effective policies mix to enforce, for example, significant improvements in the Food Safety across EU's countries as well as to determine more precise monetary values associated with these improves.

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IMPACT OF CAP FINANCIAL SUBSIDIES ON RURAL DEVELOPMENT AND EMIGRATION IN BULGARIAN RURAL AREAS

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Abstract
Bulgaria has suffered of an intense and continuous phenomenon of rural depopulation considering that the population has a level of per capita income lower two times and half than the average European value. The purpose of this paper was to assess if the financial subsidies allocated by the Common Agricultural Policy (CAP) both in the first and also in second pillar have reduced the permanent emigration. The quantitative methodology has used the Farm Accountancy Data Network dataset from 2007 to 2015. In the first approach, the linear regression model has estimated main correlations among emigration and payments allocated by the CAP, in particular towards disadvantaged rural areas. In the second phase, it has used the Structural Equation Model aimed at investigating in a path analysis the main cause-effect relationships between CAP and permanent emigration. Findings have pointed out the positive role of the financial subsidies allocated by the CAP in reducing the emigration even if outcomes have pointed out a not univocal interpretation of the effect of the CAP's two pillars and few measures of intervention. For the future, it is important to support financially Bulgarian farms and mostly some of them located in disadvantaged rural areas.

Key words: multiple regression model, structural equation model, rural depopulation, socio-economic marginalization, Bulgaria

Introduction

Bulgarian rural areas, such as other new member states of the European Unions, have suffered of a significant phenomenon of rural emigration in particular afterwards the collapse of the Communist regime (Davidova, 1991). According to this author, this has implied a pivotal intervention of national, European and international authorities aimed at improving the productive, socio-economic and agricultural fabric in new comer European states during their transition from a centralized economy to an open one (Galluzzo, 2015a; 2015b; 2016a; 2016b; 2017; Davidova, 1991; Peneva and Kopeva, 2010). In order to assess the impact of the Common Agricultural Policy (CAP) towards farmers, the European Commission by the Council Regulation 79/65 has set up since the early 1960s a survey analysis, called Farm Accountancy Data Network (FADN), on a sample of farms. These latter farms have got a level of standard income, as specified by the Commission in the Regulation 1242 published in 2008, in terms of economic size threshold, equal for Bulgarian farms to 2,000 Euro. The FADN dataset consists of lots of agricultural holdings active in the European Union with an agricultural area near approximately to 1 hectare and with a well-defined level of income and output. The purpose of the FADN is also to estimate the impact of financial subsidies allocated by the first and second pillar of the CAP to farmers hence, using this dataset by a quantitive approach it has been possible to assess the impact of financial subsidies disbursed by the European Union in reducing the rural emigration from the Bulgarian countryside. The perspective of this research is to suggest to policy makers several useful information in reducing the socio-economic marginalization in

Bulgarian rural territories by a re-allocation of payments and aids and a new planning phase in the next seven-year time of planning of the Common Agricultural Policy after the 2020.

Literature review

The transition from a centralized economy towards an open one in 1989 has implied an harsh, demanding and intense change from an exported oriented market to an imported one with worsening effects on the Bulgarian economy where lots of people live with a poor level of income (Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008). According to these two authors, the agriculture is the most important economic source in the Bulgarian national income even if poorer is the region higher is the impact of the primary sector towards the national added value. Before the enlargement of the EU, lots of Bulgarian farms got by nation authorities specific and direct payments and subsidies linked to the level of production of some specialized crops (Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008). The consequences have been an arising permanent depopulation in small rural villages due to higher level of unemployment, a decreasing level of income and inefficient farms which need of specific support and aids in getting better their productive infrastructures (Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008; Galluzzo, 2015b). Before the accession to the European Union in 2007 socio-economic findings about rural development and economic growth in Bulgaria have highlighted a significant dichotomy among rich and large farms and poor small subsistence farms and positive has been the role of financial subsidies in increasing efficiency and competitiveness by the financial allocation of SAPARD funds and another financial tool (Bachev, 2008; Rizov, 2006).

Afterwards the enlargement of the European Union in 2004 and in 2007 pivotal has been the role of some financial resources allocated by the European Union such as SAPARD and LEADER+ even if sometimes unclear have been the effects towards the whole agricultural context (Gorton et al., 2009; Dimitrova-Kaneva and Dimitrova-Anastasova-Chopeva, 2008; Peneva and Kopeva, 2010). The role of financial subsidies in supporting the rural development and in reducing the emigration from the rural areas in Bulgaria and also in other central and eastern countries, where are scattered lots of subsistence farms not oriented to the market, has pointed out their own not efficient impacts due to a modest dimension of farms, a poor level of income and enterprises not market oriented (Kostov and Lingard, 2002; Mathijs and Noev, 2014). As a consequence of these territorial and socio-economic unbalances, proposals and priorities in a holistic path of rural development have to suggest towards local and European authorities some milestones aimed at making this policy more suited to their main features and tasks which have to be faced with specific strategies as proposed by other authors before the enlargement of the EU with a different allocation of public expenditure aimed at increasing the total budget (Gorton et al., 2009; Bach et al., 2000). In general, the level of income is a fundamental variable in increasing the economic growth in the target of a whole socio-economic convergence growth with some negative impacts of subsidies in agriculture in increasing the farmer's income even if the land dimension is one of the most crucial and stressing variable able to effect on the level of income and it is sensitive for farmers (Bivand and Brunstad, 2005; Bartolini and Viaggi, 2013).

Lots of authors have addressed their studies in assessing the impact, role and function of financial subsidies disbursed by the CAP in contrasting the out emigration and in improving the standard living conditions in the countryside (Burrell, 2009; Galluzzo, 2016a; 2016b; 2017). In Europe, comparing two different seven-year time rural development programs, both in 2007-2013 and also in 2014-2020, there has been an increase of financial resources to bottom-up measures, such as those proposed in the LEADER initiative, and in improving the quality of life in the countryside in a perspective

of environmental protection also considering the precession phase and the enlargement of the EU (Harizanova and Stoyanova, 2012; Burrell, 2009; Dwyer et al., 2007). Several Bulgarian scholars have suggested a different allocation of economic resources taking into account several downsides and socio-economic unbalances among Bulgarian regions, giving a priority towards specific targets addressed in implementing competitiveness of farms and a growth of job opportunities in rural areas by the LEADER initiative or in other measures of rural development (Harizanova and Stoyanova, 2012). According to these two authors, the LEADER initiative is considered one of the most important tool in reducing the marginalization of rural areas such as direct payments can also act directly on the level of farmers income.
During the programming phase 2014-2020, the eastern European countries have insisted for an increase of financial subsidies on the second pillar of the CAP and for a different redistribution of funds aimed at stimulating the rural development (Zahrnt, 2011) instead of stimulating a growth of financial payments in the first pillar. By contrast, Bulgaria has pointed out a significant incidence of the payments disbursed by the second pillar. Compared a threshold of GDP per capita proposed by the European Union, equal to 100%, Bulgarian people are under this value because citizens have got a 39% only and this situation gets worse in the rural areas; hence, the allocation of new economic resources for the rural development should consider the role of agriculture in protecting rural space by a new reallocation and a reflection of specific policies in favour of rural areas (Zahrnt, 2009). In fact, common opinion consider that rural territories play a fundamental role in the socio-economic growth, environmental protection and economic development (Czyzewski et al., 2011), slackening the permanent emigration from the countryside.

Aim of the research
The purpose of this research was to assess by a quantitative method the main relationships among permanent emigration from Bulgaria and the impact of financial subsidies allocated by the Common Agricultural Policy both in first and also in the second pillar. In the first stage of this research the goal was to asses the main relationships, by a multiple regression model, among emigration and some economic variables such as farm net income, total assets and financial subsidies allocated by the CAP. The second step has assessed by a path diagram in the framework of the Structural Equation Model (SEM) the cause-effect relationships among the above-mentioned variables.
In this analysis, the source of data has been made by the main findings published by the Farm Accountancy Data Network since 2007 to 2015 and by the statistical of population published by the Bulgarian Institute of Statistics.

Methodology
In order to investigate in depth the main relationships among the dependent variable rural depopulation in terms of permanent emigration from Bulgaria and the independent variables as subsidies allocated by the first and second pillar of the Common Agricultural Policy, farm net income, specific financial subsidies allocated by the second pillar of the CAP, total assets and farm net income per annual working unit (AWU) produced by a sample of farms part of the FADN dataset since 2007 to 2015, it has used a multiple regression model, estimating parameters by the Ordinary Least Square.
The estimation of regressors has used the software STATA 13 and in its algebraic form of matrix, the multiple regression models can be so expressed (Verbeek, 2006):

$$y = X\beta + \varepsilon$$

where y is the dependent variable and ε is the statistical error but both are vectors with n-dimensions; X is a matrix of independent variables which has a dimension n x k.

In analytical terms, the multiple regression model in its general formulation can be written in this way (Asteriou and Hall, 2011; Baltagi, 2011; Verbeek, 2006):

$$y = \alpha_0 + \alpha x_1 + \beta x_2 + \gamma x_3 + \delta x_4 + \varepsilon_{jt}$$

y is the permanent emigration from Bulgarian countryside
α_0 constant term
x_1, x_2, x_3, x_4 independent variables such as farm net income, financial subsidies allocated by the II pillar of the CAP and total financial subsidies allocated by the Common Agricultural Policy, total assets and farm net income per annual working unit
α, β, γ, δ are estimated parameters in the model
ε_{jt} term of statistic error.

Table 1. Main correlations among some investigated variables in Bulgarian farms part of FADN dataset at 5% of significance with a star.

	Farm net income	Total assets	CAP total subsidies	LFA payments	Rural development plan payments	Decoupled payments	Single area scheme payments	Emigration
Farm net income	1.00	0.44*	0.71*	0.21*	0.51*	0.61*	0.57*	-0.13*
Total assets	0.44*	1.00	0.63*	0.07	0.46*	0.54*	0.53*	-0.03
CAP total subsidies	0.71*	0.63*	1.00	0.39*	0.73*	0.89*	0.85*	-0.08
LFA payments	0.21*	0.07	0.39*	1.00	0.39*	0.45*	0.43*	0.17
Rural development plan payments	0.51*	0.46*	0.73*	0.39*	1.00	0.62*	0.61*	0.02
Decoupled payments	0.61*	0.54*	0.89*	0.45*	0.62*	1.00	0.96*	-0.14*
Single area scheme payments	0.57*	0.53*	0.85*	0.43*	0.61*	0.96*	1.00	-0.18*
Emigration	-0.13*	-0.03	-0.08	0.17	0.02	-0.14*	-0.18*	1.00

Source: author's elaboration on data FADN published on the website http://ec.europa.eu/agriculture/rica/database/database_en.cfm and Bulgarian National Institute of Statistic

According to many authors, the basic assumptions to use a multiple regression model are (Asteriou and Hall, 2011; Baltagi, 2011):

1) statistic error u_i has conditional average zero that is $E\ (u_i|X_i) = 0$;

2) (X_i, Y_i), $i = 1$……. n are extracted as distributed independently and identically from their combined distribution;

3) X_i, u_i have no fourth moment equal to zero.

There is no correlation among regressors and random noise if the value between β expected and β estimated is the same; furthermore, in order to analyze if there is also heteroscedasticity on standard errors in the multiple regression model, in this research it has used White's test on the error terms (Verbeek, 2006).
The Path Analysis is closely linked to the multiple regression model aims to de-structure multiple variables in multiple survey plans of estimation in order to assess the direct and or mediated effects of the variables included in the model within of the method called Factorial Confirmation Analysis (Jöreskog, 1969; 1970; Jöreskog & Goldberger, 1975; Jöreskog et., 1979; Di Franco, 2016). The main assumptions in the model are based on the existence of a causal nexus that links some variables evaluated through some indexes of fit with the purpose to verify the significance and goodness of the model. Structural equation models, however, provide information on the causal processes between all variables investigated, also by a decomposition into a correlation model of parameters and covariances existing between study variables in a path diagram (Fig. 1). The arrows indicate the link between the investigated variables; coefficients 1 represent the effects of ξ on the two x variables in the model while δ_1 and δ_2 and γ are the useful coefficients for assessing the presence of a randomness and links between variables (Ingoglia, 2013).

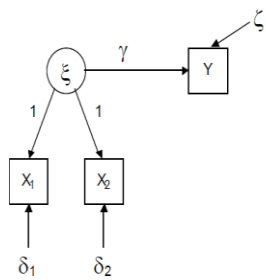

Figure 1. A simply representation of the Structural Equation Model

Source: Own calculation

Results and discussion
The variable farm net income in Bulgarian farms has pointed out, at a level of 5% of statistical significance, direct correlations with the variables total assets, total subsides allocated by the CAP and financial subsides disbursed in the CAP's second pillar in order to support rural development (Tab. 1). An indirect correlation has been highlighted between the variables emigration and farm net income hence, poorer are the areas in terms of income higher is the rural depopulation in terms of permanent emigration. In general, the level of total assets correlates directly to the level of financial support allocated by the Common Agricultural Policy. The variable emigration has been sensitive to the other

investigated variables; in particular it indirectly correlates with the variables farm net income and direct payments allocated by the first pillar of the CAP. Findings in this case seem to corroborate the positive and direct role of payments in reducing the permanent emigration from the countryside.

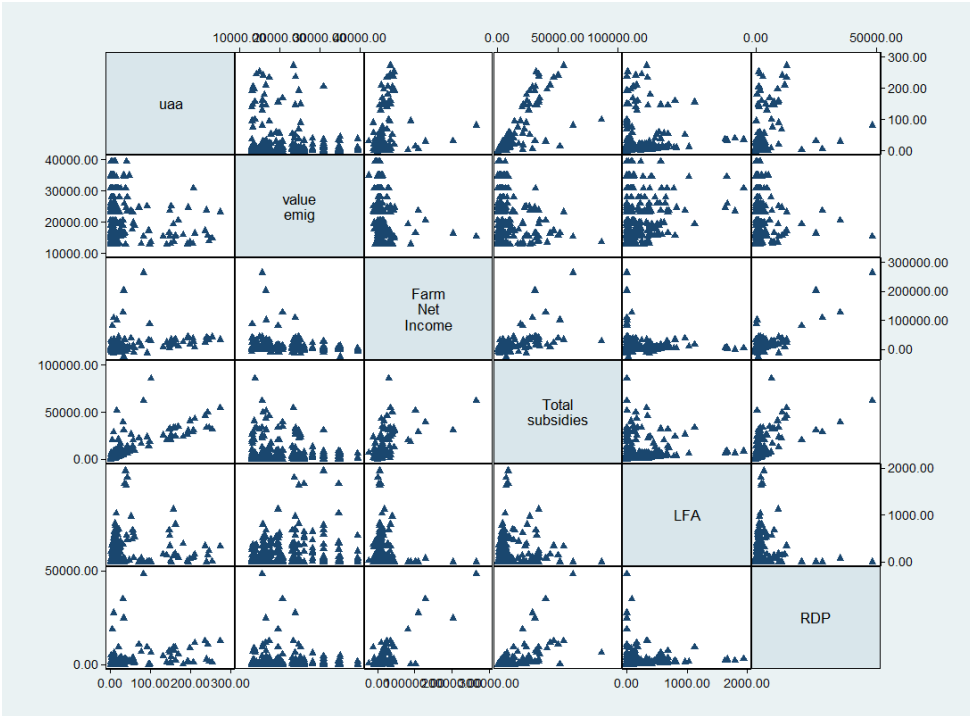

Figure 2. Main distribution and relationships among some investigated variables in Bulgarian farms part of FADN dataset

Source: author's elaboration on data published on the website http://ec.europa.eu/agriculture/rica/database/database_en.cfm and Bulgarian National Institute of Statistic

The scattered plots comparing some variable such as usable agricultural area, emigration, farm net income, total subsidies allocated by the common agricultural policy, payments allocated in favor of disadvantaged rural areas (LFA payments) and financial aids disbursed in the second pillar of the CAP has pointed out a direct correlation between usable agricultural area and total subsidies allocated by the CAP and farm net income (Fig. 2). Not so clear is the relationship between emigration and all economic variables. By contrast, total CAP subsidies and financial aids allocated by the second pillar of the CAP appears to be correlated to the value of usable agricultural area. This implies the importance of the European Union in stimulating some expansions of agrarian surface with positive effects on the efficiency and on the income of farmers. Small farms with a modest agricultural surface seem to get significant level of LFA subsidies which are a positive financial stimulus for

small farms. Not so significant is the impact of total subsidies allocated by the CAP and the emigration instead significant is the role of payments towards disadvantaged rural areas.
The multiple regression model has highlighted a direct correlation among the dependent variable permanent emigration and the variables farm net added value per annual working unit, total assets and financial subsidies allocated in favour of disadvantaged rural areas (Tab. 2). The level of R^2 and adjusted R^2 have pointed out as the model is able to explain more than 62% of the variance. Findings have corroborated as the emigration is typical of disadvantage rural areas which benefit from the specific financial supports allocated by the European Union in farms characterized by a significant diffusion of workforce. The permanent emigration correlated indirectly with the variables decoupled payments, single farms payments and farm net income; hence, poorer is the farm net income higher is the emigration and an increase of decoupled payments and single farm payments are able to reduce the emigration from Bulgaria. Not significant has been the impact of financial subsidies paid by the European Union in the second pillar of the Common Agricultural Policy and by the whole CAP which corroborates a target action of direct or indirect payments in reducing the emigration from the Bulgarian countryside.

Table 2. Main findings in the multiple regression model. Dependent variable emigration

Independent variable	*Coeff.*	*Std. Err.*	*T value*	*significance*
Decoupled payments	-1.224	0.583	-2.10	**
Single farms payments	-0.621	0.569	-1.09	n.s.
Farm net income	-0.4153	0.068	-6.62	***
Farm net added value per AWU	3.160	0.255	12.35	***
Total assets	0.026	0.005	4.64	***
CAP total subsidies	0.157	0.186	0.84	n.s.
Subsidies allocated by the second pillar of the CAP	0.162	0.311	0.52	n.s.
LFA subsidies	19.293	2.596	7.43	***

* significance at 10%; ** significance at 5%; *** significance at 1%; n.s. not significant

Source: author's elaboration on data published on the website http://ec.europa.eu/agriculture/rica/database/database_en.cfm and Bulgarian National Institute of Statistic

Table 3 shows the correlations among farm net income, dependent variable, and variables with a nexus or a direct impact on the level of income. The usable agricultural surface, the total output, the farm net value per each annual working unit, the financial subsidies allocated by the rural development plan have pointed out a direct correlation with these above-mentioned variables; hence, small farms as a consequence of modest agrarian capital have a poor level of farm net income and produced output. In the same time, findings have underlined as the total subsidies allocated by the CAP have not affected on the level of

income in Bulgarian farms. In general, rich areas have pointed out the highest level of farm net income as corroborated by the poorest level of less favoured areas payments allocated by the CAP towards these disadvantaged territories. The level of R^2 and adjusted R^2 have highlighted values close to 0.82 that implies as the model explains more than 80% of variance and fit well with the theoretical hypothesis.
The multiple regression model with the aim to assess the impact of financial subsidies allocated by the CAP stratified in function of the different financial items forming the first and second pillar on the level of Bulgarian farmer's income has highlighted as total subsidies, payments disbursed by the rural development plan correlate directly to the farm net income (Tab. 4). This explain as the financial subsidies allocated by the CAP act directly on the income of farmers. Decoupled payments and LFA subsidies indirectly correlates to the farm net income; hence, farms located in disadvantaged rural areas have benefited directly of these payments with the purpose to improve partially the level of income. The level of R^2 and adjusted R^2 have pointed out as the model of multiple regression fits well explaining more than 70% of variance.

Table 3. Main findings in the multiple regression model.
Dependent variable farm net income

Independent variable	***Coeff.***	***Std. Err.***	***T value***	***significance***
Usable agricultural area	137.877	62.106	2.22	**
Total output	0.071	0.010	6.67	***
Farm net value/AWU	1.717	0.180	9.54	***
Total assets	-0.017	0.005	-3.11	***
Total subsidies	0.065	0.163	0.40	n.s.
LFA subsidies	-5.319	2.089	-2.55	***
Rural development Plan subsidies	2.564	0.213	12.04	***
Decoupled payments	-1.657	0.586	-2.83	***
Single area payments	-0.491	0.476	-1.03	n.s.

* significance at 10%; ** significance at 5%; *** significance at 1%; n.s. not significant

Source: author's elaboration on data FADN published on the website
http://ec.europa.eu/agriculture/rica/database/database_en.cfm

Table 4 Impact of financial subsidies allocated by the CAP by the multiple regression model. Dependent variable farm net income

Independent variable	Coeff.	Std. Err.	T value	significance
CAP total subsidies	1.012	0.156	6.48	***
LFA subsidies	-4.225	2.543	-1.66	*
Rural development plan subsidies	3.398	0.248	13.66	***
Decoupled payments	-1.741	0.579	-3.01	***
Single area payments	0.821	0.582	1.41	n.s.

* significance at 10%; ** significance at 5%; *** significance at 1%; n.s. not significant

Source: author's elaboration on data FADN published on the website http://ec.europa.eu/agriculture/rica/database/database_en.cfm

Findings of structural equation model have highlighted as the index of fit is adequate; in fact, the $\chi^2(4)$ has been 0.18 with a p value close to 0.99. Outcomes have pointed out as the emigration correlates with the variables total subsidies allocated by the Common Agricultural Policy, financial payments disbursed by the second pillar of the CAP, labour input, level of taxation, investments, decoupled payments and direct financial supports in favour of disadvantaged rural areas. With a level of significance between 5-10% has been assessed a correlation and an indirect relationship between animal rearing in farms and emigration hence, the specialization of farms might be a good opportunity in reducing the rural depopulation. Furthermore, outcomes have underlined a direct relationship between LFA subsidies and emigration and an indirect correlation between emigration and funds allocated by the second pillar of the CAP; hence, the emigration is typical of disadvantaged poor rural areas towards which have to be implemented measures of farms' diversification financed by the rural development plan.

Fit indexes have corroborated as the model in the path analysis is adequate to explain the main relationships among investigated variable; in fact, RMSEA has been lower than 5% which implies as the model explains more than 95% of variance with a p value under 5% equal to 0.99; the Tucker-Lewis index (TLI) and the Comparative Fix Index (CFI) have been close to the optimal threshold of 1.

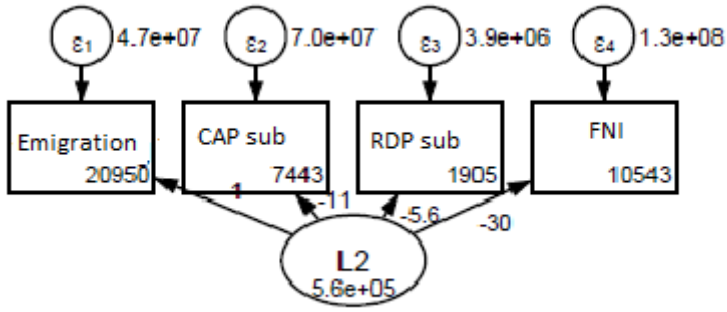

Figure 3. Main findings of the Structural Equation Model in Bulgarian farms part of FADN dataset

Source:author's elaboration on data published on the website http://ec.europa.eu/agriculture/rica/database/database_en.cfm and Bulgarian National Institute of Statistic

Figure 3 shows the main outcomes of the Structural Equation Model (SEM), considering as the latent variable (L2) is a parameter of rural development in Bulgarian countryside. In general, the index of fit such as the RMSEA has pointed out a value of 0.06 under 0.10 which implies as more than 94% of variance is explained by the SEM.

Conclusion

The role of financial subsidies allocated by the Common Agricultural Policy have had a different impact towards Bulgarian farms. In particular, payments in favour of disadvantaged rural areas have benefit of this financial support reducing the out emigration from the countryside and this has been similar to other findings assessed in other European countries where farms are characterized by modest plots of lands scattered in different rural villages.

Furthermore, financial subsides allocated by the second pillar of the CAP have had a positive and direct impact in improving the quality of life in Bulgarian farm, then the efforts of the nation authorities should be addressed to an improvement of financial and legislative initiatives able to increase the endowment of social capital and infrastructures in rural areas even if the main constraint is the dimension of farms that does not allow incisive investments in re-modernization of the productive context.

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PRODUCTION POTENTIALS AS A CHANCE FOR AGRICULTURAL PRODUCERS – CASE STUDY OF SMEDEREVO CITY IN THE REPUBLIC OF SERBIA[1]

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Abstract
The basic directions for development of agriculture of the Republic of Serbia are defined by the Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024., the Law on Agriculture and Rural Development, the Law on Incentives in Agriculture and Rural Development and the National Program for Accepting the EU Legislation 2014-2018. Given that the Republic of Serbia has a clear commitment to European integration, one of the most important prerequisites in the integration process is to improve the competitiveness of the national economy on its way to the creation of an export-oriented economy.
This paper presents production potentials in the fruit and vegetable production sector in the area of Smederevo as the potentially most developed and the most promising area for this type of production in the Republic of Serbia. The case of the city of Smederevo can serve as an example or model of well-organized and successful production for agricultural producers in all spheres of agro-business.

Key words: Smederevo, Serbia, fruit growing, viticulture, production potential, economic development.

Introduction

The main directions in the development of agriculture of the Republic of Serbia are defined in the Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024 (Official Gazette of RS, no. 85/14), the Law on Agriculture and Rural Development (Official Gazette of RS, no. 41/09 and 10/13 – etc.), the Law on Incentives for Agriculture Production and Rural Development (Official Gazette of RS, no. 10/13, 142/14, 103/15) and the National Program for the implementation of the EU legal principles 2014-2018 (SEIO, 2014).
Globalisation of markets, trade liberalisation, and especially our country's clear preference for European integrations, require a new definition of the role and importance of agricultural and food production sectors, as well as rural development. Modern positioning of the rural development policy implies its development on the basis of the policy of balanced regional development and at the same time reliance on the unique set of measures of agricultural policy, structural policy,

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industrial policy, tertiary sector development policy, health care, infrastructure and environmental protection policy in a certain area (Bogdanov, 2007).

The Republic of Serbia, especially in certain parts, has very favourable natural conditions for the growing of fruit. Fruit production in hilly and mountainous regions (where 10-15 times higher production per hectare can be achieved than in the production of maize and wheat) greatly exceeds the profitability of other crops, due to the favourable natural conditions, which is why no other production can make as much profit as fruit production in these areas (Keserovic, 2004). Significant foreign exchange inflows can be achieved through the export of fruit and fruit products, which makes this agricultural branch economically very important. There is a significant interest in fruit growing, which, with state incentive measures and founding of cooperatives and associations, can bring good results (Milić et al., 2011).

Smederevo has the *city status* (Official Gazette of RS, 129/07 and 18/16) and is located in the Podunavlje District, the region of Southern and Eastern Serbia (Table 1).

Table 1. Administrative area of the city of Smederevo, basic data, 2015.

Territory	District[1]	Region	Area	No. of settlements[2]	Number of inhabitants, 2011.	No. of CO[3]
The city of Smederevo	Podunavlje	Southern and Eastern Serbia	484 km^2	28	108.209	30

Source: SORS, 2015.

/[1] The area consists of the city of Smederevo and the municipalities of Velika Plana and Smederevska Palanka.

/[2] In the territory of the city of Smederevo there is one urban settlement (Smederevo) and 27 other settlements (rural or semi-urban): Badljevica, Binovac, Vodanj, Vranovo, Vrbovac, Vucak, Dobri Do, Drugovac, Kolari, Landol, Lipe, Lugavčina, Lunjevac, Mala Krsna, Malo Orašje, Mihajlovac, Osipaonica, Petrijevo, Radinac, Ralja, Saraorci, Seone, Skobalj, Suvodol, Udovice, Šalinac and Kulić (Official Gazette of the City of Smederevo, 2/15).

/[3] CO - cadastral municipality.

Figure 1. The geographical position of the City of Smederevo

Source: www.smederevo.org.rs/OPSTINA-SMEDEREVO-Geografski-polozaj_67____cir

With regards to the development and representation of different types of primary agricultural production (agricultural routes), the territory of the city of Smederevo, according to the internal data of the Department of Agriculture, can be conditionally divided into the so-called Sumadija and Morava area (Fig. 2).

Šumadija area (green): agricultural production is mostly directed toward fruit production and viticulture. This part of the territory of the City includes the following settlements: Badljevica, Binovac, Vodanj, Vrbovac, Vucak, Dobri Do, Drugovac, Kolari, Lunjevac, Malo Orassje, Mihajlovac, Petrijevo, Ralja, Seone, Suvodol, Udovice, Landol and Smederevo.

Morava area (yellow): agricultural areas are used for crop, vegetable and livestock production. It consists of the territories of the following settlements: Vranovo, Kulic, Lipe, Lugavcina, Mala Krsna, Osipaonica, Radinac, Saraorci, Skobalj and Salinac (Strategy of Agriculture and Rural Development of the City of Smederevo for the period 2015-2020, IAE, 2016).

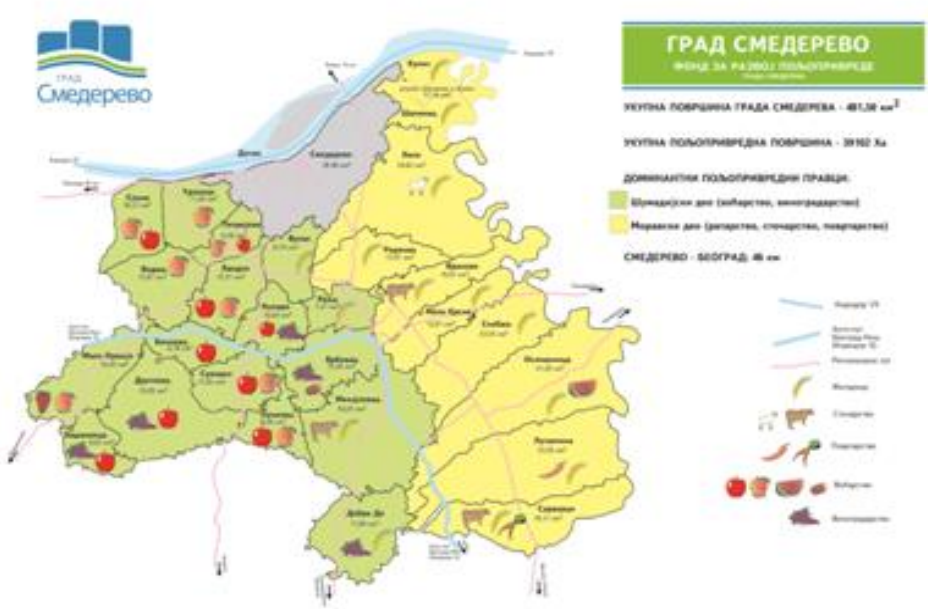

Figure 2. Agricultural routes on the territory of the city of Smederevo

Source: City of Smederevo, Department of Agriculture, internal data, 2015.

Materials and Methods of Study

Given that statistical data on the yield and production of fruit and grape for the JLS level are not available, data from the 2012 Census of Agriculture were used in the analysis of fruit production and viticulture in the city of Smederevo. Data on areas under permanent plantations and estimation of yield and production of fruit and grapes in Smederevo were obtained from field research by relevant subjects in this sector: extension service Smederevo, Kolari; fruit growers' association Zlatno brdo, Udovice; as well as an interview with leading fruit and grape producers and larger wineries.

Fruit production and viticulture

The main advantages of Serbia's agriculture are: highly productive area of arable land, long tradition in production and participation of agricultural population within the overall population, as well as installed production capacities. On the other hand, the main limitations of agricultural production are fragmentation of land parcels and insufficiently used production capacities, resulting in low productivity which affects product competitiveness the most.
Fruit production and viticulture are of special importance for the area of the city of Smederevo. Due to the mild continental climate, Smederevo region (especially Sumadija area, suitable for fruit growing and viticulture) has favourable conditions for the successful growing of almost all kinds of fruits and vines.

According to the 2012 Census of Agriculture (settlement level), the average area under permanent fruit plantation per agricultural household in Smederevo is 1.5 ha. According to the data of extension service Smederevo, larger fruit producers (owning orchards of about 10 ha and more) make up about 30-40% of the total number of fruit producers in Smederevo (these producers possess cold storage units, storage capacities, mechanization, etc.), and two large producers, which apply modern production technology and irrigate significant areas, are located in Suvodol (the producer owns about 60-70 ha of orchards) and Binovac (the area of orchard owned by the agricultural household is about 50 ha). Average fruit producers, among which is the majority of fruit producers in Smederevo, each own an area of about 5 ha under orchards, which classifies them as average producers.

According to the 2012 Census of Agriculture (settlement level), *orchards* (including areas under berry fruit) in Smederevo *occupy an area of 4,412.4 ha*, which is 16.6% of UAA, and 2.912 agricultural households (or 41% of their total number) declared having orchards (SORS, 2013).
Cultivated plantations dominate, accounting for 96% of the total orchard area[2], but only a small percentage belongs to the group of the so-called modern and contemporary orchards (orchards with irrigation systems, anti-hail nets, etc.). According to field estimates, only 1-2% of orchards are with anti-hail nets, and according to the 2012 Census of Agriculture (settlement level), only 3.2% of the total orchard area or 142 ha of orchards (including areas under berries) are irrigated.

Taking into account the participation of the orchard areas of Smederevo in the total area of orchards in Serbia and the Podunavlje District (data from the 2012 Census of Agriculture, settlement level), it can be concluded that Smederevo is the leader in fruit production in the Podunavlje District and an important factor in fruit production in Serbia, especially peach production, since almost a quarter of the total area of peach plantations in Serbia are located in the territory of the city of Smederevo (Table 2).

[2] According to the Statistical Office of the Republic of Serbia (2012 Census of Agriculture, Methodological guidelines), cultivated orchards include those plantations where modern agro-technical measures are regularly applied and which are raised on larger areas (not less than 30 a) by using plantation systems, i.e. with a certain space between the rows of trees, which allows mechanized processing. Extensive (traditional) orchards are semi-intensive or extensive fruit plantations, which sometimes contain trees of different types of fruit with different planting density. They are only present in Smederevo in weekend settlements.

Peach plantations (1,961 ha) and apple plantations (1,340 ha) dominate in the total structure of fruit plantations and together account for 75% of the total area of orchards in the area of Smederevo. Besides these two fruit species, the following fruit is grown: plum (333 ha), apricot (234 ha), sour cherry (183 ha), pear (87 ha), strawberries (63 ha), blackberries (21 ha), raspberries (1 ha), nuts (26 ha), hazelnuts (10 ha)[3].

Observed by the settlements of the city of Smederevo (2012 Census of Agriculture, settlement level), the largest areas of orchards are in the following settlements: Udovice (809 ha), Suvodol (565.2 ha), Vodanj (444.7 ha), Seone (414.1 ha), Drugovac (380.2 ha), Malo Orasje (241.5 ha), Kolari (157.3 ha), etc.

Table 2. Peach and apple plantations in the Republic of Serbia, the Podunavlje District and Smederevo, in 2012, in ha

Element	Apples	Peaches
Republic of Serbia	23.737	8.012
Podunavlje District	1.651	2.173
City of Smederevo	***1.340***	***1.961***
Share of plantations in Smederevo in the total orchard area in Serbia (%)	5,6	24,5
Share of plantations in Smederevo in the total orchard area in the Podunavlje District (%)	81,2	90,2

Source: SORS, 2013.

The largest *areas under peaches* are in the settlements of Udovica, Seone, Vodanj, Suvodol, Drugovac (68% of the total number of peach orchards in Smederevo is concentrated in these five villages), and *the largest areas under apples* are in the settlements of Suvodol, Udovica, Drugovac, Vodanj (more than half of the total number of apple orchards in Smederevo are located in these four villages).

According to the field research data, there have been a growing number of sour cherry and apricot orchards in the last few years. These fruit species do not require large investments in production (in support posts, pillars, wires, own production of planting material is possible), they are convenient in conditions of climate change (uneven precipitation), and there is a demand for them in both domestic and foreign markets, as well as a satisfactory price.
Considering the fact that the Statistical Office of the Republic of Serbia does not have data on fruit production and yield per hectare at the JLS level, Table 3 presents *estimated yields and production of the most important fruit species in Smederevo*, based on survey research, i.e. interviews with leading fruit producers and institutions in this sector in Smederevo.

[3] Field estimates related to orchard areas differ significantly from the data of the Census of Agriculture 2012.

Table 3. Estimated production of selected fruit species in Smederevo, average 2012-2015[1]

Fruit species	Cultivated area (ha)	Average yield (t/ha)	Production (t)
Peach and nectarine[2]	3.500	17	59.500
Apple[2]	2.500	25	62.500
Plum	670	16,5	11.055
Sour cherry	570	12	6.840
Apricot	500	15	7.500
Pear	350	15	5.250

Source: Author's calculations, IAE, 2016.

[1] Estimates of areas and average yields of selected fruit species were obtained from: extension service "Smederevo", Kolari, fruit growers' association "Zlatno brdo", Udovice and based on interviews with leading fruit producers in Smederevo.

[2] Average peach yields range from 15-20 t/ha, and apple yields from 22-30 t/ha.

According to the field data, *yields of all fruit species* vary by years depending on: (a) weather conditions, (b) the application of agro-technical measures, (v) assortment, (g) plantation age, (d) planting density, etc. By comparing average yields of peaches and apples produced by Smederevo fruit producers, with leading European producers (Italy, Turkey, Austria, France, Spain), one can conclude that domestic producers do not significantly lag behind in peach yields, but they achieve much lower average apple yields (http://faostat.fao.org, date of access 10.02.2016).

Fruit assortment in Smederevo is diverse, it allows for a long harvest period and is to some extent aligned with the demands in the domestic and foreign markets. There is a large number of peach cultivars (mostly cultivars of the Royal group), while nectarines are mostly represented by Kaldezi cultivar. Apples are predominantly of Ajdared cultivar; domestic cultivars and Kecskemet rose cultivar prevail among apricots; while Oblacinska sour cherry (it has a great value in industrial processing) and Sumadinka sour cherry (intended for consumption in fresh condition, it has a high price, but a decline in sales has been noticed recently) are the most grown sour cherry cultivars. Although fruit assortment is adapted to the demand in the Russian Federation market (which is the main export market of Serbian fruit), we should work on compliance of the assortment with the strong consumer demand in the EU market in the coming period. In addition, it is important that the competent services and institutions direct producers toward preservation of autochthonous fruit cultivars, such as Kozara, Kolacara, Budimka (for apples), Lubenicarka, Karamanka (for pears), etc.

The existence of a *large wholesale fruit market* in the village of Udovica has greatly contributed to the development of fruit production. This open-air market is located near the main roads, it is equipped in terms of infrastructure, is open from May to November and represents a kind of a fruit stock exchange in the region of Smederevo. Fresh fruit is traded on the market, and buyers coming from all over Serbia and surrounding countries supply green fruit markets, grocery stores, etc. with fruit from this market. Furthermore, *Fruit and Wine Growers' Association „Zlatno brdo"* is registered in Udovica, and its activity can be an additional stimulus for the development of fruit production in the future.

It is important to note that the development of the *irrigation system* with water supply from the Danube river would significantly increase fruit yields and foreign exchange earnings from fruit exports, so it is important to carry out the initiated capital irrigation projects in this area in the

coming period (Udovicki plateau and irrigation project in the southern part of the City). Irrigation systems will enable the establishment of modern intensive plantations (with the use of irrigation systems and anti-hail nets), improvement of fruit assortment, and consequently improve handling, storage and packaging practices, all in order to achieve high levels of production and productivity, as well as to improve fruit quality.

In the context of fruit quality improvement, the implementation of the *integrated production concept*[4] will become increasingly important in the future, as an indispensable factor of competitiveness in the placement of fruits, vegetables and grapes in the domestic market, and especially in exports. Generally, the intensification of agricultural production, primarily due to the large use of chemicals (fertilizers and plant protection products), leads to environmental pollution, deterioration of food quality and endangering the health of people and animals, which is why the integrated production concept is becoming increasingly significant. This production concept places emphasis on minimizing the use of chemical agents in plant protection, i.e. it is based on the optimal use of agro-technical measures, at the same time ensuring economic benefits (high yield and high fruit quality) and respecting environmental and health measures and consumers' welfare. Fruit producers have already been largely using this production concept, since a phytosanitary certificate is required for any fruit export to the Russian Federation market (which is dominant). It is issued by extension service "Smederevo" and guarantees that the consignment is free from plant quarantine diseases and pests, and that the use of pesticides was controlled. Namely, what exporters are obliged to deliver to extension service "Smederevo" is, among other things, the Plant Treatment Certificate (for the natural person / entrepreneur / legal person from whom the product was purchased), as well as the Exporter's Statement that the product is health-safe.

However, a large number of agricultural producers in Serbia and Smederevo do not keep the farm records (records of work processes performed for each culture and land parcel)[5], thus preventing monitoring and control of the use of chemicals that have a negative effect on human health (through greater content of pesticides, nitrates and nitrites in products of plant origin). In order to realize integrated production in practice, it must be adequately organized at the national level. The state is expected to adopt appropriate regulations in the shortest possible time in order to regulate the organization, control, certification and labelling of products obtained through integrated production.

The economic importance of *viticulture* is determined, inter alia, by the fact that vine can be successfully cultivated on terrains, that are not suitable for profitable production of other agricultural crops. This primarily relates to the soils of light mechanical composition, loose, sandy and pebbly soils, sandstones, carbonate soils on marble substrates, then to the cambisols, terra rossa, alluvia and diluvia, soils on the slopes of the mountains and mild slopes up to 240 m above sea level, as well as to the soils within the river valleys and in the vicinity of the lakes, where is plenty of sunlight from the water surface. In the Republic of Serbia, traditional vineyards are found on mentioned terrains with good water outflow, and in majority of cases also on terrains rich in

[4] Integrated fruit production, www.zdravasrbija.com/lat/Zemlja/Vocarstvo/1850-Integralna-proizvodnja.php, date of access 10.03.2016.

[5] Farm Records are defined in the Law on the Amendments of the Law on Agricultural Land (Official Gazette of the Republic of Serbia, 112/15) as a document on planning and monitoring of everyday activities in plant production and achieved yields during the year, especially in crop, vegetable and fruit production. At the same time, this Law defines the obligation for tenants of agricultural land in state ownership to establish and maintain farm records for plant production.

minerals, that contribute to better taste of wines (phosphorus, iron, potassium, magnesium and calcium), (Popović et al., 2011).

The most prevalent types of soil (vertisols and cambisols) are of such physic-chemical properties that they are very suitable for growing vine. Viticulture production is located in the Smederevo vineyard of the Belgrade wine region that is a part of Central Serbia viticulture region. The Smederevo vineyard covers the hilly terrain of the Smederevo's part of Danube region and its hinterland. It consists of three parts, separated by the valleys of the rivers Ralja and Konjska Reka (Official Gazette of RS, 45/15). Besides the land, to successful viticulture production of this region also serve relief, favorable microclimate and the vicinity of Danube.

In regard to viticultural production, the city of Smederevo, on one hand, has a long tradition, while on the other very favorable natural conditions. Wine history of Smederevo begins with the period of the reign of the Roman emperor Prob, who ruled this region in the 3rd century. In the 15th century the vineyards in Smederevo and the area around Smederevo were spread by despot Stefan Lazarević and Đurađ Branković. Few centuries later, Miloš Obrenović were also contributing to viticulture, who alongside the family summer house, in Zlatni breg (settlement Plavinac), planted 36 hectares of vineyards. On that site quality grapes and wine are still produced (Jakšić et al., 2015). By all means, the development of viticulture and the creation of grape varieties at individual producers in the second half of the previous century were largely contributed by the former social enterprise Godomin (currently in bankruptcy – in period of capital transition). It owned large areas under a vine, as well as large capacity wine-cellar. It was also repurchased the grapes from the sector of individual agricultural producers from this area.

Statistical data on viticulture production of mentioned region are shown in Table 4, taken from the Agricultural Census of Serbia 2012 (settlement level). Vineyards occupy 1.4% of the available UAA of the Smederevo city, where plantation vineyards and wine grape varieties dominated. Observed by settlements, the largest vineyards are in Drugovec (57.9 ha), as well as in Vrbovac, Badljevica, Udovica, Suvodol, Malo Orašje and Seone (areas ranging from 25.4 ha to 33.4 ha).

Table 4. Areas under the vine in the Smederevo city (in ha, in 2012.)

Number of farms	Number of farms with vineyards	Total area under vineyards, ha	Plantation vineyards, ha[1]		
			Vine varieties with geographical origin[2]	Other vine varieties	Table varieties
7,107	1,313	381	27	204	150

Source: SORS, 2013.

[1] Under plantation vineyards are considered those ones that regularly apply modern agro-technical measures that are raised on larger areas by implementation plantation systems, i.e. with certain spacing between the rows, which allows mechanical land cultivation.

[2] Grapevine varieties for production of wine with geographical origin are protected and registered.

According to estimation of the extension service Smederevo – Kolari (2016), at the area of Smederevo city, there are approximately 450 ha of vineyards. With average yields of 8 t/ha, within the period 2012-2015., average annual grape production were around 3,600 t.

Currently, the viticulture in Smederevo is characterized by fragmented family production of grapes and wine (average vineyard size per farm growing wine is around 0.3 ha), small number

of modern and market-oriented wineries, unorganized realization of table grape varieties, wine production for natural consumption (at household), etc.

Concerning the variety assortiment, according to data of local extension service, at this moment there is no dominant grape variety. Previously, variety Smederevka (local autochthonous variety) occupied large areas, but due to problems with grape realization, these areas have been decreased in recent years. It is currently presented on around 40% of the total area under the vineyards in Smederevo city. Its more used at farms which are not involved in wine production, while at farms with its own wineries, it is presented considerably lower. Smederevka is the variety which could be used both for fresh consumption as a table variety, and for production of quality wine. Wines obtained from Smederevka have a pleasant, refreshing taste and have even better taste when they are mixed with other quality white wines, such are Riesling, Semión, White Burgundy, increasing on that way the total acidity and improving the organoleptic characteristics of obtained wine.

For production of quality white wines are used varieties: Italian Riesling, Sauvignon, Semión and Traminac. Among quality red varieties, dominates variety wine Game, as well as wine type Ružica made from Prokupac variety. Generally, grape varaities are so deverse, covering the wide period of grape harvesting (3-4 months). Farms which have no wine production, are more oriented to table varieties (which can bu used both for fresh consumption and for wine processing, especially the Muscat de Hambourg and Cardinal varieties), while on modern farms with wineries, that incorporated and spread new knowledge within the mentioned field, a number of new high-quality wine varieties are presented[6].

Public and local support of fruit and vine production

Mentioned included official state support of the Government of the Republic of Serbia (Ministry of Agriculture), as well as local support at the level of Smederevo city (local authorities).
State support to fruit and vine production is reflected throughout the incentives for establishment of new plantations. These incentives include support to programs related to:

1. Support for establishment of new plantations oriented to modern technology of fruits/vine/hops growing, (with)out physical support (pole);
2. Land arrangement for plantations establishment.

Right to use the public support for plantation establishment has:

1. Physical person – owner of the registered commercial family agricultural holding;
2. Entrepreneur;
3. Legal entity: enterprise, agricultural cooperative, scientific-research institution, school, monastery, church and foundation.

Right to use the incentives could be realize for one or more established plantation, where the surface of each plantation should be at least:

1. 0,1 ha – for each species of berry fruits, vine or hops, or 0,05 ha for forest strawberry;
2. 0,3 ha – for each species of pomes, drupes and nuts.

[6] The most presented varieties for white wines are international varieties such as: Italian Riesling, Rhine Riesling, Chardonnay, Sauvignon Blanc, while regarding the varieties for colored wines dominate the international varieties such as: Cabernet Sauvignon, Prokupac, Merlot, Pinot Noir, etc. (Jakšić et al., 2015).

As a precondition it is marked that plantation could be located at one or more cadastral plots, but cadastral parcels must be located next to each other and to form one unit. The largest area that could achieve incentives (for all previously mentioned plantations) is 10 ha, except for the strawberry plantations, 5 ha.

User of incentives realize the right to public support in appropriate percentage of total value of made investment, considering the place of investment, or the area where plantation has been recently established, in accordance to appropriate legislation (law and regulations that regulate distribution of incentives in agriculture and rural development).

Maximal value of incentives used in establishment of plantation, depends of focused element of investment:

1. For seedlings of fruits, vine, or hops – 2 million RSD;
2. For poles, 700,000 RSD;
3. For land arranging, or purchase of certified substrata for blueberries plantations (seedlings are in containers/bags) – 200,000 RSD;
4. For chemical analysis of soil, as well as for examination of mechanical composition of soil - 100.000 RSD.

If plantations are based on domestic (autochthonous) fruit and vine varieties, incentives are increased for 100,000 RSD per established hectare.

If incentives are related to vine plantations established at hilly terrains higher than 200 m a.s.l., or southern exposition, or on slopes that incline more than 10 degrees, or on terraces, it will be increased for 100,000 RSD per established hectare.

If incentives are related to new fruit plantations based on knip seedlings, it will be increased for 100,000 RSD per established hectare (MPRS, 2017).

Local support (Administration of Smederevo city) *to fruit-vine production* could be seen throughout the annual programs for implementation of agricultural and rural development policies. It is directed to producers engaged in fruit-vine growing and covers the following activities[7]:

- Installation of anti-hail stations with adequate number of missiles, in cooperation with the Ministry of Interior (sector for emergency situations). This kind of services have a special importance for large number of fruit/vine growers whose plantations are not secured with anti-hail nets);
- *Insurance of crops, fruits, perennial plantations, nursery gardens and animals* (support cover 40% of the insurance premium). Despite this support, which aims to reduce the risk in agricultural production, there are no significant breakthroughs in the field of insurance in agriculture, given the unfavorable conditions made by insurers;
- *Purchase of mechanization and equipment* for sowing, planting, plant protection and irrigation in fruit/vine and vegetable production at the open field (the amount of subsidies per registered agricultural holdings is 40% of the total realized investment);
- *Supporting the organization of agro-touristic events important for the development of fruit-vine production*, such as "the days of peach" (at the territory of local community Vodanj); "the days of strawberry" (at the territory of local community Malo Orašje); manifestation "the village yards" (within the manifestation autumn in Smederevo), that takes place at Fortress of Smederevo (agricultural products and ethno food, primarily products from fruit-vine production are presented by 20 rural local communities of the Smederevo city. Also, in wine area number of local wineries presents its own products – wine and fruit spirits);

[7] Realization of annual programs for implementation of agricultural and rural development policies at the territory of Smederevo city for 2014, 2015 and 2016 (Official Gazette of Smederevo city, 2/16).

– Measure *„Credit support"* (co financing part of interest of agricultural credits).

Considering the incentives use, the producers has to respect the basic principle that double financing is not allowed or use of local incentives exclude the use of state support.

Conclusion

As one of the most profitable sectors of Serbian agriculture, fruit growing has dominant position, both by production value and share within the foreign trade, despite the certain difficulties in some production years (presence of drought, freezing, diseases and pests), or sometimes inadequate assortment, agro-technique, etc.

Orchards occupy the area of almost 4,500 ha in Smederevo, or around 16.6% of UAA, involving more than 2,900 farms (or more than 40% of total number of holdings) in fruit growing. Within the fruits structure peach (almost 2,000 ha) and apple (almost 1,500 ha) are dominated (around 75% of the total area under orchards).

On the other hand, the total area under vineyards is almost 400 ha. They occupy around 1.5% of UAA, where dominate plantation vineyards and wine grape varieties.

In last several years, significant improvements have been made in improving of fruit growing (mostly related to production of quality planting material), viticulture and wine production (raising the wines quality, as well as the production of wines with geographical origin). Besides state support, unites of local government are giving great efforts to encourage the establishment of new plantations and improve fruit and vine production (example of Smederevo could be a good example to other local communities oriented to intensification of mentioned sectors of agriculture).

The state should continue with well-designed incentives, in particular for raising plantations, cloning and certification, as for implementation of modern technology and systems of production. Producers themselves also need to change their habits. They must associate (primarily around geographical indications) and improve their knowledge and used technology (in line with national scientific capacities).

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RASPBERRY TRADE AS A STRATEGIC EXPORT POTENTIAL OF THE REPUBLIC OF SERBIA[1]

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Abstract

International trade in agricultural products is gaining importance, and it happens under extremely restrictive conditions. Analysis of raspberry production shows that agro ecological conditions in Serbia are favorable for raspberry cultivation. Unpolluted land, favorable climate, enough sunlight, helps the raspberries to have better organoleptic and production characteristics, more intense aroma, color and taste compared to raspberries from other countries. The raspberry is a natural Serbian brand. The subject of the research shall be the analysis of international trade in raspberries, precisely because of the importance of exports of agricultural food products, especially the raspberries, in the total export of Serbia, with the aim to analyze the level of international competitiveness of the raspberries production and export. In this paper, we have dynamically observed the raspberries trade in the world: quantity, value, and unit price, and then according to the same methodology also the export from Serbia.

Key words: agricultural products, international raspberry trade, agricultural food products exports

Introduction

International trade in agricultural products represents an integral part of the global trade. International trade in agricultural products is influenced by very complex relations and significant differences in the degree of economic development of individual countries, but by also many other factors. According to Djordjevic (2011, 25), these activities are taking place in the global market. Đorđević (2011) points out, that the market is a big and automatic regulator between production and consumption in the commodity economy. By studying the market one analyzes the creation, the role, the types, the functioning of the market mechanism and market laws, the way of production, the way of directing and coordinating economic flows and conditions of material and social development (Trivić & Šagi, 2008). According to Grandov (2010) development of production resources is

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accompanied by the expansion of the spatial framework of trade and the gradual encompassing of branches of material production.

The significance of the market observation stems from the fact that in modern ways the economy of the population needs can be organized only through a market mechanism (Tričković & Hanić, 1992). Precisely from this fact arises the very important role of the market in the conditions of commodity production, and therefore due attention must be paid to it (Trivić & Šagi, 2008, 6). The export of agricultural products is the result of high and efficient domestic production. Many mechanisms influence the international trade of agricultural products, such as customs tariffs, premiums, licenses, special agreements and prohibitions, in particular the policy of parity prices and credit policy, with the aim of developing domestic agriculture and agro-industry and its' protection against foreign competition. The largest exporters are the developed countries, although the undeveloped ones are gaining importance. Ricardo's theory underlines that underdeveloped countries participate in trade, or trade with developed countries, except in cases where one country is more efficient in production than another country. This provides significant resources for the import of energy generating products, capital equipment and other industrial products.

The agrarian sector has a significant share in the structure of the total foreign trade, so the achieved results in this sector can influence the improvement of the foreign trade balance and the balance of the overall national economy.

Agricultural and food industry provide over 15 million workplaces in the EU, accounting for 8.3% of all employed citizens of the Union. This is the average size for the entire EU, which varies significantly from one country to another. In the so-called "old" EU member states (15 industrially developed countries of Western Europe) the average value is 4%, while in the "new" Member States (Romania, Bulgaria, Slovakia, Hungary) more than 12% of total workforce is engaged in agriculture and food industry. Agricultural production participates in the GDP of the European countries with 2-3%, but in countries such as Bulgaria and Romania it can amount to up to 10% of the national GDP (Vapa-Tankosić & Stojsavljević, 2014).

The low value added agricultural products are present in the international market, while the exported quantities are higher than imported ones (Cvijanović & Ignjatijević, 2017). In the international market there is a decrease in price-competitive products, which shows that cheaper agricultural products from Serbia hardly compete with suppliers from other countries.

The raspberry production has high marketability and represents a significant part in the export of Serbian agrarian products. It is consumed in fresh condition, or processed: in the form of juices, syrups, "kompot" (non-alcoholic sweet beverage consisting of mainly fruits, sugar, and water), sweet, natural liquor or in pharmaceutical and cosmetics industry. According to the estimates the raspberries in Serbia, has begun to be massively planted in the mid-fifties (Ignjatijević & Milojević, 2011). The raspberries are grown on the territory of around 12,000 hectares in Serbia. The absolute dominant producers of its production are represented by family households with a share of 99%, while agro-industrial enterprises have, practically, a negligible share in the production of this fruit.

The largest production, regionally observed, with a quarter of domestic production, is realized in the Zlatibor region: the municipalities of Arilje, Bajina Basta, Kosjerić, Nova Varoš, Požega, Priboj, Prijepolje, Sjenica, Užice and Čajetina (Kjajić, 2017; Vlahović, 2003a). The districts of Moravica, Kolubara, Mačva and Rasina, which jointly have a share of 87% in the domestic production of this fruit, are also important in the raspberry production. The supply of raspberries is done through two channels, through an organized purchase, which accounts for 90% of the total supply, and the market place and peasant's

exchange, which accounts for the rest 10% (Vlahović, 2003b). It is evident that organized purchase is a far more important channel than the marketplace. The future possibilities are reflected in the production of high quality assortment in order to increase efficiency and qualitative competitiveness on the world market. It is necessary to create new varieties to prolong the harvest in order to have a successful export of fresh raspberries. It is necessary to programmatically and economically define the development of raspberry production and its' processing in a wide range of products, with the increased exports in existing markets, also with the conquest of new markets.

The subject of the research shall be the analysis of international trade in raspberries, precisely because of the importance of exports of agricultural food products, especially the raspberries, in the total export of Serbia, with the aim to analyze the level of international competitiveness of the raspberries production and export. In this paper, we have dynamically observed the raspberries trade in the world: quantity, value, and unit price, and then according to the same methodology also the export from Serbia.

2. Results of the research

The results of the research, represented in Table 1, have shown that the average export and import prices of raspberries in the world do not have a certain trend of growth or decline, but that the fluctuations are present from year to year. The countries with the highest prices of exported raspberries are: Ireland, with an average price of 13350 $/ton; France, with an average price of 10155 $/ton; Portugal, with an average price of $ 9778/ton. The countries with the lowest price of exported raspberries: Serbia, with an average price of 1628 $/ton; Poland, with an average price of 1696 $/ton; Canada, with an average price of $ 2818/ton. Although Serbia exports raspberries price is lower than of other countries, it is very important that it is, in the raspberry export, still among the top 10 countries in the world. The prices of imported raspberries mostly have a trend of growth, and in the later period we see that in some countries the prices are falling. Japan has imported raspberries at the highest price in 2008, amounting to $ 25130/ton. Poland is the country that has imported raspberries at the lowest price, which was 1161$/ton in 2015. Japan is a country that not only imported raspberries at the highest prices in 2008, but is also the country that imports raspberries at the highest prices for the entire period from 2007 to 2016. Serbia is in the twentieth position and has imported raspberries at the lowest prices.

Table 2 shows the data on the quantity of world raspberry exports for the period from 2007 to 2015. Mexico has exported the largest quantity, in the year 2015, which equals to 70897 tons. Morocco has exported the lowest quantity in the year 2007, which equals 718 tons. The amount of raspberries produced is increasing over the years and this trend will probably continue in the future. Serbia is in the seventh place and that shows the potential of our country in the production of raspberries.

The quantity of imported raspberries on the world level for the period from 2007 until year 2015 is shown below. The amount of raspberry imports is constantly increasing. America is the country that has imported the largest quantity of raspberries in the analyzed period, whale Serbia has imported the lowest quantity.

Table 1. Raspberry price in the world for the period 2007-2015 in dollars per ton

	Exporters	2007	Average price 2008-2011	Average price 2012-2015	Average price 2007-2015
	World	4,309	4,291.75	5,503.5	
1	United States of America	3,271	4,409.75	6,881.5	5,567
2	Portugal	10,352	10,032.75	9,723.75	9,778
3	Poland	1,749	1,503.75	1,855.75	1,696
4	France	10,050	9,940.25	10,616.75	10,155
5	South Africa	6,474	8,771.75	9,575.25	8,922
6	Serbia	1,638	1,660.75	1,663.25	1,628
7	Chile	6,754	7,870.25	4,422.5	5,734
8	Canada	1,856	3,740.75	2,197.5	2,818
9	United Kingdom	11,739	8,905.5	7,616.75	8,735
10	Ireland	8,548	11,455.5	16,305.5	13,350

	Importers	2007	Average price 2008-2011	Average price 2012-2015	Average price 2007-2015
	World	4,649	5,275.75	6,044.75	
1	United States of America	4,780	5,418.25	5,272.75	5,391
2	Canada	5,391	6,001.25	6,659.75	6,301
3	United Kingdom	8,748	8,400,00	8,136.75	8,312
4	France	7,442	6,968.25	6,696.5	6,670
5	Switzerland	10,024	10,886.25	12,881.75	11,727
6	Norway	18,514	18,429.25	15,879.75	16,975
7	Ireland	10,430	8,679.25	9,451.25	9,273
8	Japan	23,473	24,904.5	24,067.5	24,185
9	Denmark	8,054	7,536.5	8,799.75	8,314
10	Poland	5,627	4,949.5	3,954.5	4,484
11	Serbia	2,121	2,210.25	10,176.67	4,772

Source: ITC

Table 2. Quantity of exported and imported raspberries in the world for the period 2007-2015, expressed in tons

	Exporters	2007	Average price 2008-2011	Average price 2012-2015	Average price 2007-2015
	World	137,935	146,283.5	191,511.75	158,576.75
1	Mexico	33,527	37,421.75	58,889.5	43,279.42
2	United States of America	33,744	43,231.25	42,281	39,752.08
3	Spain	13,018	14,562.75	24,230.75	17,270.50
4	Poland	24,650	22,198.75	17,134	21,327.58
5	Netherlands	1,970	2,950.75	8,337.5	4,419.42
6	Portugal	887	1,988.5	6,845.25	3,240.25
7	Serbia	9,471	5,726.00	5,421.25	6,872.75
8	Morocco	718	1,801.5	4,752.25	2,423.92
9	Guatemala	2,947	3,376.00	6,247.25	4,190.08
10	Austria	3,181	2,267.25	2,172.75	2,540.33

	Importers	2007	Average price 2008-2011	Average price 2012-2015	Average price 2007-2015
	World	129,381	154,891.75	251,350.75	178,541.17
1	United States of America	37,206	49,369.50	108,181.50	64,919.00
2	Canada	18,045	27,302.50	39,119.25	28,155.58
3	Germany	15,291	17,754.50	22,207.00	18,417.50
4	United Kingdom	11,204	12,569.75	16,252.75	13,342.17
5	France	6,226	7,858.75	11,033.25	8,372.67
6	Netherlands	13,211	10,253.00	8,478.75	10,647.58
7	Austria	12,324	10,596.00	8,388.75	10,436.25
8	Spain	342	1,745.25	4,211.75	2,099.67
9	Italy	4,321	4,637.00	6,493.25	5,150.42
10	Belgium	4,068	3,548.50	6,051.00	4,555.83
94	Serbia	33	82.50	32.75	49.42

Source: ITC

Table 3 shows the value of exported and imported raspberries in a world in the period from 2007 to 2015, expressed in thousands of dollars. The results point out, taking into account to the value of exported raspberries, that Serbia is 11th in the world, and in regard to the value of the imported raspberries it is in the 73rd place. United States of America is in the first place, having achieved the total export of 2010898 thousand dollars, which accounts for, in a given period, almost one third of the value of total world exports. Although it occupies the last place among the above mentioned countries, it is highly significant that Serbia is one of the world's largest exporters and that it occupies a significant 11th position. It also shows how much has Serbia really developed in the production of raspberries.

Table 3. The value of exported and imported raspberries in the world for the period 2007-2015 expressed in thousands of dollars

	Exporters	2007	Average price 2008-2011	Average price 2012-2015	Average price 2007-2015
	World	594,415	626,319	1,057,240.25	7,328,652
1	United States of America	110,376	184,247.50	290,883.00	2,010,898
2	Spain	109,447	133,884.50	220,973.25	1,528,878
3	Mexico	182,783	112,057.00	196,476.50	1,416,917
4	Netherlands	27,770	34,173.50	87,216.50	513,330
5	Portugal	9,182	19,951.25	65,583.00	351,319
6	Morocco	1,555	7,867.75	26,005.25	137,047
7	Poland	43,112	35,347.75	31,911.25	312,148
8	Belgium	14,966	15,972.00	27,809.75	190,093
9	France	15,970	13,646.00	18,781.25	145,679
10	Germany	2,870	6,848.25	14,112.25	86,712
11	Serbia	15,513	9,984.25	9,361.25	92,895

	Importers	2007	Average price 2008-2011	Average price 2012-2015	Average price 2007-2015
	World	601,482	818,311.50	1,519,743.25	9,953,701
1	United States of America	177,838	250,097.00	575,767.25	3,481,295
2	Canada	97,273	164,399.25	260,517.25	1,796,939
3	Germany	38,778	57,574.00	122,113.50	757,528
4	United Kingdom	98,015	105,177.75	131,727.25	1,045,635
5	Netherlands	29,931	32,586.25	63,844.00	415,652
6	France	46,331	54,682.50	70,033.75	545,196
7	Spain	2,332	8,259.00	22,058.25	123,601
8	Belgium	16,873	17,663.50	33,102.00	219,935
9	Switzerland	7,067	11,794.00	27,432.25	163,972
10	Austria	24,053	23,172.25	24,683.75	215,477
11	Serbia	70	185.50	56.75	1,039

Source: ITC

Table 4. Leading global raspberry exporting companies

	Company name	Number of product or service categories traded	Number of employees	Country	City	Website
1	A GARAU ET COMPAGNIE	25	19-20	France	LE HAVRE	
2	Ablasser Obstgarten GmbH	4	20-49	Germany	Grimma	http://www.obstland.de
3	Agraimpex Sp. z o.o.	69	20-49	Poland	Warszawa	http://www.agraimpex.com.pl
4	AGRANA FRUIT LUKA Ukrainian-Austrian JV, Ltd	5	50-99	Ukraine	Vinnytskyi Dist.	http://www.agrana.ua
5	AGROFRES Sp.j. Bożena i Jerzy Kurpiel	4	19-20	Poland	Jarosław	
6	Agroponiente, S.A.	17	100-249	Spain	Ejido, El	http://www.agroponiente.es
7	Agrotime OOD	10	250-499	Bulgaria	Isperih	http://www.agrotime.com
8	Akord Sp. z o.o.	48	20-49	Poland	Lublin	
9	ALBANO CIRO COMPANY, Sas	14	0-9	Italy	TARANTO	http://www.albanocompany.com

Source: ITC

When analyzing the exporters of raspberries, the leader exporter is the company "A garau et compagnie" from France. It is interesting to note that in the top 10 raspberry exporting companies, there are 4 companies from Poland. The companies from Poland occupy 3, 5, 8 and 10th places and these are: Agraimpex Sp. the zoo, Agrofres Sp.j Akord Sp. the zoo. and Amar S.c.

Table 5. Leading global raspberry importing companies

Company name		Number of product or service categories traded	Number of employees	Country	City	Website
1	abasto s.r.o.	121	50-99	Czech Republic	Řitka	http://www.abasto.cz
2	Agraimpex Sp. z o.o.	69	20-49	Poland	Warszawa	http://www.agraimpex.com.pl
3	AGRICO Bohemia s.r.o.	81	0-9	Czech Republic	Tábor	http://www.agricobohemia.cz
4	Agroimpuls SRL	90	20-49	Moldova, Republic of	Chișinău	
5	ALBANO CIRO COMPANY, Sas	14	0-9	Italy	TARANTO	http://www.albanocompany.com

Company name		Number of product or service categories traded	Number of employees	Country	City	Website
6	Amplus Sp. z o.o.S.K.A.	53	20-49	Poland	Koniusza	http://www.amplusfoods.com
7	Anecoop Polska Sp. z o.o.	2	50-99	Poland	Swarzędz	http://www.anecoop.pl
8	Arofa, S.L.	15	100-249	Spain	Pamplona/Iruña	http://www.arofa.com
9	ASCOP-UKRAINE Ltd	21	100-249	Ukraine	Kyiv	
10	ATACRET SRL	45	0-9	Romania	ORADEA	

Source: ITC

The leading company in the import of raspberries is the company "Abasto s.r.o." from Czech Republic. In the second and third places we find companies from Poland and the Czech Republic. The company from Czech Republic "AgricoBohemia sro" is third in the world in raspberries import and belongs to a company with 0-9 employees, which is a very big success. In the import of raspberries, as well as in the export, in the top 10 companies are even three companies that are from Poland. They occupy 2nd, 3rd and 7th place. These are companies: Agraimpex Sp. the zoo, Ampuls Sp. the zoo., S.K.A, Anecoop Polska Sp. the zoo. We conclude that Agraimpex is among the leaders in the import and export of raspberries in the world.

Table 6. Exported unit value for Serbia in period 2007-2016 (US Dollar/Tons)

	Importers	2007	Average price 2008-2011	Average price 2012-2015	2016	Average price 2007-2016
	World	1,638	1,660.75	1,663.25	1,349	1,628
1	Austria	1,713	1,651.5	1,630.25	1,258	1,609
2	Germany	1,702	1,665.75	1,783.5	1,336	1,683
3	Italy	1,464	2,106	1,699.5	1,930	1,861
4	Russian Federation	-	1,329.5	1,369.75	1,672	1,385
5	France	-	5,250	5,818.75	5,214	5,569
6	Poland	-	851	1,626.67	525	1,184
7	Spain	1,080	1,089.5	1,332.75	569	1,133
8	Belgium	1,791	1,674	1,157	514	1,241
9	Netherlands	1,455	751.75	2,467	1,143	1,153
10	Montenegro	-	628.75	1,289	2,375	1,116

Source: ITC

The price of exported raspberries from Serbia, in the period from 2007 to 2016, has been shown in Table 7 and the values are expressed in dollars per ton of raspberries. Austria, Germany, Italy and Spain are countries that have imported raspberries from Serbia in each year of the analyzed period. As per the frequency of exports, Russia and Montenegro come in the second place, where export had not occurred only in the year 2007.
Price fluctuations are dynamic and have varied differently throughout the analyzed years. Serbia exported raspberries to France at the highest recorded price of $8,000 per ton in 2013. The lowest export price was reached during export to Montenegro in 2008, at $400 per ton. Generally speaking, the highest export raspberries prices from Serbia have been recorded during export to France, where the total average price for the analyzed period has been 5569 dollars per ton. Serbia has achieved the lowest export prices during export to Montenegro, and the average price for the analyzed period has been 1116 dollars per ton.
The import price of raspberries in Serbia in the period from 2007 to 2016 shows that Serbia has mostly imported raspberries from Germany, which is a very important foreign trade partner. From Germany, Serbia imports raspberries at prices that are on the level of average world prices. Serbia has imported raspberries from Mexico at the highest price of $22,000 per ton in the year 2015. The lowest import price was from Germany $660 per ton in the year 2014.

Table 7. The quantity of raspberry exports from Serbia for the period 2007-2016 expressed in tons

	Importers	2007	Average price 2008-2011	Average price 2012-2015	2016	Average price 2007-2016
	World	9,471	5,726	5,421.25	6,123	6,018.3
1	Austria	4,830	2,395	2,507.5	3,336	2,777.6
2	Germany	1,647	1,484.5	1,543.75	1,647	1,540.7
3	Italy	1,307	1,208.5	629.75	730	939
4	Russian Federation	0	20.75	59.25	122	44.2
5	Poland	0	78	384.5	99	194.9
6	Belgium	182	23.75	93	74	72.3
7	Spain	75	44.25	92.75	72	69.5
8	Netherlands	1,361	418	15	21	311.4
9	France	0	0.75	11.25	14	6.2
10	Montenegro	0	7	15.5	8	9.8

Source: ITC

The quantity of export of raspberries from Serbia in the period from 2007 to 2016 is shown in Table 7 and the data are expressed in tons. In the observed period Serbia has mostly exported, on average, to Austria. The partner countries that follow are Germany, Italy, and Russia. If we add up the quantities of exported raspberries from Serbia to Austria, Germany and Italy, we can see that this sum makes up almost 90% of the total quantity that Serbia has exported to the whole world in a given period. Austria, Germany and Italy are member states of the European Union, and we can also conclude that Serbia has agreements with the European Union for the export of agricultural products. From the Interim Agreement on

provisions on trade and trade-related matters stemming from the Stabilization and Association Agreement, the Republic of Serbia has taken significant measures to expand both regional trade and trade with the EU, in order to improve the level of economic cooperation (Vapa-Tankosić et al, 2015).

Table 8. Raspberry export value for Serbia for the period 2007-2016 expressed in thousands of dollars

	Importers	2007	Average price 2008-2011	Average price 2012-2015	2016	Average price 2007-2016
	World	15,513	9,984.25	9,361.25	8,260	10,115.5
1	Austria	8,273	4,176	4,351.25	4,196	4,657.8
2	Germany	2,804	2,237.75	2,812.5	2,201	2,520.6
3	Italy	1,914	2,997	1,113.5	1,409	1,976.5
4	Russian Federation	0	28.75	81.75	204	64.6
5	France	0	4	67.75	73	36
6	Poland	0	64	613.5	52	276.2
7	Spain	81	42	112.5	41	74
8	Belgium	326	39.75	108.25	38	95.6
9	Netherlands	1,980	340.75	37	24	351.5
10	Montenegro	0	4	17	19	10.3

Source:ITC

The values of raspberries exported by Serbia in the period from 2007 to 2016 have been shown in Table 8. The values are expressed in thousands of dollars. Serbia has exported raspberries in a given period up to the value of 101,115 thousand dollars. In regard to the value of the exported raspberries, we once again come to a conclusion that Serbia has exported the most to Germany, Austria and Italy. It has achieved the lowest value in export with Montenegro. Serbia has exported higher values in the first couple of years, than these values dropped significantly, although in recent years they have a growth tendency.

High quality of frozen raspberries has been achieved thanks to the realized degree of raspberry production, which represents the backbone of the export of agricultural products. In order to obtain high quality fruit export products, it is necessary to achieve good quality of raw materials, to work further on selection and creation of new varieties, to modernize the processing capacities, to increase the level of equipment utilization and to increase the level of finalization of production. It is necessary for agricultural producers to increase productivity and cost-effectiveness in production, and to offer, besides traditional products, products from ecological production systems. Modern trends in demand on the market of developed countries require changes in the future development of the food industry, especially fruit-raspberries should be developed for the production of juices, alcoholic drinks from raspberries, syrups, concentrates, "kompots", gelatinized products, pasteurized, frozen, candied and dried products, and semi-finished products fruits (Ignjatijevic et al., 2012). In order to make the most efficient use of potentials for the development of

agriculture and the placement of agro-food products to the world market, it is necessary to establish an efficient food safety control system, increase competitiveness to improve the market chain and consolidate supply (eg, knowledge of potential export markets, introduction of standards – production must be tailored to the requirements of consumers (HACCP, ISO) and support programs aimed at achieving added value (integral, organic production, protection of products with geographical origin) (Vapa-Tankosić and Erdelji, 2016).

Conclusion

International trade in agricultural products is gaining importance, although it occurs under extremely restrictive conditions. Because of the presence of various barriers posed by economically developed countries the process of freeing up trade does not happen. The industrialized countries, in the increasingly fierce competition and struggle for markets, have not respected the agreed principles of free international trade and have increasingly applied restrictive measures.

In recent times developed countries have used trade preferences for their strategic economic goals. In addition to agrarian protectionism, there are many multinational companies operating on the market which influence the trade, and associations of countries with a goal of improving trade are also significant. The technical-technological and political factors also affect the volume of world trade. A large part of the foreign trade takes place under the direct effect of certain countries, that is, the Government, and it can be said that the situation on the world market is largely the result of state interventions, and to a lesser extent the result of the functioning of market laws.

The export of agricultural products is the result of high and efficient domestic production. Many mechanisms affect the international trade of agricultural products, such as customs tariffs, premiums, licenses, special agreements and prohibitions, in particular the policy of parity prices and credit policy with the aim of developing domestic agriculture and agro-industry and protection against foreign competition. The largest exporters are developed countries. Regionally-observed, the largest export region is Europe. The world's leading exporter is the United States.

The developed countries that are major exporters, at the same time, represent also large importers of agricultural products. This is due to the high incomes of the population, so they also import products, of which there are plenty in the domestic market, in order to supplement the assortment.

By observing the international raspberry trade on a global scale, we have concluded that the world's largest exporters are United States, Mexico, Spain and Poland. As for the world's largest raspberry importers, United States is in the first place, followed by Canada and Germany.

If we analyze the international raspberry trade within the European Union, we can come to the conclusion that the biggest exporters are Spain, Poland and Norway, while the largest importers within the European Union are Germany, the United Kingdom and France.

When analyzing Serbian import and export of raspberries, we came to a very positive conclusion that Serbia has great potential and possibilities for the production of raspberries. Serbia is on the list of world raspberry exporters on an enviable seventh place. Serbia exports its raspberries to the European Union, Germany, Austria and Italy. In addition to the countries of the European Union, Serbia also exports large quantities to Russia. When it comes to importing raspberries, Serbia imports very small quantities of raspberries, mostly from Austria and Germany. This is very good because in this way Serbia realizes a huge foreign trade surplus.

According to the available resources, the sector of agro-food products is very important sector of the economy of Serbia. The agriculture represents an opportunity for development, given the tendency of rising food prices on the world market. Its importance is reflected in the participation of agriculture in exports, gross domestic product, gross value added and total employment. Therefore, this sector can make a significant contribution to the stabilization of economic trends in the country.
Serbia's agrarian foreign trade, accounting for one-quarter of total exports, with very high coverage of imports by exports and a positive balance of around one-tenth of total exports, with a very dynamic increase in the value of exports of some important commodity groups, undoubtedly represents a serious potential for development, for adjustment of the balance of payments and the overall macroeconomic and social stability.

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WOMEN IN RURAL AREAS OF SERBIA

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Abstract
Position woman in the rural environment has always been difficult and inextricably linked to her role in family. This was a critical factor determining its status and rights. When it comes to this and its economic dependency status in the second half of the 20th century, women are emancipated. These changes have influenced the position of women in family, relationship between sexes, interpersonal relations. The family changes its scope, functions and form. A family in the middle of the 20th century in rural areas counted dozens of its members, but today this type of family has almost disappeared. The average family in Serbia today has 2.9 members. There is an increase in the number of people living alone, an increase in incomplete families, a decline in birth rates, and a smaller number of members. Women in rural areas realize their economic role in a specific way. Position rural woman is special, but also of special social significance. Women in the village were, and still are, a marginalized social group that is still insufficiently known. Woman living in a family living and family has a more favorable social position, she is an active participant in the production and the owner of household.

Key words: rural area, women, Serbia, family, village;

Introduction

Women in Serbia make 51.3% of the total population. Observed by age, female population are more numerous, while in younger population, men are numerically dominant. Women are on average older than men in 2.7 years. The most represented are in the category of dependents, followed by women whose source of income comes from pensions, scholarships and social benefits. Geographically, women are more mobile than men, most women moved to a place of permanent residence from another place (Vukmirović, 2014, p. 10).
Women in rural areas plays an important role in economic survival of their family and community, for which they do not receive any significant acknowledgment for their investing efforts. Women in the village were are a marginalized social group that is still insufficiently known. Their contributiona are very high in agricultural production, but also in rural communities it is not visible, nor recognized, and their indvidual position is often unsecured and unsatisfactory. An important factor that influences the revival of the village and the rural development as a whole. The promotion of the position of women in the village has multiple significance: demographic revival of villages, development of rural tourism, reduction of rural poverty in rural areas, improvement of standards and living conditions in rural areas, diversification activities, maintenance and reporduction of tradition and more others.
Rural areas are gaining in importance first of all because of the need for more balanced development of a country or region, a prerequisite for general development. Rural areas are

a perfect ground for the progress and investments of certain investors. Often the factor of underdevelopment of these areas is more than challenging for investors of significant and crucial reasons. Village is increasingly investing in projects in the fields of agriculture, cattle breeding, cooperatives, and in recent times tourism or some other activity.
Employment of women in village is becoming an increasingly important issue. It is common knowledge that a certain part of women's population from the village does not use the opportunity to report and use the assistance provided by the National Employment Service. Also, one should mention the educational structure of women in the village, where the older female population is less educated than men, while in recent times this situation is reversed. Changes in ownership, legal regulations, health and social security, as well as in the mobility of population, has a negative impact on women and men living in the countryside and who are engaged in agriculture.
The rapid pace of unfavorable changes and the impoverishment of a large part in rural population marginalizes rural women in addition to exposing them to increased risks of violence and endangering health. The biological reproduction of the rural population, with low fertility rates, also reflects the unfavorable position of women in the countryside. Intensive aging of the rural population, due to the differences in the mortality rate of women and men, mainly female population, exposes an additional risk of poverty to the old woman and their single households.

Materials and methods

The aim of the paper is to analyze and present basic indicators and information on the situation of women in rural areas. Women in rural areas are a significant factor in the functioning of life. Different sources of data were used. It was used descriptive method and the method of comparison. The position of women in the village must be improved and raised to a higher level.

Research results

In our traditional society there was a series of elaborated cultural patterns that expressed the authority and domination of men over female members. If we want to look at the position of women in the traditional society in the past, taking into account its obligations, question of the difficulty of her life in these conditions is posed. Historically, with traditional perceptions, the life of the female population in the country took place by making older girls and girls a large part they dealt with manual work and with their mother prepared for their future role-wives, mothers and housewives. Another girl left her family and went to her husband's house, where from the moment of her arrival she occupied the lowest place in the family hierarchy. Often happened that she entered the new family as a twenty-member, with the least right to vote. This position was expressed in form of unconditional obedience to all men and older women. As the youngest, the snake she took to the husband, the devotees and the father-in-law she was cleaning shoes and she was obliged to help all women in all jobs. Out of the women and girls, she was expected to have great shyness, values, kindness, obedience and dedication to the family. Based on the position of the woman in our patriarchal culture, we can conclude that the control of women's behavior is carried out on several levels, such as: a) eco, b) social and c) ritual.
When it comes to economic control, it is related to the legal status of women in our traditional society. In legal terms, women were always considered a minor, her father was represented before the law, and then her husband was married. Social limitation of women's behavior implied control of movement, limitation of publicity, no right to make decisions, and the like.

Rituals represent a symbolic expression of the needs of a community and from there encourages the ritual control of women. Woman gave a role that is essential for the well-being of the entire community, and that is through the perseverance, perseverance and moral beauty enriched by the entire society. Different causes led to the formation of a particular model of a woman characterized as a "semi-supernatural type". Women of this type are lagging behind like women of a patriarchal type, but they are no longer in the same position as rural women. A semi-supernatural woman began to abstain from traditional subjugation, but she was not ready for the right position of the woman, she could not identify. The spread of society led to a situation in which more and more women had to earn money for life, either because of their own sustenance, or because of the additional income for the domestic economy.

Although in a traditional society, male and female spheres were formally separated, most of the jobs were carried out together. Revaluation of women's traditional roles in civil society means that they turned out to be less valuable than other social roles. There were some social spheres in which women traditionally had no access.

Position of a woman in the rural environment has always been difficult and inextricably linked to her role in the family. This was a decisive factor determining its status and rights. When it comes to this and its economic dependency status in the second half of the 20th century, women are emancipated. These changes have influenced for position of women in family, relationship between the sexes, interpersonal relations. Family changes its scope, functions and form. A family in the middle of the 20th century in rural areas counted dozens of its members, but today this type of family has almost disappeared. Average family in Serbia today has 2.9 members. There is an increase in the number of people living alone, there is an increase in incomplete families, a decrease in births and a smaller number of family members.

Women in rural areas realize their economic role in a specific way. A direct social organizational framework in which a woman in the rural environment does this is the family, that is, the household. Households and families coincide and their production takes place, consumption and family life. All deviations from this are exceptions and are not typical for rural economy. Family mediates business as a primary community. Production relations are based on the family division of labor. It transmits each segment and every phase of concrete work and integrates it into the family unit. All work, regardless of the gender structure and generation, is integrated into the family (Stojanov, 2004, p. 238)

Reducing the agricultural and overall active agricultural population, first of all, young farmers and the lagging behind in education indicates a reduction in the size and qualification structure of the labor force in agriculture in rural areas. Educational level of the agricultural population is still low. In rural areas, 3-4 times more illiterate than in urban areas. The number of illiterate women is higher in relation to the male population.

The problem of starting a marriage and family by young rural inhabitants is already recognized as factors that endanger the natural reproduction of rural environments and population in them. These problems arise not only because of the migration of young people from rural to urban areas, where women's youth are especially dominant. This process is significant in the whole of family and economic relations and interdependence among residents living in rural areas. Family in the rural environment, especially the peasant family, is always at the same time economically productive. This direct permeation of the family and economic factor on the holding has a major influence on the mutual transformation of both the model of family and family relations as well as economic existential activities and their character (Milić, 1997, p. 119).

Improving situation of rural women can be summarized as follows: increasing income, labor productivity, social security, raising educational levels, equating the rights of

individual farmers with the rights of workers in the industry, and most importantly, the new social valuation of the work farmers (Dilić, 1979, p. 14) .
Mostly female jobs are considered vegetation and gardening, preservation and cultivation of livestock and livestock, as well as processing of dairy products. Thus, a rural woman appears in the role of a farmer, but also in the role of a housewife. The function of a woman is not exhausted in her function of biological reproduction, that is, in the sense of the partial carrier of a certain function, because it would be contrary to social development and the building of a versatile personality and its many diverse roles, the real extent and importance of changing the position of a rural woman must be studied in within the framework of the overall relations and processes that take place both in the modern village and in the society itself (Milić, 1979, p. 31).
Political emancipation of a woman tells us about her subordinate position in the family. In political meetings in the village only the heads of households are present, because the woman is almost completely thrown out of the public sphere and is reduced to a private sphere within the home and the family where her only place is. This is out of reach as a candidate for the appropriate electoral bodies, but even when it is sporadically elected to these functions it does not perform them with sufficient energies. In recent times, there have bee In rural areas, the mature and elderly are dominated. The largest share in total rural population has an age group of 30-49 years (25.22%), followed by a category of 56-64 years old (23.21%), and the worrying fact is that one fifth of the total rural population make people older from 65 years old. Continuous aging of the Serbian population has been present for a long period of time, and is one of the major problems in the country. The level of mortality is manifested through longer life expectancy of female population than male population. The decrease in proportion of male population has intensified in the interim period of 1991-2011. According to the Population Census 2011, the male population is 48.69% and the female population is 51.31% of the total population of the country. Inequality in the structure of the population towards the gender at the age of 15-64. Year may be related to gender differences, migratory tendencies of the population, especially the mobility of the population in relation to the village village and the differences in mortality.n minor changes in the issue, since the women from the village have recently been engaged.

Table 1. Structure of population by gender in rural area, in Serbia, 2011

Type of settlement	Year	Total	Gender				Average age		
			Male	%	Female	%	Total	Male	Female
Rural	2011	2914990	1460071	50,08	1454919	49,02	43,6	42,6	44,9

Source: Census of Population, Households and Housing 2011 in the Republic of Serbia, Population of Serbia at the beginning of the 21st century, RZS, Belgrade 2015, p.162

In Serbia, changes in the gender structure of the entire population were taking place in order to reduce the difference in the number of men and women. The 2011 Census results show significant regional differences in the gender structure of the population. In a large part of the municipalities, women are more numerous than men. Migration as a factor in the formation of the full structure of the entire population was of particular importance, especially for Serbia, especially in the period 1991-2011. years.
In other settlements according to the population census in 2011, the share of male population in relation to women is higher. The structure of the population by age and

gender shows that the population is continuously decreasing for up to 29 years, and the population of both sexes after 50 years of age is growing. The above features speak about the increasing participation of the elderly in other settlements.

Table 2. Age structure of female population in other settlements in Serbia, 2011

Type of settlement	Gender	Total population	The share of the age group in the total population					Average age
			0-14	15-39	40-64	65 and more	80 and more	
Rural	Female	1454919	13,5	28,2	35,3	22,9	5,5	44,9

Source: Census of Population, Households and Flats 2011, in the Republic of Serbia, Population, Age and Gender, Statistical Office of the Republic of Serbia, 2012, p.42 and the calculation of the author

Table 3. Age structure of female population in other settlements by regions in Serbia, 2011

Rural area		Belgrade region		Region ofVojvodine		Region Shumadije and West Serbia		Region of South and East Serbia	
Total population/female		Total	Female	Total	Female	Total	Female	Total	Female
Number of people		314596	157770	785078	394103	1068149	531288	747167	371758
The share of the age group in the total population%	0-14	15,0	14,6	14,3	13,8	14,1	13,8	12,8	12,4
	15-39	32,9	31,6	31,1	29,2	29,3	27,9	27,7	26,2
	40-64	36,3	36,4	37,3	36,5	36,0	35,0	35,4	34,0
	65 and more	15,8	17,4	17,3	20,5	20,6	23,3	24,1	27,4
	80 and more	3,1	3,8	3,4	4,5	4,7	5,7	5,6	6,9
Average age in years		41,4	42,4	42,3	43,8	43,7	45	45,7	47,1

Source: Same, p.42,64,132,372 and the author's account

The data in Table 3 indicate the differences between regions in the structure of the female population by age group in other settlements. It is clearly seen that the highest average age of women in the South and East of Serbia, where it is also the smallest share of the female population aged 14 years and the largest share of the population older than 65 years and more, with the emphasis on the fact that the largest share of women older than 80 years compared to other regions. Most women in rural areas are on the territory of Shumadija and Western Serbia, while the least in other areas of the Belgrade region.

The participation of women without education or primary education in the countryside is higher than in urban areas. In addition to poverty, early marriages and pregnancy, there are reasons for terminating schooling among girls. Among women who did not complete high

school, the main reason for this was family pressure to stay and work in the household or farm, while in some cases the reason was the traditionalist attitude families that they do not need a higher level of education. Also important reasons are lack of money, early marriage, and family care. Regarding highly educated women, they are more oriented towards acquiring knowledge and advancement in the educational plan. Educational capital of rural women is low, and opportunities for acquiring additional knowledge and skills are extremely scarce. Since the environment is not incentive, the motivation for additional education, so women are more inclined to adopt skills that can be learned through inertia through their immediate social networks.

Based on many research, women in rural areas have a desire to survive in their communities, but some conditions are met: the possibility of gaining work experience and qualifications, opportunities for local education and training, employment opportunities nearby, developed local transport and developed network of preschool institutions and institutions for the elderly.

Table 4. Employed and unemployed women by age group and type of settlement in Serbia, 2014

Female		2014	
		Urban	Rural
15-24 years	Employed	17699	22520
	Unemployed	22359	19108
25-64 years	Employed	650120	365116
	Unemployed	162206	77661
64+ years	Employed	5453	37868
	Unemployed	-	-

Source: Labor Force Survey in the Republic of Serbia in 2014, the Republic of Serbia, Republika Srpska Institute of Statistics, Bulletin 599, p 29

Young women are largely unwilling to stay in rural communities or engage in agriculture in family farms. Women in rural areas are rarely property owners, they are rarely in the position of holders of the holding, that is, they rarely have the role of deciding on agricultural production and the role of responsibility for the economic risks of farm business for these reasons, and there are fewer women working in agriculture. The largest number of employed and active women in urban areas is aged 35-44 and are engaged in business in industrial centers or service activities.

Today, at the level of elementary and secondary education, gender inequality is almost eliminated in the majority population and is maintained only in marginalized social groups, at least when it comes to the inclusion of women's children in schooling processes. In recent years, in higher education, women's population recorded an even greater share of men. However, despite these trends, educational opportunities are not the same for all categories of women. Women in rural areas, as well as women from certain minority groups, have been significantly deprived of their ability to attain high educational levels.

One of the most important aspects of gender inequality, which is particularly significant from the point of view of the analysis of the situation of women in the country, is property inequalities. Women are in the status of assistant household members and are usually not the owners of the houses they live in, they do not own land, nor do they have the means of

production. Only one in ten households live in a house owned by a female member. Only 16% of women own a country. Material inequalities are largely the consequence of patriarchal patterns of inheritance of property of parents in which female heirs are significantly excluded from inheritance. Women have limited access to financial resources of the household. The official data of the Republic Geodetic Authority do not provide precise insights into ownership of land. In the total number of land plots in all cadastral municipalities in Serbia, only 36% of persons were registered on these plots. Among the enrolled persons, only 29.9% is registered with a unique registration number of citizens, on the basis of which it is possible to distinguish persons by gender. Finally, within the number of persons enrolled in land plots with registered only 31% of women are registered.
Property inequality is clearly seen in the aspect of ownership of production assets. It represents an important basis on which the organization of agricultural production on the family farm is established (Babović, Vuković, 2008).
Among rural women there are more inactive and unemployed compared to men 55% of women versus 39% of men. There is a significant participation of employees in non-agricultural sectors. 20% of women and 34% of men, and the participation of women in agricultural jobs is high and it amounts to 56.6%. Employment is mostly done within households and a large number of women have the status of an assistant household member.
Woman who lives in the countryside in family has a better social position, she is holding an active participant in the production and carrier operations performed in the household. The most important role of women is maternity, parenting, nursing and raising children and the functions of a woman as a mother. A woman also plays a role in the education of children and in their education, performs housekeeping and the function of an agricultural producer. Woman is the primary holder of jobs in the rural household, and the household is a unit of consumption.

Conclusions

The possibilities of improving the position of women, as well as the improvement of rural communities in general, are conditioned both on the resources and on the way of life in the countryside, as they are frameworks within which concrete activities and development policies should be applied.
Women in the countryside, as part of the population on semi-productive clothing, remain mostly outside the influence of positive social and economic changes. Women must be guaranteed to use all benefits of social protection and social care, should be provided with the use of health care services and family planning services, women should be able to access agricultural loans and facilities and facilitate employment and self-employment. Situation of women in the countryside is unfavorable, and access to services for establishing economic participation is limited. Female population in the village is very different educational and age groups. Different forms of policy should improve and facilitate this type of migration. This type of migration can contribute to the development of the village and to affect gender equality.
Educational capital of rural women is low, and the opportunities for acquiring additional knowledge and skills are extremely scarce, under the pressure of jobs and obligations of rural women are poorly motivated to perform more actively in the labor market. Women in the village earn less income for the household than for men, but a large number of women contribute family budget. Women in villages rarely go to visit a doctor. Almost half go to doctors only when they are ill. Among the rural population there is not enough widespread awareness of need for prevention.

It is necessary to emphasize that the position of women in the country in terms of their freedom and the right to free choice of life priorities changes, because the entire society changes, especially the concept of patriarchal families. Certainly, big problem is irrelevant evaluation of the efforts and work of women in farms, because they often work until 15h, but no one records them and does not receive special acknowledgments for this. Women in rural areas are increasingly becoming self-employed in the form of tourism and hospitality, and they have significant successes and results in this field. They can be very important actors and drivers of the development of rural areas.

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THE IDEA OF SUSTAINABILITY BETWEEN SCIENCE AND PHILOSOPHY

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Abstract
The concepts of sustainability or sustainable development have various meanings and definitions, depending both on the author's vision and on the different set of values or criteria used to define them. Regardless of its specific meaning or definition, the concept of sustainability implies the idea of preservation or conservation, yet when talking about what is to be sustained, why should it be sustained or how should it be sustained the things become extremely unclear. Reviewing the relevant literature regarding the scientific definitions and meaning of sustainability, the current paper argues that ultimately the definition of sustainability and its concrete dimensions are a matter of philosophy and not of science. Defining sustainability entails the idea of values and social justice, yet these are pertaining to philosophy and not to science, which is only able to describe facts or the world as it is and not the world as it should be.

Key words: sustainability, ecocentric perspective of sustainability, anthropocentric perspective of sustainability, values, justice

Introduction

The contemporary debate concerning the problem of sustainable development has determined the emergence of various meanings of sustainability, each built on a slightly different set of values or each defined using a different set of criteria. So, we have at the one end of the spectrum the „ecocentric" concepts, demanding efforts to be directed towards granting nature sustainability for its own sake, and at the other end, the „anthropocentric" concepts, having at their core the idea that nature is valuable only in the light of the consequences it has on the wellbeing of humans. The choice between the two alternatives (and the many intermediary nuances) is ultimately a problem of philosophical nature, that cannot be solved scientifically.

Moreover, whatever concept of sustainability we will prefer, the dominant way of dealing with the principles of practical action will necessarily be concerned with the allocation of resources. Since the resources available in any society are by definition scarce, and should not be wasted, at the first sight we could say that the problem we face is an economic one: it concerns the allocation of scarce resources. But if we go further, it becomes clear that the matter goes beyond economics, because in order to find the rules of action, we must first decide which entity we chose to sustain, and which does not deserve our attention, and second, how much from the available resources are we willing to spend in order to gain sustainability.

In any society, in the last instance, the problem of resource allocation is a problem of decision, and decision implies a certain conception of justice: what exactly is the just allocation of resources between alternative present uses, or between present and future? But justice is a philosophical problem, not a scientific one, so ultimately the solution for the sustainability dilemmas cannot be found in science, but in philosophy.

1. Theoretical Framework

Since 1987, when the UN's Bruntland Commission released its document on sustainability, asserting the necessity of fulfilling the needs of the present generation without endangering the fulfilment of the needs of future generations and remarking the necessity of designing proper measures for managing the commons (UN, 1987), numerous definitions of sustainability and sustainable development have been advanced by experts in various fields of research. It is even estimated that there are about 300 definitions of the two terms in the field of environmental management and related disciplines, of which around 140 different denotations were released in a period of only two years after the 1987's Bruntland Report (Johnston et al, 2007). More importantly, in the absence of a commonly accepted, standard definition of sustainability, it is extremely hard if not impossible to measure sustainability or progress in this field (Moore et al, 2017).

The concepts of sustainability or sustainable development have various meanings and even more definitions, depending both on the author's vision and on the different set of values or criteria used to define them. Regardless of its specific meaning or definition, the concept of sustainability implies the idea of preservation or conservation, yet when talking about what is to be sustained, why should it be sustained or how should it be sustained the things become extremely unclear. The complexity and difficulty of defining sustainability has led many authors to consider that it is more accurate to talk about "philosophies" rather than "theories", or "models" of sustainability (Loukola & Kyllönen, 2005). From this point of view, a comprehensive literature review indicates that, widely speaking, there are three main general perspectives of envisaging the intricate concept of sustainability, which place either humans or nature at their core. At the one end of the spectrum, the anthropocentric perspective (or the so-called "Conception A") assumes that nature is valuable only in the light of the consequences it has on the wellbeing of humans. At the other end of the spectrum, the ecocentric perspectives (the so-called "Conception B" and "Conception C", with noticeable differences between them) assume that efforts are to be directed towards granting nature sustainability for its own sake (Dobson, 1998, pp. 33-61).

The following sections of the current paper will briefly present each of the three main philosophies of sustainability, in an attempt to identify their weaknesses and strengths related to their possibility of becoming the dominant view that would guide the decision-making process and set the foundations for public policies.

2. Different Philosophies of Sustainability

Although vague and prone to different interpretations, the concept of sustainability makes reference to the relation between nature and humans. Therefore, a first category of problems here is related to the value of nature. If we assume that nature has only an instrumental value, being important only as long as it provides the necessary resources for ensuring the welfare of humans, we place ourselves on an anthropocentric perspective and all our actions will be directed towards viewing nature only as a means to a higher end. On the other side, if we assume that nature has an intrinsic value and it should be protected for its own sake, then we place ourselves on an ecocentric perspective and all our actions will aim at viewing nature as an end in itself. A big question here is whether nature should be considered only as a means to a higher end or an end in itself, as the answer to this question will guide both the decision-makers in designing policies and the actions of laymen (Schuler et al, 2017).

The antropocentric perspective – *Conception A* – is exclusively focused on the instrumental value of nature, the natural capital being vital for the wellbeing of humans. According to this view, what is to be sustained or preserved is the nature as a resource provider, because the human wellbeing, both of current generations and future ones, is dependent on nature,

which provides the crucial resources for the production and reproduction of the human well-being, for fulfilling the human needs. What is to be done, according to this view, refers to the protection of nature or substitution of resources that are vital for humans, even this might imply that non-human beings are of lower value than human beings.

The first ecocentric perspective – *Conception B* – sees nature as being irreversible and having a high intrinsic value. As a result, what should be sustained refers to elements of nature which are vital, or non-renewable and non-replaceable, which once lost will be lost forever, regardless of their direct or indirect contribution to the human wellbeing. Based on this perspective, non-human beings are as valuable as human beings and, if endangered or threatened with extinction or destruction, all elements of nature should be protected or substituted.

The second ecocentric perspective – *Conception C* – assumes that all the elements of nature have an intrinsic value, therefore they should be equally valued and protected or sustained. What is to be sustained is nature more generally, because of its high value, be it about human or non-human beings, or about man-made or natural elements. According to this perspective, even if we could reconstruct a destroyed ecosystem, it would not be the same. Therefore, each natural element has its unique value and should be protected for its own sake, as every human living today have duties both to future generations, and to nature as such. As beautiful as this latter perspective might seem, it certainly leads to controversial situations. For instance, if any element of nature or being is as valuable as any other, we should be ready to accept that the hungry leopard chasing a little girl is as valuable as the child, that, if necessary, a landscape should be used for setting up habitats for wild animals rather than for building homes for people, or that epidemics and malnutrition should be praised for keeping the population number of poor countries under control (Scruton, 2012, p. 196). A similarly controversial situation results from various initiatives such as the *Voluntary Human Extinction Movement*, which states that all the problems of the worlds will be solved if humans stopped procreating, exposing themselves to a voluntary extinction. According to the supporters of the movement, if entire ecosystems are destroyed by humans and if the population increase inevitably leads to the over-exploitation of resources, the gradual and steady voluntary extinction of humans will clearly solve all these problems (Delingpole, 2013, pp. 223-224).

A second category of problems encountered by any expert when trying to define sustainability is related to the allocation of resources. Whatever concept of sustainability we will prefer, it implies allocation of resources for sustaining, conserving or protecting what is to be protected. Resources available in any society are, by definition, scarce, therefore at a first sight it seems that the problem we face is an economic one: it concerns the allocation of scarce resources. Going further with this inference and supposedly logical arguments, it results that, if the problem we are faced with is an economic one, then a simple cost-benefit analysis would be sufficient for deciding how many resources and what kind of resources should be directed towards ensuring sustainability and sustainable development. In order to find the rules of action, we must first decide which entity we chose to sustain, and second, how much from the available resources are we willing to spend in order to gain sustainability. Moreover, if resources are unquestionably scarce, and they should be directed towards ensuring sustainability, it results that some interests and/or some categories of individuals should be sacrificed for a higher goal. However, as intensively debated, a cost-benefit analysis is unconceivable when interests that cannot be traded are involved, such as fundamental freedoms or primary needs pertaining to the very survival of humans (Scruton, 2012, p. 188).

A third category of problems when trying to define sustainability is related to social justice and intergenerational justice, which are also philosophical concepts. A good argument for

the fundamental philosophical character of these issues and at the same time an excellent example of the difficulties that may appear when science is employed for answering moral questions concerning justice in the context of sustainability can be found in Kristin Shrader-Frechette's book on environmental justice (2002). Here, discussing the relation between distributive and participative justice from the perspective of the principle of *prima facie* political equality, she sheds some light on the way careless use of scientific ideas can lead to environmental injustice. Thus, argues Shrader-Frechette, the principle of *prima facie* political equality is connected both with distributive and participative justice. The idea of distributive justice in the context of sustainability issues and of environmental justice is of the utmost importance because it requires a morally equitable repartition of both benefits (wealth, resources, opportunities, leisure) and costs (air and water pollution, waste dumps, climate change) among all members of the society, meaning that all those concerned must have equal technological benefits and bear equal ecological burdens. Certainly, the natural distribution of costs and benefits may or may not be equitable, and certain inequalities among individuals are unavoidable, because they are based on innate abilities (some of them are stronger or have a higher I.Q., for instance), while others are avoidable, being the result of social arrangements (for instance, wealth or social status). The second category leads to the problem of equality, be it political (meaning equal treatment by the law) or economic (concerning wealth distribution). Four kinds of arguments, believes Shrader-Frechette, can be formulated for advancing equality: (a) all human beings have similar capacities for a happy life; (b) the principle of equality is rational; (c) the principle of equality can be the basis of other ethical values, such as justice, fairness, autonomy; (d) the very idea of law presupposes equality for those with the same situation (Shrader-Frechette, 2002, p. 26). According to (b) and (c), in order to build a fair society, it is absolutely necessary to found it on the principle of equality. Yet equality does not always mean that everyone should receive exactly the same treatment, quite the opposite: the treatment must be proportional to the justification and strength of one's claims to it, so treatment must not be similar, but in accordance to the merit of the individual. Nevertheless, what should be always equal is the respect and concern with which every individual is seen in the context of the distribution of goods, opportunities and of legal treatment.

Consequently, rather surprisingly, the principle of *prima facie* political equality does not necessarily mean that the imposition of unequal environmental burdens on different social groups is a violation of the equality. A violation of the principle would presuppose either that there are no relevant moral reasons for the unequal distribution, or that the groups' comparative interests were wrongly estimated from the first instance. Differently said, the principle of equality is considered *a priori* valid, and only the different or unequal treatment has to be justified: those who wants to impose discrimination must bring serious moral reasons for it, otherwise it would mean an abusive use of power.

But the principle of distributive justice, according to Shrader-Frechette, is not enough if we want to achieve environmental justice, because it tends to ignore the, sometimes unjust, institutional contexts that influence distribution. It is essential that people should acknowledge and correct the institutional causes of injustice, for example the case of those who, benefiting from the advantage of having more money, gain more access to other goods, such as environmental advantages. This can be achieved by introducing a principle of participative justice, and thus removing the inequality of opportunity in the decision making. According to the principle of *prima facie* political equality, the institutional and procedural norms should be reframed such as to guarantee that both experts and stakeholders have equal power of decision when it comes to voting decisions concerning environmental or sustainability problems. Continuing in the same vein, Shrader-Frechette argues against the usual reverence for the so-called experts and their opinions, and for what

she calls 'scientific proceduralism', i.e. a system of procedural, legal and methodological reforms destined to encourage the public rational debate and negotiation about sustainability and environmental issues (Shrader-Frechette, 2002, p. 34).

But what happens when expert opinion, and especially scientific expert opinion is used as the basis of decisions concerning the moral problems of environment and sustainability? According to Shrader-Frechette, in those cases the injustice and inequality are perpetuated because the appeal to scientific methods of decision encourages people to ignore or to excuse environmental injustice. For instance, the use of econometric data and models, such as cost-benefit analysis and the aggregation assumption, ignoring the evaluation of distributive inequalities, as a method to measure various distributions of environmental impact and effects on sustainability can lead to false or unethical conclusions and therefore to mistaken decisions (Shrader-Frechette, 2002, pp. 34-36). Economic models can indicate which alternative of action is more 'efficient', more 'economic', more 'safe' or most 'cost-effective', but do not answer the remaining questions: more efficient, economic, safe for whom?

How is this situation to be explained and dealt with? Why cannot we use science to solve decision problems concerning sustainability and environmental justice? Because these are not scientific problems, but philosophical ones: they do not concern *de facto*, but *de jure* situations, not what the situation is, but what it ought to be. This dichotomy originates in the work of Scottish modern philosopher David Hume who, as many of his commentators observe, drew a clear distinction between questions of science and matter of fact on the one hand, and questions of ethics and matter of morality on the other hand (Wright, 2009, pp. 253ff).

At the end of the first section of his 1740 book *A Treatise of Human Nature*, Hume asserts that: "In every system of morality, which I have hitherto met with, I have always remarked, that the author proceeds for some time in the ordinary way of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when of a sudden I am surprized to find, that instead of the usual copulations of propositions, is, and is not, I meet with no proposition that is not connected with an ought, or an ought not. This change is imperceptible; but is, however, of the last consequence. For as this ought, or ought not, expresses some new relation or affirmation, it is necessary that it should be observed and explained; and at the same time that a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it." (Hume, 2007, § 1.1.27) According to this paragraph, Hume believes that there is a fundamental difference between descriptive statements, concerning what is the case and value statements, concerning what ought to be that case. For Hume, as we can see, it 'seems altogether inconceivable' to logically derive second-type statements from the first-type ones. This radical position, argues J.P. Wright, can be found even more clearly expressed in other Humean works, such as the essay *The Sceptic* (Cf. Hume, 1987). Here, the Scottish philosopher argues for strong scientific realism, the doctrine that things have an existence independent of any subject, and truth is entirely independent from our beliefs, ideas and concepts. On the other hand, moral and aesthetical judgements are not entirely determined by the real qualities of the external objects judged, but are essentially influenced by our own sentiments and feelings of delight or uneasiness, approbation or blame. The same idea can be found also in the 1751 book *Enquiry Concerning the Principles of Morals*, where Hume states that we use our faculty of reason to discover objects "as they stand in nature, without addition or diminution" (Hume, 1998, Appendix I). In contrast with reason, i.e. the mental faculty that investigates objective reality, we also have a second, 'productive faculty', that produces moral and aesthetical ideas and values and uses them to judge and evaluate the objects in the real world. The world in itself does

not contain values: values are created by humans and projected onto the things and actions in the world.

The precise meaning of the Humean distinction between matters of fact and matters of value, between 'is' and 'ought' continues to be a question of intense debate between philosophers (Cf. Hudson, 1969), who never stopped trying to understand how what ought to be the case should be connected to what is the case. In the first instance, argues W.D. Hudson, we can agree that the logical form of sentences as 'This action is right' and 'This apple is red' are the same. Some would say even that both are descriptive statements: the first one describes an action, a moral fact, while the second describes an object, a physical fact. But the majority of philosophers believe that even the two sentences are syntactically identical, have the same grammatical and logical form, there is a difference between them in meaning. In the case of moral statement, in fact, we are not describing something, but prescribing, evaluating, taking a position, expressing an attitude, advising (Hudson, 1969, p. 12).

Therefore, how can we make a connection between the two kinds of statements? In practice, they seem to be used very often in conjunction. To use Hudson's example, individuals often move logically from statements of fact, as 'Religion is a debatable problem' to moral statements: 'Religion ought not be taught in school'. But the problem here is that the syllogism is not complete, as it still needs a major premise in order to be valid: 'Whatever is debatable ought not to be taught in school'. This major premise, however, necessary for the validity of our syllogism, is not a statement of fact, but a moral statement (it contains an 'ought'), and this is a general rule. If we want to derive a moral conclusion (an 'ought' statement), the major premise must be a moral statement also. For the philosophers who acknowledge this logical gap, this means either that 'ought' cannot be reduced to 'is', or that 'ought' cannot be derived from 'is'.

From our point of view, this idea means nothing less that the decisional problems concerning the right decisions to be made in order to attain ecological justice and sustainability are not to be left to science, because science deals with matters of fact. These are problems to be dealt with by moral and political philosophy, because they are *de jure* questions, concerning not what is, but what ought to be. And as we have seen, what ought to be remains an open question, one still to be debated.

Conclusions

Scientific theories of sustainability never indicate clearly what is to be preserved and what is not, and they do not help us choose between various concepts of sustainability, centred either on human beings (the anthropocentric perspective) or on nature as such (the ecocentric perspectives). Science deals with statements about facts, describes the state of affairs, the world as it is (*what is*), while philosophy deals with the world as it should be, deals with statements about values (*what ought to be*). Therefore, the choice between the anthropocentric and ecocentric perspectives (and the many intermediary nuances) is ultimately a problem of philosophical nature, that cannot be solved scientifically.

Scientific approaches of sustainability help us identify and explain the factors that are crucial for sustainability, yet ultimately sustainability is about decision-making regarding social goals and distributional options, which imply value judgements, ethical judgements, therefore, philosophical considerations for or against a certain philosophical orientation, a certain conception of social justice, a certain system of values, a particular conception of intergenerational justice.

Therefore, although valuable and absolutely essential, science cannot solve all the problems implied by sustainability, because sustainability is not a problem pertaining to science, more specifically to economics, but a problem of philosophy. Science and economic

reasoning are focused on facts and individual choices, yet sustainability regards choices and interests of communities, of current and future generations. Only philosophy can guide decision-makers and neophytes equally in their endeavour to ensure sustainability, on condition that philosophy is given its traditional role, that of providing a worthwhile guide of living a good life and searching for wisdom.

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FOOD SECURITY IN ROMANIA – BEYOND THE STATISTICAL DATA

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Abstract
This study highlights what statistical data hides in respect to food security in Romania. Even statistics show that food security is achieved; individuals are at various stages of food and nutrition insecurity. The objective of the study is to analyze food security beyond the statistical data that show an average trend, trying to answer the question whether all people have access to sufficient and nutritious food. The results show that 15 percent of people live with less than $3 a day and they have limited dietary choices, which hide forms of malnutrition.

Key words: food security, nutrition security, malnutrition

Introduction

Ensuring food security and improved nutrition are ones of the goals of sustainable development, put forward at the 2030 Agenda for Sustainable Development of the United Nations (UN, 2015). Food security is an issue largely discussed in research papers, reports and official documents. FAO assesses the global progress towards reducing hunger worldwide and annually reports on the State of Food Insecurity in the World (SOFI). The terms food security, food security and nutrition, and food and nutrition security are used in ways specifically intended to make a distinction between food security and nutrition, or nutrition security.

Since 1996, when FAO defined food security as a situation "when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." (FAO 1996), the definition of food security developed itself. The term nutrition has been added to food and, currently, FAO defines food and nutrition security as a situation when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (FAO 2011, p.10). The addition of the term nutrition has engendered new approaches where individuals are the key aspect of food related problems.

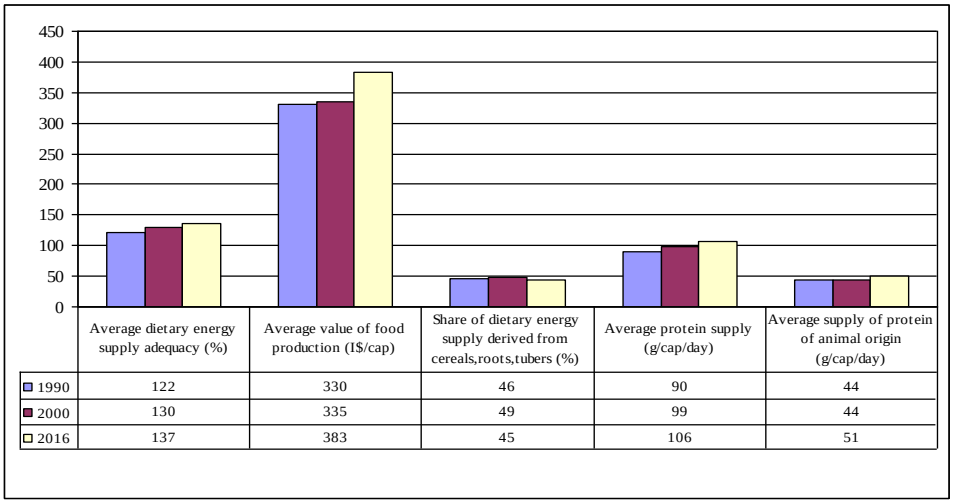
In Romania, the macroeconomic indicators show that food security is ensured (Istudor et al. 2014). Still, in rural areas, where people are poor, they have imbalanced diets, as forms of malnutrition. This raises the question whether nutrition security has really been achieved in Romania. Thus, the objective of this research is to analyze the food and nutrition security of the poor.

The hypothesis tested in this piece of research is: (H1) The problems of food security in Romania do not result from inadequate food supply, but from households' lack of purchasing power. The hypothesis is in line with other findings. Alexandri (et al. 2015) pointed out that, although Romania has significant agricultural resources, it is one of the most vulnerable European countries from the point of view of its population's food security. Romania's problems related to food insecurity are given by the differences in the standards of living between the urban and rural areas (Alexandri, 2013). Ion and Popescu (2013) argued that food security is ensured in Romania, but only on average, without considering the extremes. This research analyzes the food security of the poor. In the first part, the indicators of food security and situation of the poor are presented. In the second

part of the paper, the food security indicators are analyzed and discussed in line with other findings. Finally, conclusions are drawn in relation to testing the research hypothesis.

1. Materials and methods

The issue of food security appraisal is broadly discussed in research papers and reports. FAO operates with a specific system of indicators to estimate the state of food security in one country (FAO, 2017). The most relevant indicators for this research, regarding Romania, are shown in Figures 1, 2 and 3. Three decades have been considered for analysis – 1990, 2000 and 2016 or 2013 or 2011, as the last statistical years with available data.



	Average dietary energy supply adequacy (%)	Average value of food production (I$/cap)	Share of dietary energy supply derived from cereals,roots,tubers (%)	Average protein supply (g/cap/day)	Average supply of protein of animal origin (g/cap/day)
1990	122	330	46	90	44
2000	130	335	49	99	44
2016	137	383	45	106	51

Figure 1. Food availability in Romania

Source: Food security indicators, FAO, 2017

	GDP per capita (1000 I$/capita in purchasing power equivalent)	Share of food expenditure of the poor (%)	Cereal import dependency ratio (%)
1990	11.181		8.6
2000	10.249	72	0.5
2016	19.098		-22.6

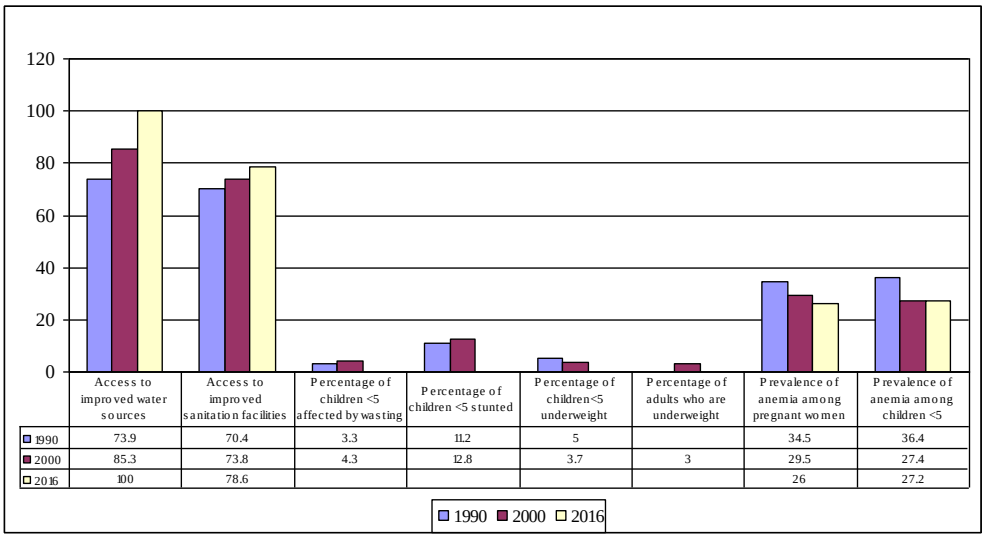
Figure 2. Food access and stability in Romania

Source: Food security indicators, FAO, 2017

Food availability in Romania is presented in Figure 1. It comprise, as main indicators, the average dietary energy supply adequacy, the average value of food production, the share of

dietary energy supply derived from cereals, roots and tubers, and the average protein supply.

The access group comprises indicators that show the economic and physical access to food and markets (Figure 2). The main indicators are the gross domestic product per capita and the share of food expenditure of the poor. Among the stability group of indicators, the cereal import dependency ratio is presented in Figure 2. It shows how much of the available domestic food supply of cereals has been imported and how much comes from the country's own production. Negative values indicate that the country is a net exporter of cereals.



	Access to improved water sources	Access to improved sanitation facilities	Percentage of children <5 affected by wasting	Percentage of children <5 stunted	Percentage of children<5 underweight	Percentage of adults who are underweight	Prevalence of anemia among pregnant women	Prevalence of anemia among children <5
1990	73.9	70.4	3.3	11.2	5		34.5	36.4
2000	85.3	73.8	4.3	12.8	3.7	3	29.5	27.4
2016	100	78.6					26	27.2

Figure 3. Food utilization in Romania (%)

Source: Food security indicators, FAO, 2017

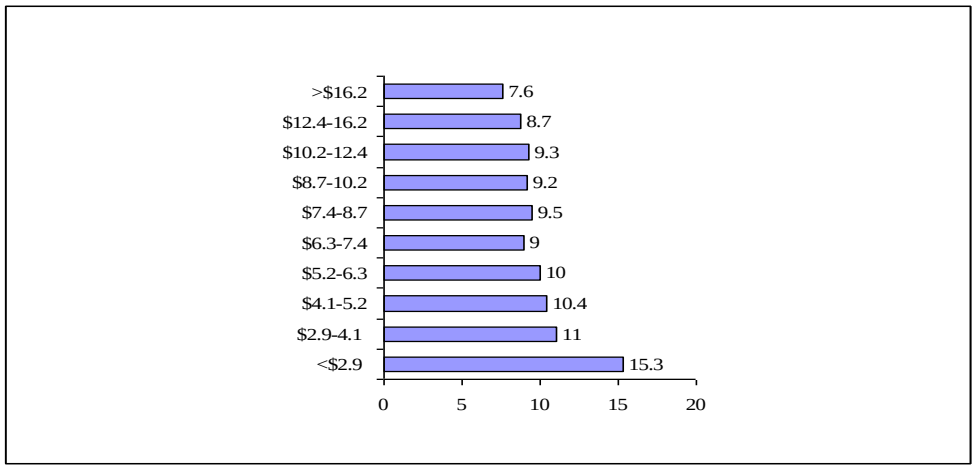


Figure 4. The shares of persons by groups of income, in Romania, 2014 (%)

Source: author calculations based on the Romanian Statistical Yearbook 2015, p.172

The main indicators of the utilization group are presented in Figure 3: the access to improved water sources, the access to improved sanitation facilities, the percentage of

children under 5 years affected by wasting, the percentage of children under 5 years stunted, the percentage of children under 5 years underweight, the percentage of adults who are underweight, the prevalence of anemia among pregnant women, the prevalence of anemia among children under 5 years.
The answer to the research question whether all people in Romania have physical and economic access to food should be searched in the number of people who live in poverty. Figure 4 illustrates the number of persons in groups of income, in Romania. The poorest people, who live on less than $2.9 a day, account for 15.3 percent of the population, while the group of people who live on more than $16.2 a day account for 7.6 percent. Almost fifty percent of the Romanian people live on less than $6.3 a day.

2. Results and discussions

The average dietary energy supply adequacy is higher than 100 percent, which demonstrates that the dietary energy supply is higher than the dietary energy requirements. In 1990, the supply exceeded the requirements by 22 percent, in 2000 by 30 percent, and in 2016 by 37 percent.
The average value of food production has an upward trend, its values were I$330/person in 1990, I$335/person in 2000 and I$383/person in 2013. The latter is higher in Romania compared to the average value of food production in the world: I$311/person and of I$272/person in developing countries, but lower than its value of I$491/person in developed countries. In other European countries, the value of food production is I$1084/person in Denmark, I$938/person in Ireland, I$795/person in the Netherlands.
The share of dietary energy supply derived from cereals, roots and tubers was 45 percent in 2011, down from 49 percent in 2000. It still has a high value that reveals the importance of carbohydrates in people's diet and low budget pattern of consumption. The value of this indicator is close to the world average of 52 percent and of developing countries of 56 percent. In developed countries, the share of dietary energy supply derived from cereals, roots and tubers is only 32 percent. We may argue that the pattern of consumption in Romania is not varied, since almost half of dietary energy supply comes from cereals, roots and tubers. This claim is sustained by the results of other studies (Alexandri and Luca, 2016), that revealed a deficient consumption in qualitative terms in Romania, due to the high share of calories from cereals and potatoes.
The average protein supply is 106 g/person/day, higher than FAO recommendations. About 10-15 percent of daily calories should come from proteins (FAO, WHO, 2003). It could be expressed as an average daily recommended intake level of 50 grams per person (Keats and Wiggins, 2014). Out of 106 g/person/day, 51 grams are protein of animal origin, higher than the average world consumption of 31 g/person/day and the average consumption of 25 g/person/day in developing countries. The average protein supply reveals the structure of the diet; about 50 percent of people's consumption of protein comes from meat, animal fats and products, milk and milk products, eggs, fish, seafood and aquatic products. The rest of 50 percent come from vegetal origin products, such as mushrooms, beans, peas, nuts, quinoa and other cereals.
The gross domestic product per capita in Romania is I$19,098/person in 2016, up from I$11,181/person in 1990. This indicator helps for evaluating the economic access of people to food. Compared to the world average of I$14,463/person, the level of GDP per person, in Romania, is higher. Compared to the developed countries' average of I$37,094/person, the level of GDP per person, in Romania, is much lower.
The share of food expenditure of the poor shows the proportion of food consumption over total consumption for the lowest income quintile of the population. Its level, in Romania, was 72 percent in 2003, close to its level in developing countries.

Among the stability group of indicators, the cereal import dependency ratio is presented in Figure 2. In Romania, its value is negative, except the periods 1990 and 2000, at the start of the transition to the market economy, when economical, social and political environment was unstable and countries consumed the national strategic reserve of cereals.
Some indicators of the utilization group are presented in Figure 3. In 2003, in Romania, 100 percent of population has access to improved water sources, and 78.6 percent has access to improved sanitation facilities. Both indicators are on upward trends, and they are higher than the world averages. Still, 21.6 percent of the population remains without access to improved sanitation facilities.
In 2000, 4.3 percent of children under 5 years old were affected by wasting, and 12.8 percent of children under 5 years old were stunted. Although these levels are lower than the world average, they were growing in the period under analysis, which shows the precarious situation, in particular in rural areas, where low income families do not have access to varied and nutritious food. In the same year, 3.7 percent of children under 5 years old and 3 percent of adults were underweight.
The levels of anaemia among children and pregnant women have downward trends, but still they register high levels of 27.2 percent, respectively 26 percent. The prevalence of anaemia is an important health indicator. Anaemia is a condition in which the number of red blood cells (and consequently their oxygen-carrying capacity) is insufficient to meet the body's physiologic needs (FAO, 2017). Anaemia has various causes. Iron deficiency is thought to be the most common cause of anaemia, but other nutritional deficiencies (including vitamin B12 and vitamin A), acute and chronic inflammation, parasitic infections, and inherited or acquired disorders that affect haemoglobin synthesis, red blood cell production or red blood cell survival, can all cause anaemia (FAO, 2017).
The data for prevalence of under nourishment, prevalence of vitamin A deficiency in the population, and prevalence of school-age children (6-12 years) with insufficient iodine intake have not been reported for Romania in Food Security indicators data base.
Previous research (Ion, 2017) established that the average consumption corresponds to a budget of $3.28 a day, considering the average prices of food in Romania. Going back to Figure 4, 26.3 percent of people with incomes below $4 a day are excluded from this pattern of consumption, because they spend about 72 percent on food (Figure 2), meaning $1.08 for the first quintile of income and $2.52 for the second one.

Conclusions

The study presents an analysis of food security in Romania. Considering the food security indicators, we draw the conclusion that food security is widely ensured in Romania, although there still are a number of poor people who live under the threat of food insecurity. This category of people, accounting for 15.3 percent of population, suffer of malnutrition, reported as lacking in micro and macronutrients, mainly caused by a lack of purchasing power. This conclusion validates the hypothesis: (H1) The problems of food security in Romania do not result from inadequate food supply, but from households' lack of purchasing power. Furthermore, the daily diet is not diversified, since almost half of it is based on cereals, roots and tubers.

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THE EUROPEAN LEGISLATIVE CONSTRUCTION ON AGRICULTURAL COOPERATIVES AND ITS NATIONAL TRANSPOSING

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Abstract
The cooperative sector is regarded as relatively new despite its 200 years old history. It has been developing on its own no matter the political regime or the philosophical trends thorough the people who understood it as a help in their economic and social development. In recent years, the EU has been promoting it as a mean of achieving rural development. In order to do that, some regulations and strategies regarding the agricultural cooperative sector have been issued for both supporting and controlling it. These regulations are constantly analyzed and modified. The member states are supposed to transpose these regulations in order to suit their best interests and national specificities, and as it will be shown in this paper, Romania has done a poor job in this matter. Even so, the time is not lost, some new opportunities and approaches may be taken into consideration for further readjustments of the Romanian cooperative sector.

Key words: legislative construction; agricultural sector; national transposing; rural development.

Introduction

The choice of studying the European legislation was not random, but based on the following reasoning: Romania is an EU member with full rights and responsibilities towards EU citizens and the national legislation is going through a constant harmonisation process in order to follow the EU recommendations.

Studying the construction of EU regulatory documents, as the authorities' way of communicating with citizens, may be considered as a discourse analysis. This choice allows regarding the official discourse, through the analysed documents, as a variable dependent of the believes and concepts of document writers, and so the approaches regarding agricultural cooperatives can be traced. Also, it may be regarded as an independent variable, through the influence it has on national interpretations in this field.

The research question of the present study is if the EU legislation favors building agricultural cooperatives in the member states and if the way this legislation has been transposed at national level, in Romania is satisfactory.

The premises of the study states that for both EU and Romania, the interest for regulating the cooperative sector in agriculture is relatively new. The projections regarding the rural development opportunities this sector may offer are framed by the end of the twentieth century and the current period. Also, one of the significant factors that contribute to the poor development of the agricultural cooperatives, at national level, is the defective regulation of the sector, with vague expressions and not regarding the best interest of the local producers nor the rural economic development through cooperatives.

The methodological frame is based on a mixed method approach regarding discourse analysis. In this regard, the AntConc computer software has been used for finding the word appearance frequency, also as manual filtering of key words in the research corpus formed of four document categories: EU Parliament Regulations, EU Commision Communications, EU development Strategies, transposed in national regulations through National Rural

Development Programs, and their explanatory documents, and research articles that regard the regulations impact in this matter. The four categories of documents were chosen for an objective and holistic approach on the way agricultural cooperatives is regarded by them.
The official Regulations, Communications and Decisions of the EU have been downloaded from the dedicated website http://eur-lex.europa.eu, they were selected to contain "agriculture" in the title and to address cooperation. Four Communications were selected, from the 2012-2016 time period and six Regulations and Decisions in the 1998-2016 time period. The selection of the five explanatory guides and reports followed the same key words in the publications of accessory or partner institutions to the EU. The Strategies were downloaded also from http://eur-lex.europa.eu, as they are also Commision Communications. The seven scientific articles were selected from the author's personal data base, based on their relevant to the topic content.

1. Literature review

The fact that in 1869 the cooperatives were associations between the poorest people and they followed the principles of solidarity and mutual help by heart, as Ferreira da Costa (1980) observes, and today there is a minimum of contribution for entering a cooperative, of 5 000 000 lei (Law 566/2004) or approximately 1.1 million euro, is proof that evolution has pushed these structures from the grasp of the poor to the one of people with agricultural and economic potential, able to expand it through cooperatives. Shaffer (1999) presents in his cooperative movement dictionary that several international institutions such as FAO or the UN have included the agricultural cooperatives in their resolutions. Yet, the EU has recently started to channel much attention towards them.
In the current period, van der Sangen (2014) observes both a complexity of European regulatory documents, born out of the need of recovering the time when these structures haven't got any attention, each country had its own regulation and understanding for them, and not from the wish to offer support for building new structures. With the understanding of the cooperatives potential in enhancing rural development came a rush for promoting and controlling them in that direction with such a fast pace that countries like Romania, which have been through a political regime that used them for controlling and suppressing the rural population as Popescu (2014) observes, cannot follow.
A state like Romania in which the authorities try their best to keep up with the western economies, some aspects may be overlooked, and agriculture was, unfortunately, one of them. Bijman (2012) and van der Sangen (2014) observe that in this country the agricultural cooperatives sector is mostly inexistent, the regulatory harmonisation was made fast, in order to respond positively to the EU request for a candidate country, but with no respect to the local economy, development potential or support. Considering that in 2004 the agricultural cooperatives Law came 14 years after the destruction of the communist cooperatives and with little explanatory actions regarding the capitalist cooperatives that were regulated by it, there is no great surprise in the stage of development this sector has in the current period.

2. European legislation

Between the Commision and the Parliament documents there are two similar aspects. First, the used vocabulary, the words are clear, with general valid implications. Second, although they are created to respond to a long term vision of the EU, these documents suggest immediate changes that the member countries must make.
There are also differences that are visible to the reader without using specialised software, the most important being the documents structure. While the Parliament uses documents with a numbered structure that resembles more to a national law and gives the reader the feeling of compulsoriness. These is easily seen in Regulation (EU) No 233/2014,

Regulation (EU) No 1305/2013, Decision No 2179/98/EC, Regulation (EU) No 1293/2013, Decision No 1386/2013/EU or Regulation (EU) No 1291/2013.
The Commision Communications, like COM (2012) 79 final, COM (2014) 130 final, COM (2016) 739 final and COM(2012) 72 final have the structure of an expanded scientific article and leave the reader with a motivational speech feeling rather than compulsoriness, although the practical importance of the two is not different.
The tense used in Parliament documents is present simple, suggesting actions that need to be done soon after the documents publication.
The involved actors and the actions that need to be done are clearly stated and so are the connections to other regulatory documents.
The objectives, the programs and actions for reaching an objective and the financial allocation is clearly mentioned in a Parliament Regulation.
The structure of a Commision Communication, is formed of a succession of statistical and historical data, pilot programs in the area of the issued document. This form of presenting a legislative change has the role of guiding the reader to accept the objectives without feeling restricted, but as a natural part of the future.
The constant variation of verbal tenses, even in the context of presenting clear objectives and measurement indicators for achieving the objectives in certain time frames, has the role of introducing the reader in the story and lifting the compulsoriness halo otherwise felt.
The Communications are addressed to the people while Regulations are addressed to the national authorities, the documents complement each other in order to address each actor in the agricultural sector in a characteristic way.
The Communications go through changes of approach, from the possibilities the cooperatives can offer to define them as knowledge transfer vectors. In recent documents their possibility of understanding and filtering the information and further passing it on to the members and the whole community in which a cooperative acts.
The Regulations and Decisions of the Parliament refer to the authorities' role in implementing the actions and achieving the objectives stated by the Commision. Since all resort authorities should be aware of their role, there is no need for telling stories.
Another analysed corpus is formed of Strategies and their explanatory documents, guides or reports. What can be noticed for this category is that the choice of presented facts and words used leave the reader with the feeling of a very dramatic text, with rather religious shades. Even so, these explanatory documents have an important value for researchers since they contain data otherwise difficult to access. The chosen documents for the analysis are COM (2000) 97 – Agenda 2000 and COM (2010) 2020 – Strategy 2020, but also guides and reports designed by Birchall, (2003): Rediscovering the cooperative advantage-Poverty reduction through self-help, Brief: Cooperatives and the Sustainable Development Goals, Halvorsen and Askvik: A new global partnership: Eradicating poverty and transform economies through sustainable development, Poppe, and Bijman (2012): Support for Farmers' Cooperatives, Roelants, Dovgan, Eum, and Terrasi (2012): The resilience of the cooperative model. How Worker Cooperatives, Social Cooperatives and other Worker-owned Enterprises Respond to the Crisis and it's Consequences
The general idea that can be extracted from the analysed set of documents is that the development of agricultural cooperatives is seen both as a necessity and an opportunity and the EU allots time and financial resources for developing this sector.
The member states may adapt the objectives considering their own stage of development, needs and specificities. This is a freedom exploited to its maximum by some countries and less by others.
These explanatory documents are the produce of several accessory institutions or committees that help the official institutions with additions and explanations in order for the local actors to understand the objectives of the official document. The forms of these

documents are guides, reports, evaluations or notes, all with the clear purpose of enhancing the importance of the strategy they speak about.
For a distinct note, a series of seven articles by Gutierez, Atela and Dueñas (2005), Noakes (1967), Borzaga, Depedri, Bodini (2010), De los Ríos, Rivera and García (2016), Goel (2013), Simmons and Birchall (2008) and van Oorschot, de Hoog, van der Steen and van Twist (2013) approaching the legislation of the cooperatives topic have been analysed. The obvious difference between research articles and regulation documents, no matter their issuer, is that the first category has well defined objectives, delimitated, that usually gravitate in the area of evaluating the impact of a document in a specific area, while the second category leaves room for national interpretations.
The general conclusion of these articles is that the evolution of the agricultural cooperatives concept and the expectations set for these structures leaves behind their birth as a form of expression of the poor and places them as positive influencers for developing the rural area. The form of survival through joint work of the poor has turned into potential growth of the already wealthy.
Their role as a knowledge transfer vector is not denied nor is their capacity of raising the living standards in the areas they function. Yet, their initial purpose, which helped with their worldwide popularity, has been somehow lost in context.
These articles also show that the strategies cannot have uniform effects and these has contributed to the regional disparities and to a new regional objective setting, approached by the EU in recent documents.

3. Romanian transposing or harmonization of the EU legislation

The legislation harmonization process regarding agricultural cooperatives in Romania is considered completed with the publication of Law 566/2004, two years before becoming a full EU member.
In this country, the national law did not need to regulate the agricultural cooperatives, the rural population feared them after the communist experience, and the EU was recently put together. In this case, what were the chances that Romania would build a favorable frame for the cooperative sector?
The answer is given by foreign researchers like van der Sangen (2014) and Bijman (2012), who evaluate Romania as one of the EU members in which the agricultural cooperatives sector in almost inexistent.
The harmonization was made on an inexistent base, without the authorities knowing what should or shouldn't be in the legislation, and so being unable to fight for the national interest.
The chronological order of the published documents that regulate the cooperative sector in Romania are: agricultural cooperatives Law 566/2004, the Law regarding organising and functioning of cooperation 1/2005 and, eleven years later, the Law for modifying and completion of the agricultural cooperatives Law 164/2016.
If Law 566/2004 specifies the purpose of an autonomous association of persons to be the promotion of members' interests, than Law 1/2005 states the same purpose to be the joint exploitation of commonly owned agricultural areas and joint field carrying out of agricultural work in order to obtain agricultural production.
The two documents are profoundly different. The second excludes specific activities of agricultural cooperatives mentioned in the first, like marketing and selling activities, financing or insurance activities.
The two are currently functioning together, with no priority and without one of them ruling out the other. This leads to misunderstandings, interpretations and, overall a feeling for the interested actors that it is too much of a mess to even try starting this kind of structure.

The 2016 Law sticks to its name, it only brings modifications and additions, not at all clarifications or settlings between the first two documents. According to it, a first degree cooperative may be started also by economic entities that did not exist eleven years ago.
A positive aspect is ruling out the activities restrictions for the agricultural cooperatives, so is introducing a probation period for new candidates. These leads to a better selection of members, only those who can prove their economic potential being accepted.
The purpose of agricultural cooperatives is modified to be more similar to the 2005 Law, as in joint owning and exploiting the agricultural areas and other resources.
The aspects regarding obtaining structural funds came almost nine years after the funding opportunities.
The harmonization of legislation, in a Romanian concept, has not prioritized the national interest nor the economic interest, as a general aspect, nor the local producers' interest. No, the main interest was diminishing the adherence time and accessing EU funds…it didn't matter that the grounds for this were not properly set. The local producers were put in the same pool of free market as the western producers without a lifeline and with many expectation which they could not meet.
The ambiguity that still defines the Romanian cooperative sector is one more factor that stands against producers interested of starting such a structure and be competitive in the EU market.

Conclusions

The present paper represents a summary of the analysis made on Laws, Regulations, Decisions, Communications, guides, reports and scientific articles regarding agricultural cooperation in the EU countries. The analysis confirms the premises of the study, the Romanian harmonization in this sector was made in a hurry, on wrong bases. Considering that after 1990, Romania had no cooperative sector, the authorities were unable to build a proper legislation for it, not knowing what to regulate on one side, and on the other not taking the time to learn from other countries. In this situation, the harmonisation meant mostly a translation of the EU regulation, which produced two separate documents, ambiguous and difficult to use.
More, the difference between the number and frequency of new documents regarding this field of interest in the EU and Romania shows a lack of attention for practically favoring a cooperative sector in agriculture for the Romanians.
The absence of a cooperative sector when issuing Law 566/2004 was not seen as an opportunity for building a prosper sector, the moment was lost, and today local producers are facing struggles that the polish ones, for example, do not. Poland showed an opposite attitude, their authorities negotiated every drop of advantage for their own people and now they have cooperatives in the top 100 turnover of CopaCogecas' last report (2014), the only one of the former communist block that managed this performance.
The solution for solving this problem might be a new law, build by experts in the field, considering the local actors needs and requests, regional specificities and possibilities of the country. A law that should rule out the former ones in order to start fresh, from the current stage.

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STIMULATING HUMAN RESOURCES IN THE ROMANIAN AGRICULTURAL AND FORESTRY RESEARCH

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Abstract
Romania's agricultural and forestry research are facing to serious failures due to its current funding system and the lack of attractiveness of a research career.
The paper presents some issues referring to the agricultural and forestry research with accent on the human resources and it proposes some measures in view to reinvigorate and increase the efficiency by: involving researchers in dissemination of their most important results by building "bridges" with consumers of information (small and medium agricultural producers); starting of a coherent process of lieders formation from the ranks of young researchers; including in the management plans of the research entities from agriculture and forestry the provisions of the National Strategy for Research, Development and Innovation 2014-2020 dedicated to the research labor market
Key words: agriculture; human resource; research expenditure; leadership; *partnership*.

Introduction

The "Global Competitiveness Report 2017-2018 (The Global Competitiveness Report 2017-2018", 2017, which was published by the World Economic Forum in the context of "Initiatives for the Future of Economic Progress System Initiative) developed by the World Economic Forum highlights the recovery of the global economy. At the same time, it recognizes the role of technology in shaping the global economic, social and political order.
Regarding Romania, the mentioned Report specify the negative contribution of both state activity (bureaucracy, poor infrastructure, difficult access to finance, incoherent taxation, etc.) and of the business environment, which explains the low levels of the main human resources indicators (such as capacity to keep talent, ability to attract talent, staff training, spending on R & D, innovation capacity of companies, capacity of new enterprises to assimilate technologies, the degree of production processes sophistication) that characterize the country's economic profile.
Several of these shortcomings are also found in the Romanian agricultural and forestry research, which for more than 25 years has been experiencing serious malfunctions generated by the current institutional and financing system of the field, as well as the lack of attractiveness of a research career.
In this paper we propose an analysis of the state of agricultural and forestry research in Romania, as well as the identification of some of the possible ways of activating the existing human resources in the field.

Literature review

The Romanian agricultural and forestry research is carried out in the following institutional structures: the institutes and research and development stations of the Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu-Sisesti" (AAFS); in five Universities of Agronomic Sciences and Veterinary Medicine from Bucharest, Iasi, Cluj, Craiova and Timisoara; in private companies.

Both national research units and five Universities of Agronomic Sciences and Veterinary Medicine administer public and private state patrimony in order to ensure their activities as a basis for scientific and technological competence, expertise, and human resource development and documentation scientific and technical research. Also, their research goals are included in the National Strategy for Research, Development and Innovation (RDI).

1. The state of human resources in agricultural and forestry research

1.1. Total number of scientific researchers

The processes of Romanian economy adapting to the market economy, as well as to the European space of scientific research, have not been realized without losses, some of which are irretrievable. In 2015, were 27,253 researchers in Romania, with 11.2% fewer than in 2010. In research areas, in 2015, the research staff structure was as follows: 44.2% of the total number of scientific researchers were in the field of engineering sciences and technology; 19.3% in natural and exact sciences; 12.8% in social sciences; 9.7% in medical science; 8.8% in agricultural sciences; 5.1% in humanities. Regarding the evolution structure of the research staff, in 2015 as compared to 2010, the share of researchers increased in the following fields: engineering and technological sciences (by 6.1%); natural and exact sciences (by 2.5%); agricultural sciences (by 1.8%, respectively from 7.0% in 2010 to 8.8% in 2015); also, there were diminution in the share of total researchers, in 2015 as compared to 2010, in social sciences (with -4.7%), humanities (with -4.0%) and in medical sciences (with -1,6%).

Table 1. Researchers from the research-development activity by scientific area/fields. Number of persons (at the end of the year)

	2010	2011	2012	2013	2014	2015	Dynamics 2015/10, %
Total	**30,707**	**25,489**	**27,838**	**27,600**	**27,535**	**27,253**	**88.8**
Researchers by scientific area/ fields							
Natural and exact sciences	5,163	5,448	4,789	4,986	4032	5259	101.9
Engineering and technological sciences	11,718	10,122	13,063	13,157	12,904	12,053	102.9
Medical Sciences	3,491	3,010	2,572	2,621	2,736	2,656	76.1
Agricultural sciences	2,154	1,293	1,252	2,398	2,525	2,396	111.2
Social sciences	5,376	4,112	4,428	2,484	4,204	3,500	65.1
Humanites	2,805	1,504	1,734	1,954	1,134	1,389	49.5

	2010	2011	2012	2013	2014	2015	Dynamics 2015/10, %
Researchers at 10,000 civilian employees, persons	36.7	30.5	32.5	32.4	32.7	32.7	89.1
Researchers in agricultural science to 10,000 people employed in agriculture, persons	**6.2**	**4.0**	**4.2**	**8.9**	**10.3**	**11.0**	**176.9**
The ratio between the researchers in agricultural sciences to 10,000 persons employed in agriculture and the total researchers to 10,000 civilian employed	**0.18**	**0.13**	**0.13**	**0.28**	**0.32**	**0.34**	**195.3**

Source: Processed from "Romanian Statistical Yearbook", NIS, Bucharest, 2017

For the agricultural and forestry sector, the number of scientific researchers involved in agriculture and forestry to 10,000 persons occupied in the branch, in 2015, was 11.0 researchers. It should be noted that in 2010 the level of this indicator was of 6.2 researchers in agriculture to 10,000 persons employed within the branch. So was an increase of reference indicator from agriculture faced to total economy by 1.8 times[3]. The same phenomenon is found in the ratio of the number of scientific researchers to 10,000 persons employed in the economy (increase of 1,95 times).

Table 2. The number of PhD students trained by the five reference universities

	2013	2016	Dymanics, %
University of Agronomic Sciences and Veterinary Medicine (UASVM) from Bucharest	115	201	174.8
UASVM Cluj	109	106	97.2
UASVM Iasi	64	56	87.5
UASVM Timisoara	16	43*)	268.8
Faculy of Agronomy from Craiova University	26	26e)	100
Total	330	342	103.6

*) 2017; e) – Estimation

Source: Data processing according to the websites of refference universities.

Another indicator which influenced the future evolution of human resources in agricultural and forestry research is the number of doctoral students trained by the five mentioned universities. In 2016 the number of PhD students was 342 persons, up by 3.6% over 2013 (330 PhDs). In 2016, the highest number of PhD students was registered by University of Agronomic Sciences and Veterinary Medicine (UASVM) from Bucharest (201 PhD students, which represented 58.8% of the total) and by UASVM Cluj (106 PhD students, which represented 31.0%).

1.2. Current expenditures in R & D activity, by performance sectors and research types/ categories

The total current expenditures on R & D activity, by performance sectors and types of research, amounted to ROL 2,762.1 million in 2015 (euro 610.5 million)(Exchange rate at December 31, 2015was 4.5245 lei (RON) per 1 euro, http://cursbnr.clubafaceri.ro/arhiva/2015-all-all/), up by 35.1% as compared to 2010. As a whole, the structure of current expenditures on R & D activity from Romania has oriented to applyed research (49.4% of total expenditures, in 2015) to the detriment of the fundamental one (31.5%).

The structure of R & D current expenditures by type of research and performance sectors highlights the following issues:

- in the business sector the highest weights are held by applied research (63.6% of the total sector) and by experimental development (25.8%);
- in the public sector the largest shares of current expenditures are held by fundamental research (48.1%) and by applied research (39.0%);
- in the tertiary sector the highest weights are held by fundamental research (60.0%) followed by applied research (27.4%) and experimental one (12.6%);
- in the main non-profit private sector the highest weights are held by fundamental research (51.6%), followed by applied research (37.6%) and experimental research (10.8%).

By sectors of activity, in 2015, *the structure of the current expenditure for the R & D activity* are:

- 48.4% of the total are expenditures are in the *business sector*;
- 38.6% are in the *government sector*;
- 12.7% are in the *higher education sector*;
- 0.3% are in the *non-profit private sector*.

Comparing the evolution of the structure of the current expenditure for the R & D activity, in 2015 compared to 2010, there is an increase of the expenditures in the business environment by 11.4%; in the same time on note the decrease of the current expenditures for the research-development activity of the higher education sector by 11.3%.

On mention that the total *expenditures for the research and development activity allocated to agriculture by the business sector* represents only 1.2% of the total, respectively RON 17.9 million, in 2015 (compared to RON 10.95 million, in 2013). *However, it should be underline that the trend of these allocations has been steadily increasing (1.64 times in 2015 compared to 2013),* but them were far by the evolution of the total indicator (the expenditures for the research and development activity allocated by the business sector, în 2015 compared with 2013, increased by 1.33 times).

With all these results which characterizes the total R & D expenditure allocated to Romanian agriculture, however, if their structure is taken into account on the basis of expenditure categories, i.e. current and capital expenditures on can say: in the business sector, current expenditure decreased in favor of capital ones (the current expenditure decreased from 88.92% in 2013 to 87.38% in 2015 and capital expenditures increased to 11.08% respectively to 12.62%); in agricultural and forestry research sector the situation has been reversed – the current expenditures increased (from 92.89% in total in 2013 to 95.49% in 2015) and the capital expenditures decreased (from 7.11 % in 2013 to 4.5 in 2015).

Table 3. Applications for inventions recognition – number

	2010	2011	2012	2013	2014	2015	Dynamics 2015/10, %	Structure, %	
								2010	2015
									Total
Applications for inventions recognition – total	**1,418**	**1,462**	**1,077**	**1,046**	**1,036**	**1,053**	**74.3**	**100**	**100**
By categories of applicants:									
Romanian applicants:	1,382	1,424	1,022	995	952	980	70.9	97.5	93.1
Research Institute	334	357	208	136	156	168	50.3	23.6	16.0
Education Institutes	346	288	225	206	141	89	25.7	24.4	8.5
Of which: in the technical field numed "Necessities of life"	308	322	264	248	242	274	89.0	x	x
Share of Applications for inventions recognition in the technical field "Necessities of life" in the Total no. of applications,%	21.7	22.0	24.5	23.7	23.4	26.0	4.3*)	x	x

*) Percentage points

Source: Processed from "Romanian Statistical Yearbook", National Institute of Statistics, Bucharest, 2017

Regarding the way of financing the agricultural research units in the AAFS network or those outside it, it is not without interest to specify that it is regulated by two organic laws – The Law no.45/2009 on the organisation and functioning of the "Gheorghe Ionescu-Şişeşti" Academy of Agricultural and Forestry Sciences and of the research and development system in the fields of agriculture, forestry and food industry and The Law no. 72/2011 amending and supplementing Law no. 45/2009. According to the Law no. 45/2009, the financing of agricultural research sector is realized from its own revenues and subsidies from the State Budget. However, for three consecutive years (2013, 2014 and 2015), the State Budget Law suspended the application of Organic Laws regarding the financing of agricultural research units in the AAFS network (the Law no. 45/2009). This decision created real existential problems for the agricultural research sectors (arrears, receivables, incapacity to realize their own revenues, blockages from the debts to the State Budget of the research units, and the impossibility of the AASF to attend in competitions for European funds accessing, etc.) – all of this threatening both the realization of National Research Programs with a high importance for the Romanian economy (the fruit tree programme, the wine programme, the programme for achievment hybrids and sheep breeds, the programme for grasslands and pastures, etc.), on the one hand, and, on the other, the quantity and quality of human resources allocated to the research sector.

1.3. Some results from the research activtity: applications for inventions recognition and research projects carried out

In 2015, the total number of applications for inventions recognition was 1,053 out of which 26,0% (274 applications for inventions recognition) came from the technical area with the name "Necessities of life"(which included agriculture and forestry, also).

The evolution of the reference indicator – in 2015 as compared to 2010 – on the whole, was a regressive one (it decreased with 25.7%).
By category of applicants for inventions recognition, most of the proposed applications came, in 2015, from Romanian applicants represented by individuals (50.0% of the total).
Romanian applicants for research inventions decreased by a total share (from 23.6% in total to 16.0% in 2010), while education institution inventions have decreased their share in total (from 24.4% in total in 2010 respectivelly to 8.5% in 2015).
The *total number of projects accomplished* in 2015 was 7,872 and the *total research and development current expenditures on the project* was RON 246,021; only 10.1% of the total number of scientific research projects accomplished were from agriculture (794 projects accomplished, which included agriculture and forestry, also), with an average value of RON 218.406 per project (by 11.2% below the national average).
Another result of the research activities in the field of agro-forestry is the various publications realised by each research institution involved. At the AASF level, the following are main recognized: Scientific research offer for technological transfer in agriculture, food industry and forestry; AASF Brochure; AASF yearbook. On can mention that these publications ensure the continuity of actions to disseminate to a large circle of users the main research results of the units from AASF with practical applicability. Also, AASF regularly publishes on its website (http://www.asas.ro/wcmqs/oferte-inovare/) its innovation supply, such as: Lamb fattening technology along with sheep mothers; Romanian goat line; Reghin meat population; Ecological method of cultivating the Chardonnay variety; Plant cultivation process by applying dewaxed and anaerobically stabilized sludge to acidic soils; Lavender harvesting equipment; Modernizing and optimizing the structure of alfalfa varieties, etc. Similar initiatives are also in the relevant universities.

2. Possible development ways for the human resource from the agricultural and forestry research in Romania

*"Always we need to look to the future. When the world around you it changes and changes are over you, it must to understand what you have to do because to cry is not a solution"(*Jeff Bezos, founder of Amazon.com*)*

Taking into account the incentive of the "Amazon.com" founder Jeff Bezos and keeping the dimensions, we will try to outline some of the immediate possible measures that can be taken to revive human resources in agricultural and forestry research.
The proposed measures are based on the assumption that existing agricultural and forestry research entities that produce specific information and knowledges do not have only the role of a "passive storage". It is time for them to come out of the present patterns and to try to connect to the socio-economic environment, to the requirements of the specific actors for which they "produce", respectively the agri-food sector and, finaly, the agricultural producers.
This part of paper presents some measures in view to revigorate and increase the efficiency of human resources from agricultural and forestry research, which relate to: involving researchers in dissemination of their most important results – information and knowledges – by building "bridges" between researchers and information consumers (agricultural producers); starting a process of lieders training among young students and researchers, given the reduced number of senior researchers and their advanced age; in order to increase the activity of research units, on is proposed to include in the management plans of the agricultural and forestry research entities the provisions of the National Strategy for Research, Development and Innovation 2014-2020, dedicated to the research labor market, measures that represent openness of opportunities.

2.1. Changing the paradigm of human resources management and increasing the capacity to communicate of the agricultural and forestry research institutes and stations

The accelerated development of social media products has facilitated easy connection among people from the most diverse areas, regardless of their economic, social, cultural or geographical status. Thus, a new fulfillment model of personal, professional and social responsibility has emerged. Unfortunately, the main value-added producers from the research, the researchers, either remain in a isolation state or have a low visibility because of their modest material and financial resources received by the research units from the public budget.

The new paradigm of human resource management in agricultural and forestry research invites thise people to rethink the individualism and collectivism in their institutes. These attitudes must coexist because the quality of research results are fueled by a solid substrate of individualism and professionalism and, on the other hand, by the development of the institutional capacity to interact with the real world of the consumers of the research results obtained. Basically, everything happening at individual, professional, institute / research level must influence the local, national and even global environment.

There is a lack of critical mass of human resources in agricultural and forestry research in view to develop areas of perspective, for interdisciplinary research and innovation and, in particular, to ensure the transfer of knowledge. The number of researchers is still insufficient, and the R&D institutes and centers are delayed in their engaging in the development of regional or local consultancy centers.

Researchers' mobility is limited and this is a phenomenon that has an undesirable impact on the circulation of technical knowledge and innovation. Private sector access to public research infrastructures is difficult and than the extent of use its results – as a real opportunities to its development – is low.

The RDI sector from Romanian agriculture and forestry is under-sized compared to country's natural and biodiversity resources. This phenomenon is due to: reduced funding of the sector In absolute figures, ("Romania spends on research and development per capita almost 20 times less than the European average". See “The National Strategy for Research, Development and Innovation 2014-2020", April 2014) (; communication of agricultural and forestry research results is insufficient due to the weak links amongst research representatives and small agricultural producers; the potential beneficiaries of the research results - the nearly 4 million subsistence and semi – subsistence farms – do not have intellectual training or financial resources to access the expert knowledge from agricultural and forestry research units.

We appreciate that by the establishment of a "Dissemination system based on in advance subscriptions to agricultural advisory services" within the institutes / research centers on can set-up the real premises for the revitalization of the links between the qualified human resources existing in the agricultural research units, on the one hand, and most small farms, on the other one.

We propose to set-up a "*system of in advance subscriptions for agricultural advisory services*" at the level of research institutes / research centers. Thus, it is possible to create real premises for reviving, on new bases, the connections among agricultural and forestry research and agricultural producers, respectively the links among the existing qualified human resources and the majority of the small agricultural households.

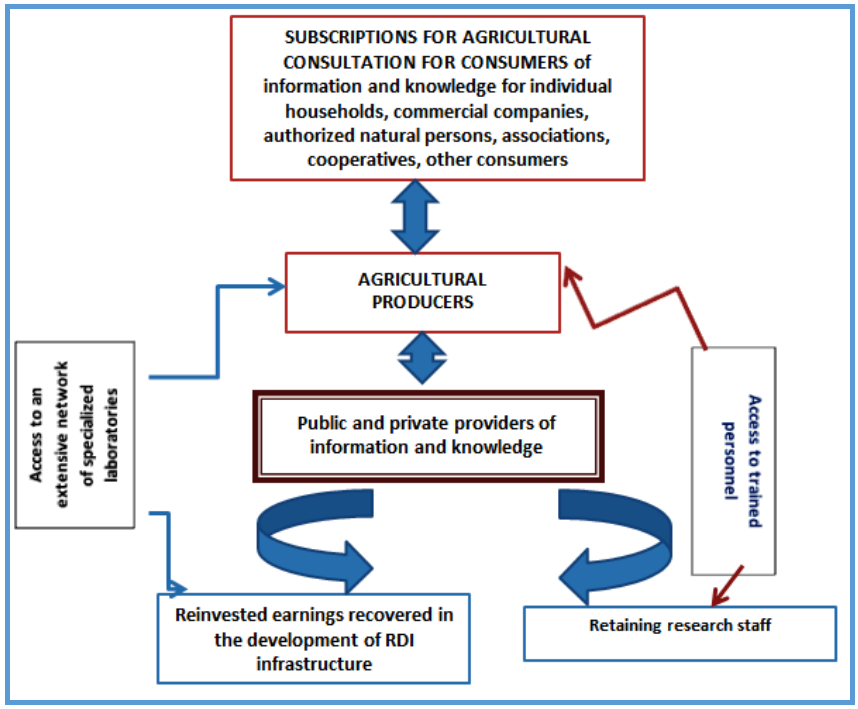

Figure 1. Scheme for subscriptions to agricultural advisory services for consumers of information and knowledge by individual households, commercial companies, authorized natural persons, associations, cooperatives, other consumers

Source: Popescu, G; Preda, Elena; Bara, Simona, 2017, „*The effects of the transition period on the knowledge transfer market in Romanian agriculture*", manuscript

For the first step, agricultural and forestry research institutes depending on their specifics areas, can develop and place on their own institutional sites applications with information about the types of services they can offer.
A such initiative can be successfully implemented with the expansion of the use of social media devices, for example, mobile phones, as well as the fact that everything is interconnected and interdependent in the Universe. On this way, our understanding of the world and how on interact with each other acquires real valences for a large number of farmers, contributing to unitary dissemination and various forms of materialization of information and knowledge gained in research activity and them transfer to the level of agricultural producer (in fact, they are the real consumers of information and knowledge from research activities).
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As the system of subscriptions to agricultural advisory services develops, the researchers will be able to diversify/ differentiate this kind of services according the information and their know-how required by the market, respectively by the agricultural producers. In addition, a such activity is likely to drive to the increase of motivation, from a new position qualified human resources from the agricultural and forestry research and development institutes, but also it contributs to increase the confidence of the agricultural producers in the research results.

By this proposed project on hopes to revigorate the agricultural advisory activities.

2.2. Reviving the leadership in agricultural and forestry research

In an interview with Review Economic Tribune /Tribuna Economica , The ex-president of AASF Gheorghe Sin(Sin, Gh. (2015). "Scientific research and the performance of Romanian agriculture", in Review Economics Tribune, no.35, September 2) mentioned: "... The problem of human resources in the research is the most serious, it is very difficult to solve, not only because of the underfinancing and unattractive of it, but also because the young people who come in the research sector no longer has mentors to teach them, to shape, to transmit the knowledge and experience accumulated over the years. On are quickly reaching the point where we will resort to the intelligence import, because the Romanian intelligence, neglected by us, it is in the service of the others. It's not a good thing!..."

In this context, on appreciatte as beeing of interest the fact by which the human resource from agricultural and forestry research feels the need to be reinvigorated by their leadership. The magnitude of the development of emotional intelligence within active generations after 1990 – this being represented by increased of self-awareness, autonomy development, motivation, empathy, and social skills – has drived to leaps in the individual perception capacity of the surrounding reality. Than, the leadership in research has become more than "leading to impose opinions and ideas." The leadership of the agricultural research institutes / research centers will have to be interested with the formation of lieders by extending, for example, of the practice named "Lead by Example".

Box 1. Top 10 Ways to Lead by Example / Lead by Example

Paraphrasing Carl Golden on the ways of the practice named "Lead by Example" refers to the following ten requirements:
Take responsibility for the facts. The mistake costs credibility, maintains team members in defensive, and eventually on sabotages the real development of individuals.
Be honest. Incorrect representation of facts, phenomena and processes is likely to affect everyone. A lieder must show that in all circumstances honesty is the best policy.
You must prove that you are brave. First you have to go through fire (or attend in a crisis) – so have your own experience. Generally, the calculated risks demonstrate the individual's commitment to a more general, broader goal.
Recognize your failure. It is good for the team you are leading to do the same and have the ability to define failure as part of an extraordinary individual making process.
Be consistent. The idea is to repeat attempts to solve a problem. On is advisable to go either under or around any obstacles to show to the team which you are leading that the obstacles do not define the institution or team.
Create solutions. Do not focus on the issues that is possible / may arise. You have a top position and that is why you have to offer solutions; only after then you will consult the team to develop more solutions.
Listen. Ask questions. Try to understand. You will receive valuable information and be sure to set a such tone that encourages a healthy dialogue.
Delegate / authorize with freedom. It is very important to encourage an atmosphere where team members can focus on their strengths.
Take care of yourself. As an exercise, be careful not to overwhelm, so take a break. A balanced team, mentally and physically, is a successful team. Consequently, model it, encourage it and support it!
Raise your sleeves. Following the model of Alexander the Great, who led his men in battle, you will be able to inspire greatness in your institution.

Source: „Top 10 Ways to Lead by Example"
by Carl Golden, http://www.soulcraft.co/essays/lead_by_example.html

Through this practice – "Top 10 Ways to Lead by Example" – the existing management of the research units can educate new leaders through their personal example. The adoption of the mentioned technique asks: (i) to identify models of success from agricultural and forestry research; (ii) to recognise them; (iii) to try to disseminate this things to the people from the scientific and academic environment, and in the business ones, also. Thus, identified lieders from the research sector can become and represent a model of inspiration for young people, and , at the same time, they can contribute to the development of the motivations to other representatives of the agricultural and forestry research environment, but also, for the academic environment, in general.
The initiation of a *National Recognition and Training Program for New Leaders within Agricultural and Forestry Research*, people who excels in these areas of reference, is likely to: (a) induce positive effects at institutional level and in specific universities; (b) contribute to the reinvigoration of human research resources; (c) contribute to the credibility, on new bases, of existing human resources; (d) contribute to promoting the values of social

responsibility of agronomic research towards rural areas as a whole; (e) attract new young people in agricultural and forestry research and on this way it contribute indirectly to the performance gains by specific universities.

2.3. Speeding the materialization of measures to increase the attractiveness of the research career from the "National Strategy for Research, Development and Innovation 2014-2020 "

It seems that the organizational and financial issues (There is a delay in clarifying the application the provisions of the Law on Scientific Research. According to the law for the reorganization of the research institutes /centers, 48 government decisions had to be made and approved. During 2009-2016 only two Gocernamental Decisions (GDs) were formulated and approved to reorganize agricultural research. Other 46 GDs were completed only in the summer of 2017 and they are in the process of being approved.) have occupied all the interest of the agriculture and forestry R & D institutes, it explains why their inclusion in the programmatic documents and in their own management programs continue to stay on the second level of interest or even them were postponed.

The National Research, Development and Innovation Strategy 2014-2020 included a chapter dedicated to the research labor market. In this document, starting from the realities, designed directions to be followed by research activities regarding

the access of young doctoral students and fresh doctors in science to a research career remains relatively limited.

The measures related to the exchange of research personnel between public and private organizations is today only "accidental", also (There is a delay in clarifying the application the provisions of the Law on Scientific Research. According to the law for the reorganization of the research institutes /centers, 48 government decisions had to be made and approved. During 2009-2016 only two Gocernamental Decisions (GDs) were formulated and approved to reorganize agricultural research. Other 46 GDs were completed only in the summer of 2017 and they are in the process of being approved.)

The mentioned document proposes measures to increase the attractiveness of the research career as well as a partial rethinking of the present doctoral training system.

Therefore, increasing of the internal and international mobility of young researchers and teachers included the following measures:

- Integration of doctoral students and young doctors in the science into the RDI projects;
- Attracting researchers from abroad to project management in host institutions from Romania;
- Obligation of public research organizations to publish and disseminate all their available jobs on the EU Platform Euraxess There is a delay in clarifying the application the provisions of the Law on Scientific Research. According to the law for the reorganization of the research institutes /centers, 48 government decisions had to be made and approved. During 2009-2016 only two Gocernamental Decisions (GDs) were formulated and approved to reorganize agricultural research. Other 46 GDs were completed only in the summer of 2017 and they are in the process of being approved);
- Duty of public research organizations to accede to the Research Charter and to The European Code of the Researcher (http://ec.europa.eu/euraxess/ index.cfm/rights/whatIsAResearcher);
- Legalizing of the electronic identity of researchers in view to facilitate their access to the digital services for the research and development activities;

- In order to increase the transparency of the researchers community, on reccomands to set-up the Romanian Researchers Register, including Romanian people from abroad who participates in local projects, also.

Also, to increase the degree of internationalization of Romanian research, the presence of innovative products made in the country on international markets, as well as to achieve the global opening of the national RDI market it will be necessary to increase work of the R &D institutes from agriculture and forestry to attract public founds in view to attend to European or international initiatives, bodies, programs or infrastructures.
By "The National Strategy for Research, Development and Innovation 2014-2020" regarding the guarantees of public co-financing research activities by the State Budget for participation in Horizon 2020 projects, as well as, of the other types of institutional partnerships, "joint departments", or of the use of other international instruments in the field of RDI. Thus, among the main measures co-financed by public founds through the "National Strategy for Research, Development and Innovation 2014-2020" and to which the agricultural research should be oriented, on can mention:

- Participation of the research units in the Horizon 2020 projects;
- Participation in European initiatives such as Joint Programming Initiatives (JPIs), Joint Technology Initiatives (JTIs) / European Innovation Partnerships (EIPs);
- Participation in collaborations within third countries;
- Participation in international bodies (the European Organization for Nuclear Research - CERN, European Space Agency portal features the latest news in space exploration, human spaceflight, launchers, telecommunications, navigation, monitoring and space science – ESA, etc.) within mutually agreed integrated plans with others entities;
- Calls for financing of bilateral projects;
- Developing and creating synergies – through "twinning" and "teaming" projects (at the level of emerging centers of excellence, innovative regions, innovative clusters from Romania and the EU) – within the research-development- innovation (RDI) programs, which are managed from the central level by the European Union; In this context, the partnerships for top research facilities with the laboratories of Magurele, where the Extreme Light Infrastructure (ELI) is being built offer a new infrastructure of world interest and new opportunities among the most diverse interdisciplinary research;
- Establishing the framework "department" ("ERA department") in view to attract famous researchers and / or academics.

Many of these proposals can find a quicker solution, given that the managerial concerns of all actors involved in agricultural and forestry research intend to enhance the identification and implementation of new tools to improve the finance of their activities.

2.4. Development of the public-private partnerships, a prerequisite for attracting and maintaining human resources in agricultural and forestry research in Romania

The essence of the public-private partnership is that it brings together competencies, know-how and management of the private sector with that of public institutions, in this case, of the agricultural and forestry research institutes and centers and the capacity to share the risks between partners ensuring efficiency in the use of funds, also.
Referring to the functionality of the public-private partnership in case of accessing European funds by the agricultural and forestry research institutes and resorts Gh. Sin said: "... Public-private partnership has no clear legislation and our request for clarification at the Ministry of Finance and the Ministry of Justice, drived to confusing answers with remittances from one ministry to another ... "

The public-private partnership is the one that would benefit both to the private operator and to the public sector. Also, the access of Romanian agricultural and forestry research entities to some of the European funds is conditioned by the presence of partnerships with private economic agents. At present, in Romania however,a such legislation is not enough clear. Regarding this issue on can mention that legislative changes have been attempted in 2016 (http://ec.europa.eu/euraxess/index.cfm/rights/whatIsAResearcher), but them failed to strengthen an attractive private-sector partnerships similar to those existing in most of the Member States of the European Union, aiming at: attracting of the private financial resources for the purpose of carrying out public projects; attracting foreign investment; creating new jobs; Improving the performance of public project implementation; reducing the pressure on public finances; increasing participation in attracting European funds, etc.

Conclusions

1. In fact, with European money in Romania comes the principles, the mentality, the different ways to approach the problems of development. The R&D structures from agriculture and forestry will be involved to create real premises for the revitalization of the connections between the existing qualified human resources and the majority of small farms.
2. In order to restructure the existing agricultural and forestry human research resource and to develop the dissemination activities of some products resulting from their activity it is necessary to increase the introduction of the elements from the cathegory "best practices", which can reposition the agricultural and forestry research, priorities both of the "production" of existing research information and knowledge and their future specific activities. In the medium and long term, implementing this types of measure can influence the research institute's partnerships, the choice of future research directions and the additional fund resources of this units.
3. The revival of leadership in agricultural and forestry research institutes and centers has to become one of the major concerns of the management of these institutions. On appreciate that this action will have to be carried out within the framework of a specific program*: the National Program for the Recognition and Training of New Leaders in the Field of Agricultural and Forestry Research*. This program will act as a tool for bringing together public and private efforts to attract young people into the research activities, as well as, to enhance the performance of young people from universities.
4. To speed up the process to include in the management programmes of research entities from agriculture and forestry the realization of measures to increase the attractiveness of the research career foreseen in the "National Strategy for Research, Development and Innovation 2014-2020" is likely to contribute to increasing the access of young PhD students and fresh doctors in science to a research career, to a broader public research environment to private and foreign researchers in the programs of agricultural and forestry research institutes, as well as to increase of the degree of Romanian research internationalization.
5. Improving the use of human potential in Romanian agricultural and forestry research can also find other sources of inspiration than those of this paper. For example, it should be mentioned that after the accession of Romania to the EU, the main advantage that came together the European funds was the know-how, and not necessarily the material issues. The support of this statement is reinforced by the fact that during the programming period 2007-2013, through the NRDP, approximately 88,000 projects were financed, given that in Romania are 3.8 million small and medium peasant farms or approx. nearly one million of peasant households (if take into account only the entities registered with the Agency for Rural Investment Financing – ARIF/ AFIR). In

this context, projects developed from EU funds must be analyzed by the R&D institutes / departments in view to (i) look after the models of "good practice models" for semi-subsistence and subsistence farms, (ii) to institutionalised them for different regiond and (iii) to transforme them in reference models for a new programation period. In a such way it is possible to reduced the farmer costs for preparing the next projects.

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ANALYSIS OF COMPETITIVENESS ON THE MEAT MARKET AND MEAT PRODUCTS IN ROMANIA

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Abstract
The world's meat industry is in a phase of major structural changes, with visible advances in reproduction and genetics, slaughter and development of new automation technologies for processing. The new challenges and opportunities on this market lead to greater product uniformity and quality, and more and more emphasis will be placed on issues related to the competitiveness of the sector. Meat is an important product of human consumption, and meat consumption is an indicator of living standards. The analysis of the competitiveness of this sector will be achieved from both point of view, of the companies in the market, and the economically one; in the first part there will be conducted a marketing research designed both in qualitative and quantitative terms, and in the second part will be presented an economic analysis of the main brands of meat and meat products. Thus, an image will be formed about the differences between consumer perceptions and economic efficiency.

Keywords: Competitiveness, meat market, economic performance

Introduction

In some situations, the definition of competitiveness is subject to confusion between the authors, some of whom consider the competitiveness of a society as the ability to adapt to competition; but other authors say that the term competitiveness suggests a situation where products are produced at low cost while assuring and controlling quality, which leads to a direct association of competitiveness with profitability, efficiency, productivity and, implicitly, profit (Hchaichi, 2014, p.203).

The adherents of the term competitiveness, bearing in mind that there are also anti-supporters of competitiveness, associate this word as a description of productivity and resource management (financial, human, natural, technological and even knowledge) that each society (Chițea, 2015, p.298).

Competitiveness usually refers to the effects of a policy on the ability of regulated entities to compete in international markets. These effects can be felt at several levels.

At the firm level, a business is competitive if it can produce better or cheaper products or services than its domestic and international competitors.

Competitiveness at sector level expresses how some countries are attractive to a particular industry and is often measured in terms of international trade (net exports, investment flows).

Country Competitiveness is a popular concept, measured for example by the "Global Competitiveness Report" or the "World Competitiveness Yearbook". These indicators generally measure country leadership, long-term attractiveness such as living standards, health, local pollution and employment, as well as economic growth and economic security.

Meat is an important product of human consumption, and meat consumption is an indicator of living standards. Trade has led to a strong bond between peoples, contributing to the development of economies and societies, taking into account that they are based on strong competition.

The analysis of the competitiveness of this sector will be achieved both from the point of view of the companies that have the market and economically.

1. Literature review

With the rise of globalization, the term "competitiveness" has become ubiquitous. Most associate this term as synonymous with productivity; Michael Porter said: "The only significant conception of competitiveness at national level is productivity."

The World Economic Forum: The "Global Competitiveness Report" defines competitiveness as "the set of institutions, policies and factors that determine the level of productivity of a country." Also, the World Competitiveness Yearbook describes competitiveness in a similar way, but in a wider sense, in which "an economy manages all its resources and competencies to increase the prosperity of its population" (Atkinson, 2013, p.2).

According to the literature, marketing research may vary according to the intended objective, including market research, product research, and last but not least consumer research. This last part will appear in this part. Consumer research consists of identifying its preferences, motivations and buying behavior. Quantitative research is used to quantify the situation by generating numerical data or data that can be converted into usable statistics. This type of research is generally used to quantify attitudes, opinions, behaviors and other variables, and to generalize the results from a larger sample.

2. Analysis of competitiveness on the meat market and meat products

The analysis of the competitiveness of this sector will be achieved from both point of view, of the companies in the market, and the economically one; in the first part there will be conducted a marketing research designed both in qualitative and quantitative terms, and in the second part will be presented an economic analysis of the main brands of meat and meat products. Thus, an image will be formed about the differences between consumer perceptions and economic efficiency.

2.1 Quantitative research on consumer preferences of meat and meat products

For this, a questionnaire was created, which was applied in the online environment, which was completed by a sample of 300 people.

Generally, this questionnaire was distributed on social sites via emails and text messages. The survey was mainly addressed to EAM faculty students, ASE students, employees of the Research Institute for Agricultural Economics and Rural Development, and to any person consuming meat and meat products.

For the first question, 93% confirmed the consumption of meat and meat products, of which 51.67% are women and 41.33% are men. Out of the 300 respondents, 7% of them are not meat consumers, namely 3.33% of females and 3.67% of males. Among non-consumers, 2.33% are people between the ages of 18 and 25, but the same percentage was recorded for the segment of 25-30 years.

Non-eating people were interviewed, in the second question, why they did not consume such products. Most of them (47.6%) follow a certain lifestyle (vegetarianism, raw-veganism, etc.), the second reason people do not consume meat and meat preparations was "the doctor does not recommend me" with a share in total negative responses of 28.6%, and the third reason and the last one for which answers were obtained were considerations related to the religion of the person, with a percentage of 23.8%.

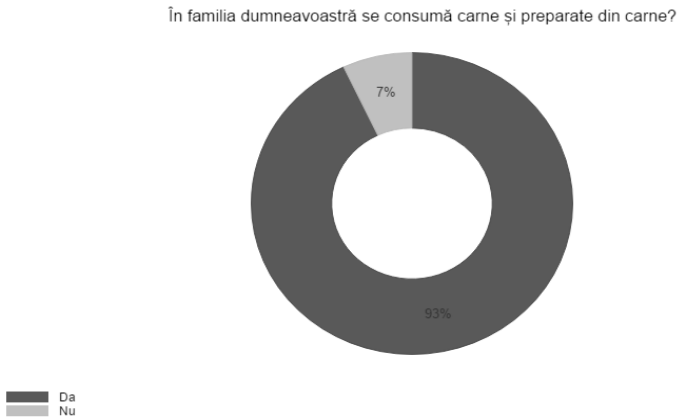

Figure 1. Level of consumption of meat and meat products

Source: Data processed based on www.isondaje.ro

Asked by certain brands and producers of meat and meat products, the respondents in the questionnaire responded as follows, for the first two companies, the consumer's "popularity" rate was 12.1%, of which for Aldis 8.4% come from urban areas and 3.7% from rural areas, and for Ana and Cornel 7% come from urban and 5.1% come from rural areas.

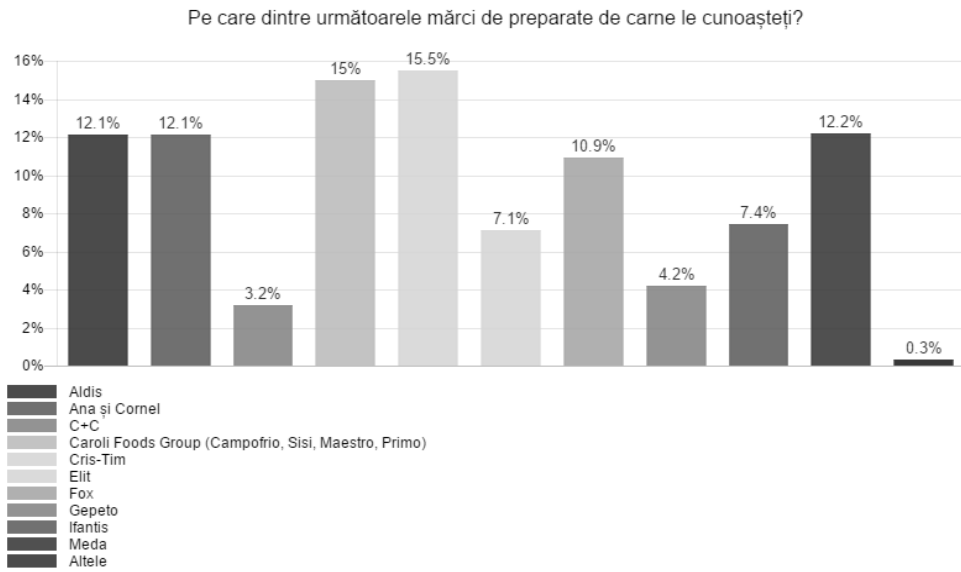

Figure 2. The level of knowledge of the brands in the market

Source: Data processed based on www.isondaje.ro

C + C has a share of only 3.2% and its respondents are equally divided by the residence environment (1.6% for each of the two). Caroli Foods Group recorded 15%, the second highest among the consumers who preferred this company, 9.5% came from urban and 5.5% from rural areas.
The most famous brand of meat products was Cris-Tim, with a share of 15.5%, and the people who know this company are thus spreading 10.7% of the urban area and 4.8% of the rural area. A degree of knowledge of 7.1% was obtained by Elit, of its consumers, 4.2% are townspeople and 2.9% are villagers. Fox has a 10.9% recognition rate, of which 7.2% of people live in the city, and 3.7% in rural areas. Gepeto recorded 4.2%, Ifantis 7.4%, and Meda saw a 12.2% popularity, 7.5% of which live in urban areas, and 4, 7% in rural areas. A further 0.3% was recorded in the category „other" "Agricola", "Angst" and "Marisan".

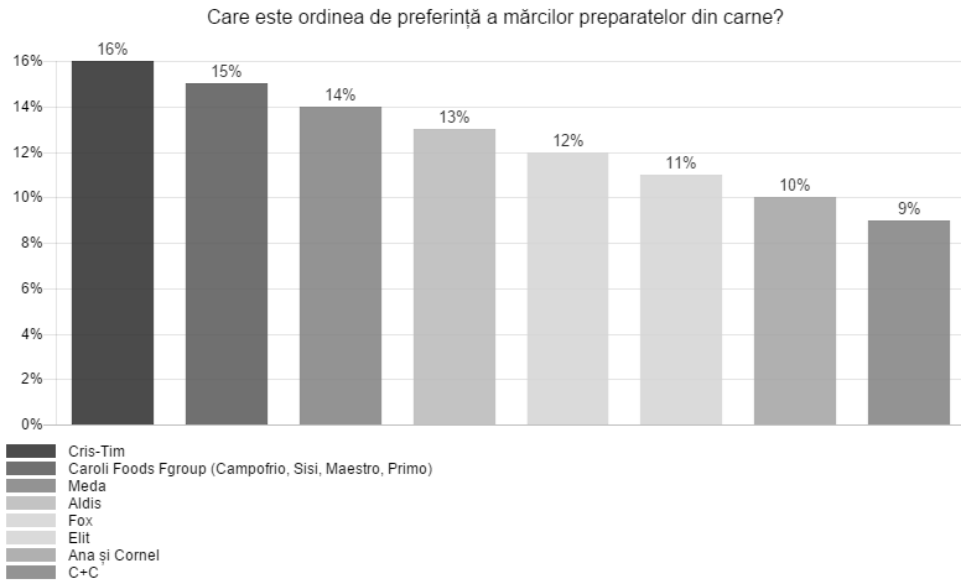

Figure 3. The order of preference of the brands in the market

Source: Data processed based on www.isondaje.ro

Able to give marks to each brand, respondents found that the most preferred company is Crist-Tim, with a score of 922 points (as the number of points is inversely proportional to the place of importance), the second place The third one is occupied by the Caroli Foods Group (1031 points), the third place by 1101 points by Meda; Aldis is ranked fourth with 1145 points, followed by Fox (1225 bridges), Elit (1419 points), Ana and Cornel (1445 points), and last place according to consumer preferences C + C with a total of 1756 points.
If we only looked at the first-ranked companies, we found that Meda ranked 22.6% first, and places 2 and 3 were equal to 19 percent by Cris-Tim and Aldis , Caroli ranked No. 4 with 17.9%. Still 10% of 1st place was achieved by Ana and Cornel, 6.8% by Fox, 2.9% by Elit and only 1.8% by C + C.

2.2 Comparative analysis of consumer preferences and economic performance of meat producers and meat products

In this part, two rankings will be compared, one on the consumer preference order made after completing the questionnaire, and the second ranking will be based on economic and financial data, which will measure the performance economic marks.

As a result of the questionnaire, a classification will be made, and with the rank ordering method, a score for each brand will be calculated. 300 people participated in this survey, of which 279 completed questions for meat and meat consumers.

Table 1. Branding according to consumer preferences

Companies / Position	First place	Second place	Third place	Fourth place	Place V	Place VI	Place VII	Place VIII
Aldis	53	31	36	38	38	32	20	31
Ana & Cornel	28	29	20	23	31	35	62	51
C+C	5	14	16	12	21	51	64	96
Caroli Food Group	50	46	40	47	39	23	24	10
Cris-Tim	53	58	54	46	32	15	11	10
Elit	8	22	40	36	44	57	35	37
Fox	19	41	38	48	45	35	41	12
Meda	63	38	35	29	29	31	22	32

Source: Data processed based on www.isondaje.ro

Depending on the place occupied, each company will be assigned a coefficient inversely proportional to the occupied place, thus the place I will get a coefficient of 8 and the place VIII the coefficient 1. With the help of the above method will be calculated the score of each company in the "eye" of consumer.

$$P_{Aldis} = \frac{53*8+31*7+36*6+38*5+38*4+32*3+20*2+31*1}{279} = 4,9$$

$$P_{Ana\&Cornel} = \frac{28*8+29*7+20*6+23*5+31*4+35*3+62*2+51*1}{279} = 3,8$$

$$P_{C+C} = \frac{5*8+14*7+16*6+12*5+21*4+51*3+64*2+96*1}{279} = 2,7$$

$$P_{Caroli} = \frac{50*8+46*7+40*6+47*5+39*4+23*3+24*2+10*1}{279} = 5,3$$

$$P_{Cris-Tim} = \frac{53*8+58*7+54*6+46*5+32*4+15*3+11*2+10*1}{279} = 5,7$$

$$P_{Elit} = \frac{8*8+22*7+40*6+36*5+44*4+57*3+35*2+37*1}{279} = 3,9$$

$$P_{Fox} = \frac{19*8+41*7+38*6+48*5+45*4+35*3+41*2+12*1}{279} = 4,6$$

$$P_{Meda} = \frac{63*8+38*7+35*6+29*5+29*4+31*3+22*2+32*1}{279} = 5,1$$

In order to provide an overview of the eight brands of meat and meat products, we will also undergo a similar analysis of the economic and financial indicators of these companies, thus creating a comparative picture between perception / preference and economic performance.

Table 2. Sorting of brands according to economic indicators

Indicators / Position	First place	Second place	Third place	Fourth place	Place V	Place VI	Place VII	Place VIII
Net turnover	Cris-Tim	Elit	Caroli	Aldis	Fox	Ana și Cornel	C+C	Meda
Average number of employees	Elit	Aldis	Caroli	Ana și Cornel	Cris-Tim	Meda	C+C	Fox
Labor productivity	Fox	Cris-Tim	C+C	Caroli	Elit	Aldis	Meda	Ana și Cornel
Gross profit	Elit	Ana și Cornel	Caroli	Fox	Meda	C+C	Cris-Tim	Aldis
Profit rate	Ana și Cornel	Elit	Fox	Caroli	Meda	C+C	Cris-Tim	Aldis

Source: Data processed based on www.mfinante.gov.ro

Depending on the economic and financial data, a hierarchy was made according to the average of the economic indicators of the market companies presented in the table 2. This will result in a score similar to that achieved on the score obtained for consumer preferences.

$$P_{Aldis} = 5 + 7 + 3 + 1 + 1 = 17$$

$$P_{Ana\&Cornel} = 3 + 5 + 1 + 7 + 8 = 24$$

$$P_{C+C} = 2 + 2 + 6 + 3 + 3 = 16$$

$$P_{Caroli} = 6 + 6 + 5 + 6 + 5 = 28$$

$$P_{Cris-Tim} = 8 + 4 + 7 + 2 + 2 = 23$$

$$P_{Elit} = 7 + 8 + 4 + 8 + 7 = 34$$

$$P_{Fox} = 4 + 1 + 8 + 5 + 6 = 24$$

$$P_{Meda} = 1 + 3 + 2 + 4 + 4 = 14$$

With these scores, we can compare the situation both from the point of view of consumers and from the point of view of economic and financial performance.

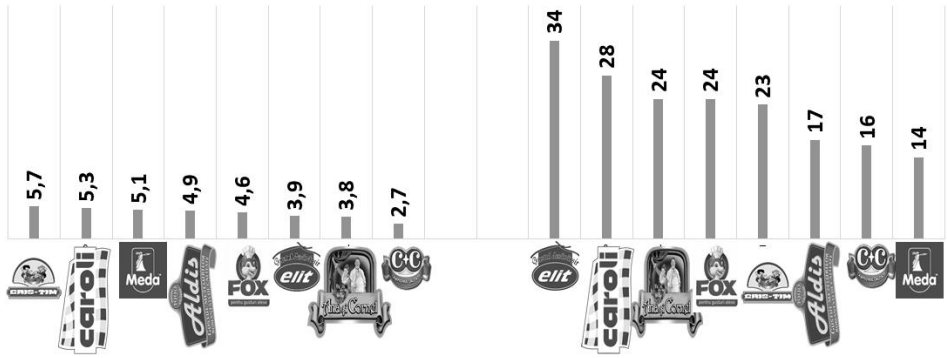

Figure 4. Consumer preferences versus the economic efficiency of brands

Source: own calculations based on mfinate.gov.ro, isondaje.ro

As can be seen in the figure 4, between consumer preferences, meat brands and meat preparations, and hierarchy of brands, according to the averages of economic indicators, there are quite clear differences, the main reason being the way of implementation of the marketing strategies of each company, but also the size of the company, the market share, the quality standard and the culture and tradition of consumers.

As can be seen in the questionnaire, the company that scored the best score was Cris-Tim, but on the basis of economic performance, it ranks fifth. Caroli Food Group is the only one of the eight analysts to keep their place in both rankings, ranking second in consumer preferences as well as economic efficiency.

A surprise in terms of the perceptions / performance ratio can be identified for Meda, the third-largest consumer, but from the economic point of view it is the last place because of its small size.

Another surprise, however, is the brand Ana and Cornel, which in consumer perception is not so well seen (7th place), compared to the economic performance it performs (3rd place). In this case, this is the case for the fairly small company and the enlargement range proportional to size.

Elit is ranked first in terms of feasibility, but in the perception of consumers it is only sixth.

Aldis, ranked fourth in the preference rank, occupies only the sixth place in the order of economic efficiency, it loses ground when it comes to gross profit and profitability, because it actually recorded a loss in the analyzed period.

Fox did not record very large differences in the two rankings, ranked No. 5 in consumer preference and ranked fourth in the ranking of economic efficiency; the same situation being also found in the case of C + C, which was the last place in the perception of buyers and the seventh on the basis of economic profitability.

Conclusions

Competitiveness analysis is of particular importance, which is useful to every actor present on a particular market. This study was based only on a correlation between two actors on the meat market and meat preparations, namely producers and consumers. This analysis clearly shows the assessment of the volume and value of the quantities of products traded, the "power" of the producers and their competitive nature, but also the influence of this character in consumer preferences.

At the stage of the marketing research, a quantitative analysis was carried out, for which a questionnaire was applied and the main conclusions were: 93% of the respondents consume

meat, 48.7% consume daily. The most widespread reason for non-consumers was the lifestyle they have (vegetarianism) 47.6%. Of the consumers 45.9% consume poultry meat, but when it comes to meat dishes, 38% prefer different specialties. In 55.2%, consumers buy meat and meat products from supermarkets 2-3 times a week (42.3%), average 1kg of meat (50.9%) and 2-3 products (64.4%). As far as the order of the brands is concerned, it was found that the first place is the company Crist-Tim followed by Caroli, Meda, Aldis, Fox, Elit, Ana & Cornel and C + C. The time most people spend at the shelf purchase was 3-5 minutes (52.3%). Of the consumers, 68.1% have recently seen advertisements for meat and meat products.

Moving on to the second phase of the competitiveness analysis, namely the economic and financial analysis of the producers, it was observed that the highest turnover, on average during the analyzed period belonged to Cris-Tim. As for the average number of employees, Elit holds the highest number. According to the "labor productivity" indicator, Fox is the first company, the main reason being the very low number of employees. First, according to the gross profit, is Elit, and Ana and Cornel are profiting according to the profit.

Finally, a score for these indicators was calculated, and the order of performance and economic efficiency was: Elit first, followed by Caroli, Ana & Cornel, Fox, Cris-Tim, Aldis, C + C and Meda.

There are quite a lot of differences between the two rankings, from the consumer perspective and from the economic and financial indicators, these differences being mainly due to the way of promoting the products and implementing the marketing strategy of each company, but also the degree of market expansion, the market share of each company, the size of the firm and the quality implemented at the product level; other considerations for which differences have been found are found in the consumer's sphere, tradition, culture, religion, as well as the perception of the product and the segment it belongs to.

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DESIGNING OF NUTRITIONAL FOODS THROUGH ECONOMIC AND MATHEMATICAL MODEL

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Abstract
The study refers to designing vitamin C in order to find out its sortimental structure. The relevance of vitamin C is because it is found in most foods. The paper is based mainly on methodologically of analysis and synthesis using the linear programming method. The analysis take into account three direction: dynamics, correlation and causal. As a result, the assessments made in the analysis were presented and summarizes the trend, aiming, of course, not be overlooked key aspects of the production structure of the reference period. To meet market requirements, the companies must reorganize production structure. Starting from market studies regarding of the consumption needs of the population, is set up what will happen and how much of each sortiment of vitamin C. When choose sortiment have had on the availability of various kinds of companies (potentials) and the income it generates marketing of products. Through a selection process and combining all of these conditions, result maintenance of companies. The problem is to determine the structure (shares) of these conditions in the companies work. The optimal solution for combining these sortiments requires building a model of economic and mathematical linear programming. Linear programming is a quantitative method used in the decision process for selecting optimal management. The results shows that the sollution is when the profit is higher.

Key words: linear programming, nutritional foods, vitamin C, sortiment, efficiency

Introduction

One of the most significant current discussions in drug industry is getting vitamin C. It is becoming increasingly difficult to ignore such issues, because this vitamin acts as an antioxidant, being at the same time, and nutrient. Lacks of vitamin C represent one of the leading causes of the illness of scurvy. Equally, designing a plant for producing vitamin C, play a key role in processing drugs.

The vitamin C prevails in environment, being biosynthesized by plant and animal organisms, as well as by many microorganisms. In natural sources, it is found in the free state and in the form of complexes with proteins, polypeptides, amino acids, forming different types of ascorbigen complexes. Higher, vitamin C is found in lemons, oranges, mandarins, pomegranates, blackcurrants, sea buckthorns, unripe nuts, leaves, apples etc.

Ascorbic acid is the name recognized by IUPAC (Commission on Biochemical Nomenclature) for Vitamin C. Vitamin pure ($C_6H_8O_6$) has a molar mass of 176.13 g/mol; is soluble in water (solubility 0.33 g/L) and the optically active and seem as a white crystalline powder. Vitamin C (L-ascorbic acid) is the most common vitamin in nature, being biosynthesized by vegetable organisms and animal ones (with some exceptions), as well the numerous microorganisms. Vitamin C can be found in free form and in the form of complex (conjugate) proteins, polypeptides, amino acids, various kinds of complex forming

ascorbigen. Vitamin C is involved in the metabolism of aromatic amino acids, carbohydrates, fatty acids, bile acids, iron, hemoglobin, proteins and other substances, protects tissues from the destructive action of the oxidative processes involved in many chronic diseases.
In the food industry, vitamin C prevents pigment discoloration, loss of flavor and extends shelf life (Chauchan et al., 1998).
The pharmaceutical industry uses vitamin C for medical applications and for the production of vitamin supplements (Marz, 2002). Vitamin C has many uses. As a percentage, 30% is used in the pharmaceutical industry, both medicinally and as vitamin supplements; 13% is used in the feed, 5% in the cosmetic industry and 2% in other industrial processes (Hancock, 2009). Also, approximately 50% of vitamin C production is used in the food industry, being added to technological processes.
The commercial value of vitamin C was recognized in the early century XX and industrial processes have been patented since 1930. The research that led to the discovery of vitamin C began in 1907 by Axel Holst and Theodor Fröhlich noticed that guinea pigs were suspected of scurvy. This has led to the development of an analysis for the biological determination of antiscorbutic activity of food products.
At European level, there are a number of regulations on the market for medicinal products for human use. In order to protect human health, the goal is to regulate the production, distribution and use of medicines. In this regard, the European Commission has concluded that the internal rules of the Member States of the European Union relating to the manufacture, control and inspection of medicinal products need to be harmonized in order to allow safe and good quality medicinal products to circulate throughout the Community. On 6 November 2001, Directive 2001/83/EC of the European Parliament and of the Council establishing a Community code relating to medicinal products for human use was adopted. The provisions of Directive 2001/83/EC apply to medicinal products for human use intended to be placed on the market in industrially manufactured European Union countries. In Romanian legislation, this directive has been transposed into Title XVII "Medicament" of Law no. 95/2006 on health reform.

Material and method
Vitamin C is the first vitamin produced by industrial scale synthesis. Major suppliers of vitamin C are Hoffmann – La Roche, as well as many Chinese companies. Production also occurs in Eastern Europe and India. This process has become very profitable. In commercial production the value of one kilogram exceeded 1000 €. Thus, the price subsequently showed a steady decrease with the improvement of productive efficiency.
Since the market entry of the state-subsidized Chinese producers, the price has fallen to a historical level of approx. 3 €/kg in the early 2000s, since then has increased and since 2007, stagnating at 11 €/kg.
In order to overcome the threat posed by Chinese competition, significant research and development investments have been developed in the US, Europe and Asia, the result of which has been the revival of patents in AAs (ascorbic acid) activity over the last few years. Despite the fact that China now supplies more than 81% of vitamin C worldwide, very little information is available on the latest research and findings in the US and Europe (Figure 1). The price varies between 6 şi 8 €/kg which can ensure an annual profit over 500 milion €.

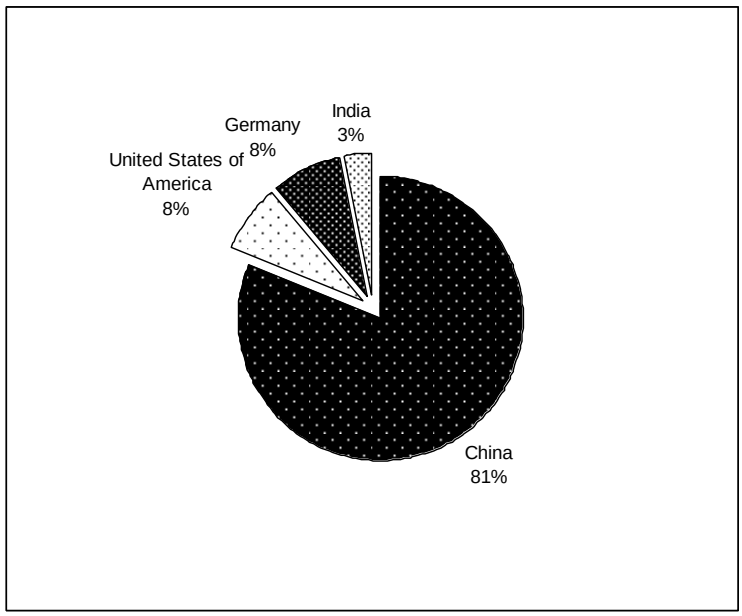

Figure 1. The main producers of raw material to vitamin C

Source: PublishedLiteratureDOWCOM

Vitamin C has multiple uses. It is used in the pharmaceutical industry, food industry, animal feed and cosmetics industry (Figure 2).

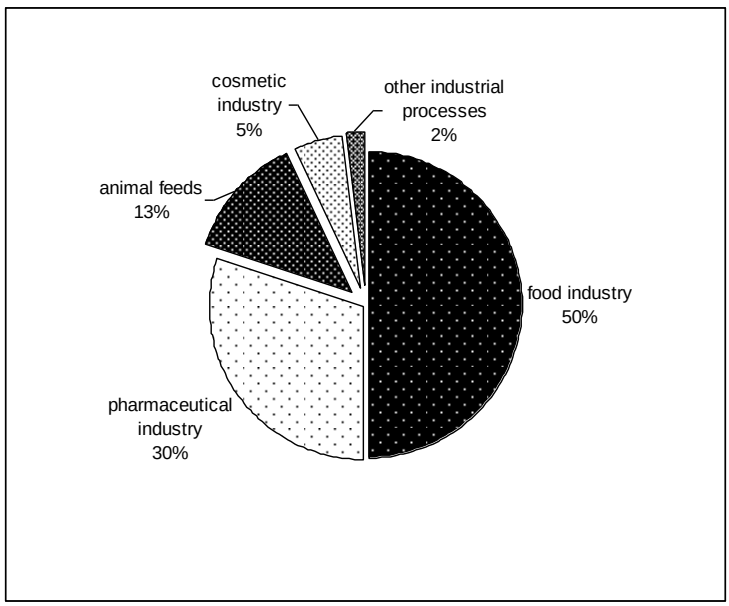

Figure 2. The use field of vitamin C

Source: Hancock, 2009

An important problem for producers is the determination of the vitamin C assortment (solid or liquid) to meet consumer requirements, as well as the possibilities of obtaining technology at the company level, as well as to obtain a profitable advantage for the producers. In this respect, based on statistically retrieved data, models of optimization of the assortment structure is used.
Linear programming is an optimization method that provides results that can be applied in practice (Gheorghiţă, ASE online).
The components of the linear programming model are: the variables, the restrictions and the optimization criterion, in which the variables are the varieties of vitamin C, according to the physical state of the products.
The restrictions refer to relations between variables and quantitative and financial availability, rendered in mathematical expression.
The optimization criterion is a mathematical function of maximizing the total profit of the economic activity as a result of the new assortment structure and the connection between the types of products and the profit for each of them.
Model was solved with Quantitative Management software package, module A - linear programming using the Simplex-Primal method.
Elements needed for optimization refer to:
- Production capacity of the company, in tons;
- Production of assortment n, n = 1-3, expressed in grams;
- Production costs for each assortment, expressed in lei/g;
- Profit for each assortment, expressed in lei/g.

The coefficients of the variables have predicted values, based on existing resources and specific consumption.
Constraints (equality and inequality) are algebriac expressions of degree I and refer to:
- Full use of production capacity (C1);
- Ranking in the availability of financial resources (C2);
- Higher and lower limit of active substance concentrations of vitamin C (C3);
- Limitations of non-negativity, all variables have positive values greater than 0 (C4).

Data sources were an official statistic. They were subjected to procedures for calculating relative size and dynamic structure in order to capture changes of the production structure.
The optimal determination of vitamin C assortments starts from the active substance concentration at product level.
Differentiation is based on the physical state of the product (solid or liquid), implicit after the technology of obtaining.

Results and discussions
Optimizing assortments
Introductory data

Table 1. Assortment and Expenditures

Indicators	x_1 1g	x_2 0.75g	x_3 0.2g	Resources/ Availability
Assortment (grams)	-	-	-	10000
Expenditures (€[x]/gram)	0.06	0.66	0.24	7709.25
Profit (€[x]/gram)	0.02	0.03	0.027	maximum

[x] Euro 4.5411, 30.12.2016, http://www.cursbnr.ro/arhiva-curs-bnr-2016-12-30

Where x means concentration of active substance.

Linear programming model

A) Objective function

Max f(x) = 0.02 x_1 + 0.03 x_2 + 0,027x_3

B) Constraints (first variant)

C1 Full use of production capacity

$x_1 + x_2 + x_3 = 10000$

C2 Availability of financial resources

$0.06x_1 + 0.66x_2 + 0.24x_3 \leq 7709.25$

C3 Non-negativity constraints, all variables have positive values higher than 0.

1)$x_1 \geq 0$

2)$x_2 \geq 0$

3)$x_3 \geq 0$

The first solution of model shows that $x_1 = 0$, $x_2 \geq 10000$, $x_3 = 0$ and Z (Profit) = 308.37 €, given that x_1 and x_3 are 0. This means that the optimum value of profit is obtained only when we have a single product. According to C_1, the solution can not be optimal because it is not satisfactory for the market. As a result, the process which determine the optimal structure of vitamin C products is much more complex, making it necessary to resort to the addition of superfluous or lower and upper limitations of product quantities. In this respect, the linear programming model involves the elaboration of 8 variants.

According to data the constraints are shown below.

V_1. $x_2 \leq 4000$;

V_2. $x_2 \leq 5000$;

V_3. $x_2 \leq 1000$;

V_4. $x_1 \geq 2000$;

V_5. $x_2 \geq 5000$;

V_6. $x_1 \leq 2000$;

V_7. $x_2 \leq 5000$;

V_8. $x_3 \geq 5000$.

In these conditions the results were between from 308.37 € to 272.02 € (Table 2). The fesable sollutions are presented in table 2.

Table 2. Result of the data

Constraints/Variants	Value (grams)	Profit (€)	Expenditures (€)
V_0 $x_1 \geq 0$ $x_2 \geq 0$ $x_3 \geq 0$	$x_1=0$ $x_2=10000$ $x_3=0$	308.37	7709.25
V_1 $x_2 \leq 4000$	$x_1=0$ $x_2=2000$ $x_3=8000$	281.93	3259.91
V_5 $x_1 \geq 3000$	$x_1=3000$ $x_2=4000$ $x_3=3000$	272.02	3370.04
V_6 $x_1 \geq 2000$	$x_1=2000$ $x_2=4000$ $x_3=4000$	277.53	3744.49

Source: own proccesing

The optimal solution for which the analysis has been made is ensuring when profit is equal to 272.02 €. It is obvious that this variant is the best in terms of the restrictions mentioned (Figure 3).

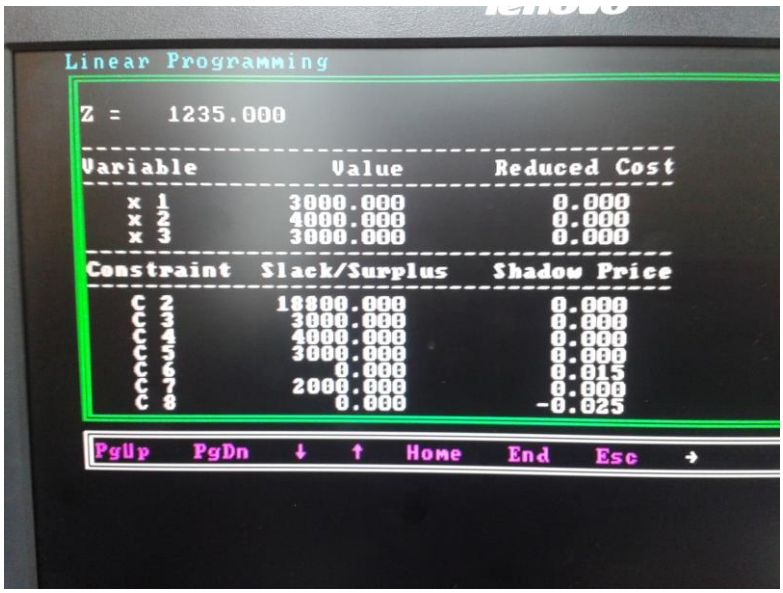

Figure 3. Linear programming-optimal variant

Source: own calculation

Conclusions

The study reffered to designing vitamin C in order to find out its sortimental structure, because its relevance for human health. Vitamin C has become indispensable in industrial food, as an additive and complement of nutritional value. Thus, market demand was constantly increasing.

Much of Vitamin C is obtained through chemical synthesis with industrial and medicinal applications in extension. The synthetic product, according to the bibliographic study, has been shown to have the same biological activity as the natural substance. The vitamin C prevails in environment, being biosynthesized by plant and animal organisms, as well as by many microorganisms. In natural sources, it was found that vitamin C is in the free state and in the form of complexes with proteins, polypeptides, amino acids, forming different types of ascorbigen complexes.

The optimal solution for combining the vitamin C assortments was obtained with the help of econometric-mathematical models, relying on linear programming whose objective function was to maximize profit. The importance of linear programming for the efficiency of the assortment structure is that it allows, in a relatively short time, that it is possible to choose the best variant in the given physical and economic conditions from a multitude of possible solutions and variants.

The linear programming model shown achieving an optimal combination of the influence factors of the vitamin C assortments. The application of this method have had the role of conducting economic activity not by appreciation and experience, but by precise and scientific methods and methods.

The first solution of model showed that $x_1 = 0$, $x_2 \geq 10000$, $x_3 = 0$ and Z (Profit) = 308.37 €. This means that the optimum value of profit was obtained only when we have a single product.

According to C_1 (constraint 1) the solution can not be optimal because it is not satisfactory for the market. As a result, the process which determine the optimal structure of vitamin C products was much more complex, making it necessary to resort to the addition of superfluous or lower and upper limitations of product quantities. In this respect, the linear programming model involves the elaboration of 8 variants. In these conditions the results were between 281.93 € and 272.02 €. The fesable sollutions was when $x_1 = 3000$, $x_2 = 4000$, $x_3 = 3000$ and profit is equal to 272.02 € and expenditures are 3370.04 €.

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STOCHASTIC METHODS OF ANALYZING MACROECONOMIC INDICATORS CHARACTERIZING ENVIRONMENTAL PROTECTION IN ROMANIA, IN LINE WITH THE EUROPE 2020 STRATEGY FOR SUSTAINABLE DEVELOPMENT

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Abstract
Environmental protection encompasses several activities aimed at a better maintenance or restoration of a clean environment by collecting, recycling and treating waste, preventing emissions of pollutants, of noise, as well as by reducing the presence of pollutants in the environment.
The European environmental policy is based upon the principles of caution, prevention, correction of pollution at source and the fact that the polluter must pay. That is why, under the Treaty of Lisbon (2009), "combating climate change" and sustainable development in relations with third party countries, have become specific objectives. At the same time, in 2011, the EU decided to slow the decline of biodiversity and the degradation of the ecosystem by 2020, in line with the EU Biodiversity Strategy.
In May 2016, the EU Commission launched the Assessment of Environmental Policy Implementation, a new tool to help fully implement the EU legislation. The field of environment protection is closely linked to the adequacy checking (REFIT), as well as to monitoring and reporting obligations pertaining to environmental policy, in order to simplify and reduce costs.
The Europe 2020 strategy proposed for implementation identifies three key environmental objectives: protecting, preserving and increasing the Union's natural capital; transforming the Union into a resource-efficient economy; green and competitive low-carbon economy to protect the citizens of the Union from pollution.
The National Strategy for Sustainable Development of Romania – Horizons 2013-2020 has the following main objectives: improvement of the environmental infrastructure and reduction of the current gap between EU Member States; biodiversity preservation; reducing pollution and improving air quality and, at the same time, promoting alternative, renewable and non-polluting sources of energy production, as well as stimulating sustainable economic growth, with a focus on providing new green jobs. An essential element will be the increase of the absorption capacity of European funds through the Sectorial Operational Programme ”Environment” and to prepare the Multi-Annual Financial Framework 2014-2020.
The main purpose of the paper is to make a comparative study of the various statistical techniques used to describe environment protection in Romania: the graphical method, the structural modification method, the regression and correlation methods; methods to be implemented with database management and analysis programs: E-Views, Excel.
The main conclusion of this paper is that such a complex approach will help the EU thrive in a low-carbon environment with limited resources and, at the same time, will prevent environmental degradation, biodiversity loss and the unsustainable use of resources.

Key words: environmental protection, macroeconomic indicators, stochastic methods, biodiversity preservation, energy production, low-carbon economy

1. Introductory elements on the European environment policy under the Europe 2020 strategy.

Sustainable growth entails building a competitive, durable and efficient economy, in terms of resource use, that takes advantage of Europe's leading role in the race to develop new processes and technologies, including green technologies which speed-up the development of smart networks, which use ICTs, which use networks at EU scale and which reinforce the competitive advantages of our business environment, particularly in the manufacturing segment and in SMEs, so as to help consumers better understand the value of the efficient use of resources.
Https://www.mae.ro/sites/default/files/file/Europa2021/Strategia_Europa_2020.pdf

In this context, the EU implements some of the strictest environmental standards in the world. The European Union's environmental policy contributes to having a more and more ecologic **economy and to** protecting the environment, on the one hand, and to maintaining a competitive EU presence in the global market, on the other hand. Also, environmental policy can play a vital role in developing jobs and in stimulating investments. The "green growth" entails the development of integrated policies that promote a sustainable environmental framework. Innovations in the field of environment can be implemented and exported, thereby enhancing competitiveness and improving the quality of life in Europe.

The European environmental policy is based on the principles of caution, prevention, fixing pollution at source and the principle according to which the 'polluter must pay'. (http://www.europarl.europa.eu/) Therefore, under the Treaty of Lisbon (2009), the fight against "climate change" and sustainable development in relation with third party countries became specific objectives. The European Union environmental policy is supported by a series of strategies and directives meant to make it more efficient and to support its sustainable development. These can include: the Climate Change Strategy 2020; Directive no. 75/2010 / of the EC on Industrial Emissions; Directive 1999/31/EC on waste disposal, etc. These examples are conclusive, since they are important initiatives taken under the communal environmental policy. In this context, the Seventh Environment Action Programme of the EU, 7 EAP, sets nine environmental priority targets to be reached by December 31, 2020: protecting, preserving and enhancing the natural capital in the EU; making the EU a competitive low-carbon, greener and more efficient economy in terms of the use of resources; protecting EU citizens against environmental pressures and health hazards; maximizing the benefits of the EU environmental legislation; improving information and data needed to define the environmental policy; providing investments for environmental and climate change policies at a fair price; improving the integration of environmental issues and consistency with other policies, etc. (Nature and Biodiversity Newsletter, 2015)
In conclusion, environmental protection includes several activities directed towards a better maintenance or restoration of a clean environment by collecting, recycling and treating waste, by preventing pollutant emissions, noises or by reducing the presence of pollutants in the environment. The European Union introduced its Sustainable Development Strategy (SDS) as a complement to the already adopted Lisbon Strategy. Renewed in 2006, in order to combine the domestic and international dimensions of sustainable development, the revised SDS of the European Union is constantly trying to improve the quality of life by promoting prosperity, environmental protection and social cohesion. In line with these objectives, the Europe 2020 Strategy for Economic Growth is aimed at a "smart, sustainable and inclusive growth".

(Http://www.ier.ro/sites/default/files/pdf/politica_de_mediu_brosura_nr.4_.pdf)
Moreover, it was in 2011 that the EU has pledged to fight the loss of biodiversity and ecosystem services downfall, by 2020, under the EU Biodiversity Strategy. In May 2016, the EU Commission launched the *Evaluation of Environmental Policies Implementation*, a new tool that aims at contributing to the full implementation of EU legislation on the environment. This is closely connected to checking the adequacy (the Program for adequate and functional regulation – REFIT) of the obligations pertaining to monitoring and reporting, under the environmental policy, in order to simplify and reduce its costs.
The Europe 2020 Strategy proposed for implementation by the EU identifies three key objectives regarding environmental protection, namely: protecting, preserving and enhancing the natural capital of the Union; making the Union an efficient economy in terms of the use of resources; making it greener and more competitive, with low-carbon emissions, in order to protect EU citizens from pollution. Under this strategy, the flagship initiative "A Resource-efficient Europe" paves the way for a sustainable growth and supports the transition to an efficient economy in terms of the use if resources and low carbon emissions. (https://www.mae.ro/sites/default/files/file/Europa2021/Strategia_Europa_2020.pdf)

At legislative level, there appeared a series of new initiatives aimed at waste management, at reducing carbon dioxide emissions and at protecting biodiversity. From an institutional perspective, we noted the establishment of public bodies and institutions in charge of environmental protection. In order to ensure the health and wellbeing of the citizens, it is necessary to have a clean environment, based on the rational use of natural resources.

2. Particular features, objectives and trends of the National Strategy for the Sustainable Development of Romania 2013-2020

2.1. Developments and key objectives of Romania's National Strategy for Sustainable Development 2013-2020

Development strategies of the national environmental policy are shaped by national priorities and by the priorities of the European Union. Thus, we can refer to communal programs such as: PHARE, ISPA, Agenda 21 and the Framework Program for Competitiveness and Innovation, as well as national programs such as: *România Curată* (A Clean Romania), *Facilitatea Globală pentru Mediu* (the Global Environmental Facility), *Programul Operaţional Sectorial de Mediu* (The Segment Operational Program for the Environment), *Programul privind Promovarea achiziţiilor publice ecologice* (the Public Green Procurement Program), *Casa Verde* (the Green Home) and *Programul Rabla* (the Cash for Clunkers Program). These projects began both in Romania's pre-accession period to the European Union, and in the present. Their role is to assist the national environmental policy and to contribute, by specific, targeted measures, to the protection of the environment in Romania.
The funds allocated to the environment segment in Romania, by the European Commission, for the period 2007-2013, amount to 5.6 billion Euro. These allocations originate from two European Union funds: the European Regional Development Fund (ERDF) and the Cohesion Fund (CF) 92. The strategy and distribution of these funds was developed under the Sectorial Operational Program for the Environment (SOP Environment).
The National Strategy for Romania's Sustainable Development – Horizons 2013-2020 envisages the following main objectives: to improve environmental infrastructure and to reduce the gap between EU member states; the preservation of biodiversity; reducing

pollution and improving air quality and, at the same time, the promotion of energy production from alternative, renewable and clean sources; stimulating a sustainable economic growth, with a focus on creating new, "green" jobs. A key tool will be the increase of the European funds' absorption through the Sectorial Operational Program for the Environment and the preparation of the Multiannual Financial Framework 2014-2020. (http://mmediu.ro/new/?page_id=81)

In terms of **biodiversity**, Romania brought valuable assets into the EU portfolio, including numerous plant and animal species, some of them being endemic, which are extinct or rare in other parts of Europe. Although natural vegetation occupies small areas in the plains, plateaus and low hills, there are still significant areas where human intervention was minimal (mountains and high hills, the Danube Delta, the lagoon systems and river floodplains).

In terms of **renewable resources**, according to the legislative package under discussion in the European Parliament and the EU Council, Romania will have to increase the share of renewable sources (solar, wind, hydro, geothermal, biogas, etc.) in the final energy consumption, from 17.8% in 2005, to 24% in 2020 (compared to the EU average of 8.5% in 2005 and the objective of 20%, in 2020). The target envisaged by Romania is that, in 2020, the share of electricity produced from renewable sources will reach 38%. (Report on the implementation of environmental policies – Romania-EU, Brussels, 2017).

In 2016, the priorities of the Ministry of the Environment, Water and Forests referred to creating a framework to make the Romanian economy speedup the transition towards a green economy, as well as to develop ecological enterprises and environmental entrepreneurship. In addition, according to the information provided by Romanian authorities, a white book on green economy is about to by published. Moreover, Romania has increased the number of employees in the environmental goods and services segment from about 130000 people in 2011 to about 146000 in 2016. The Romanian Ministry of Environment recognizes the need for more investments in ecological skills and in the education of the people for a sustainable development. The National Agency for Employment is involved in the "Green jobs" project, funded by the European Social Fund, which aims at evaluating the Romanian market for green jobs and at identifying the best practices for support measures in this segment. Romania hardly used the licenses for the EU's Ecolabel in 2015.

Romania has significantly improved her environmental performance since joining the EU, in 2007. Although Romanian legislation accurately reflects the environmental requirements agreed at EU level, their implementation in the field is a challenge, in general, determined, inter alia, by the lack of planning, of coordination and adequate funding. Gaps in implementation is problematic in several areas, notably in terms of waste management and wastewater treatment. Romania is encouraged to make better use of EU funds so as to meet these challenges and to strengthen the coordination of her administrative mechanisms.

In Romania, both small and medium-sized enterprises (SMEs), as well as large enterprises have a low level of awareness about their environmental impact and the economic opportunities created by circular economy / the efficient use of resources. However, the private segment has a few initiatives about recycling and the reuse of materials, which were further developed, in recent years.About 63% of SMEs in Romania invested up to 5% of their turnover in annual actions for the efficient use of resources (the EU28 average is 28.50%); 26% of them currently offer green products and services (the EU28 average is 26%); 37% have taken steps to save energy (the EU28 average is 59%); 26% have taken steps to minimize waste (the EU28 average is 60%); 29% have taken action to save water (the EU28 average is 44%) and 32% have taken action to save materials (the EU28 average is 54%) (the European Commission, 2015).

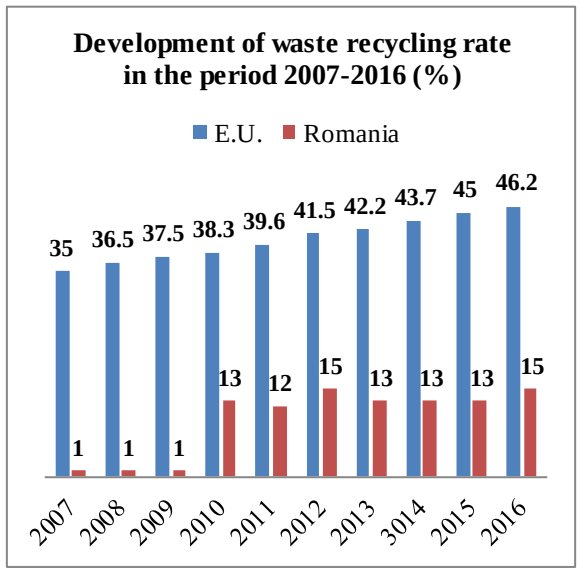
In conclusion, environmental issues are very complex, as the causes are interrelated, which requires action at all levels: local, national and regional authorities, as well as the European Union, each having its role in taking more responsibility for environmental protection. This involves a detailed analysis of the links between different policies and responsibilities, including the links between different areas of administration.
(Comănescu, M., 2010)

2.2 Characterization of trends pertaining to environmental indicators in Romania during 2007-2016

Currently, waste production is no longer considered one of the indicators that are the expression of consumption and richness, but shows the progress of a society, how effective is it in relation to the consumption of natural resources and waste treatment operations. (Duţu, 2008)

Waste management continues to be a major challenge for Romania. In 2017, the transitional period granted to Romania under the Treaty of Accession, for the implementation of the Landfill Directive is about to end and, therefore, Romania will have to close 101 dump sites. Given the large volume of stored waste, Romania could face a serious storage capacity crisis as of 2017 and may violate current legislation on waste. Therefore, Romania opted for a new waiver, until 2020, in the implementation of the target of a 35% cut in the volume of waste to be deposited (in force since 2016). Public access to the municipal waste collection system was only 76% in 2012, i.e. 90% in urban areas and 59% in rural areas. In addition, landfills often do not meet quality requirements. Relatively few localities have put into place a selective waste collection system. (Report on the implementation of environmental policies – Romania-EU, Brussels, 2017)

Regarding the treatment of municipal waste in Romania, in kilograms per capita (see Figure 1), we note that Romania will have to make significant efforts to enhance recycling and reduce the storage of waste. Also, low waste fees do not generate enough revenue for future investments. Therefore, it is not surprising that the absorption of EU funding in order to improve waste management was extremely low, mainly due to the incapacity of the final beneficiaries to prepare and implement large investment projects, the lack of responsibility and the large periods allocated to tender procedures.



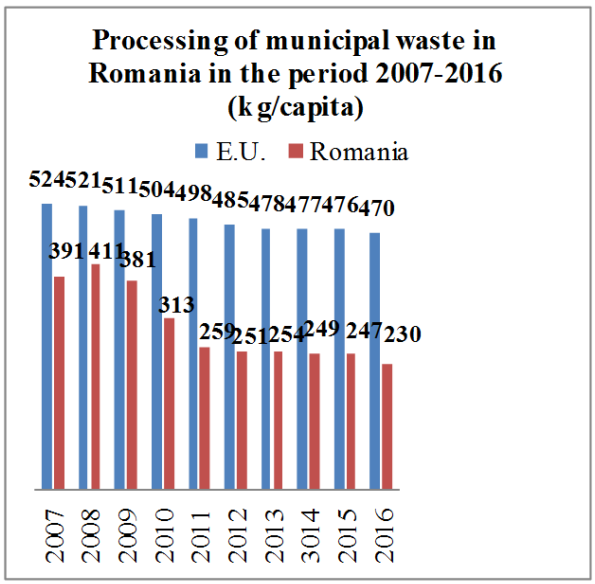


Figure 1. Romania's and EU's situation of waste management in 2007-2016

Source: Eurostat, municipal waste recycling rate, table accessed in October 2017.

In Romania, the indicator referring to the efficient use of resources is low and circular economy remains underdeveloped. Along with Bulgaria and Estonia, "resource productivity" (the economy's efficiency in using material resources to produce wealth) was the lowest in the EU (see Figure 2). In this context, a more circular economy that focuses on recycling and reuse of materials, as well as on a more efficient use of resources, would help stimulate investments. Also, it would generate benefits both in the short and long-term, for the environment, employment and the economy, in general.

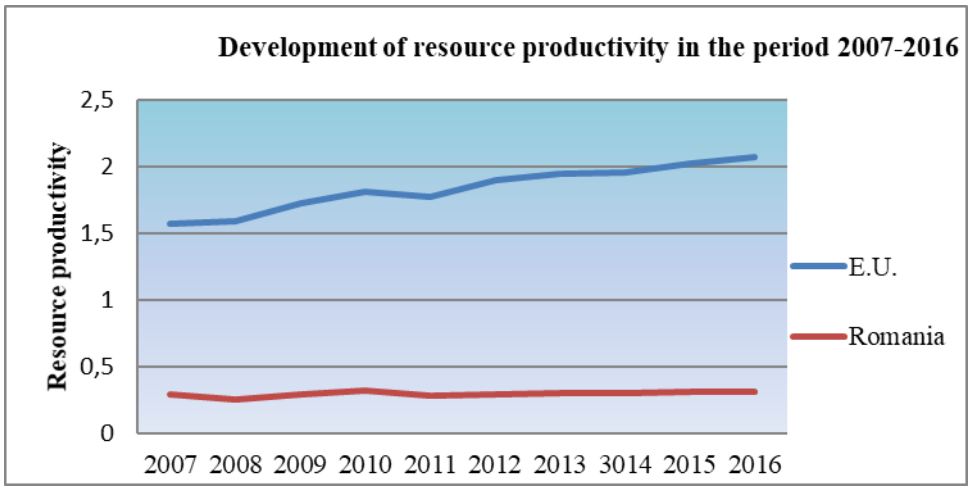


Figure 2. Resource productivity in Romania and in the EU in 2007-2016

Source: Eurostat, resource productivity, table accessed in October 2017.

Taxing pollution and the use of resources can generate more revenue and bring about important social and environmental benefits. According to the latest ESTAT data about Romania, revenues from environmental taxes amounted to 2.42% of GDP in 2014 (the EU28 average is 2.46% of the GDP). Revenues from environmental taxes applied in Romania have increased continuously, as of 2011 (see Figure 3).

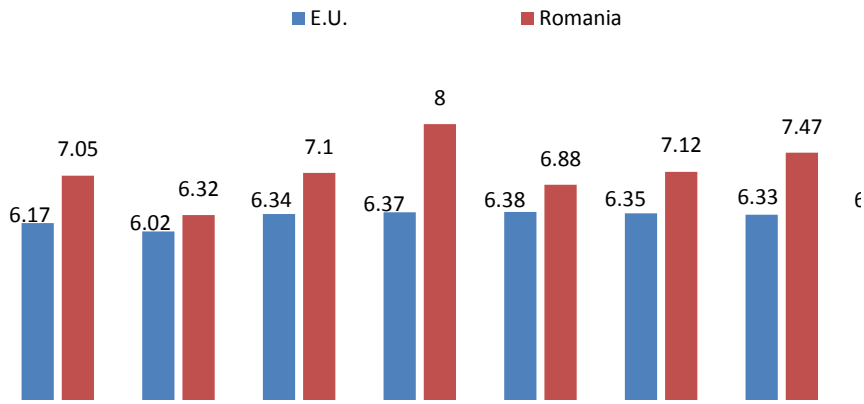


Figure 3. Environmental tax revenue development in Romania and EU in 2007-2016

Source: Eurostat, revenue from environmental taxes, table accessed in October 2017.

Since Romania is facing difficulties with regard to environmental objectives for water, waste and air, further action in the field of environmental taxes is justified, given the considerable potential of additional revenue from environmental taxes. (the European Commission, 2015 Tax reforms in EU Member States – in 2015, institutional document 008, dated September 2015, p. 68.)

3. Research Methodology

Data collection was based on the statistical information published by the National Institute of Statistics of Romania, as well as on the data published by Eurostat for EU countries in order to describe trends of environmental indicators. The analysis and modeling of environment protection in Romania, based on secondary data, studied dependencies that can take place due to implementation of the regression and correlation parameters methods for indicators that characterize the effects and impact of environmental protection upon the health and the people's quality of life, such as: current domestic expenses for environmental protection, investments in environmental fields, the GDP per capita, environmental tax revenue, etc. These analyzes were conducted in this work by using the databases management and analysis programs (Excel, EViews). (Andrew T.; Stancu, S.; Iacob, A.I., et all, 2008).
Thus, the single-factorial and multifactorial regression method was used, which implies an estimation of the regression function parameters through the OLS method. The correlation method leads to pertinent conclusions, even if it is difficult to measure the set of all causal factors and their socio-economic effects.

4. The correlation analysis between the indicators that characterize environmental protection in Romania during 2005-2016

The model reflects the relationship between current domestic environmental expenses (endogenous variable), Gross Domestic Product/capita (GDP) and Investment for the environment (exogenous variable). GDP and FDI were transformed in comparable prices in million Euro. In this case, the regression analysis covers the following stages: developing the regression model and estimating the model parameters, checking the accuracy of results. The following results of multiple regression function using linear regression model of multi-factorial were obtained (see Table 1):

$$\hat{Y}_i = -12727.05 + 0.66x_1 + 255.74x_2$$

Table 1. Output EVIEWS for the multiple regression model

Dependent Variable: CURENT_DOMESTIC ENVIRONMENTAL
Method: Least Squares
Sample: 2005 -2016
Included observations: 12
ENVIRONMENT EXPENSES=C(1)+C(2)* INVESTMENT_ENVIRONMENT+C(3)* GDP/capita

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-12727.08	723439.4	0.784123	0.9831
C(2)	0.663731	0.771614	1.547056	0.0363
C(3)	255.7416	117.1059	0.716888	0.0316

R-squared	0.644679	Mean dependent var	2229814.
Adjusted R-squared	0.547941	S.D. dependent var	578539.4
Log likelihood	-172.8107	Hannan-Quinn criter.	29.25690
F-statistic	7.813256	Durbin-Watson stat	0.910840
Prob(F-statistic)	0.012450		

The link between the variables of this model is measured by the multiple correlation report of ($R_{y/x1,x2}$ =0.80). We appreciate that the multiple relationship is in a linear form and intense. The positive sign of the correlation indicates that our relationship is also direct. The coefficient of determination (R-squared) indicates the percentage by which we explain the influence of significant factors. It is used in evaluating the quality of the model. It can take only values in the range [0, 1]. The values are closer to 1, the model is better. In this case R-squared = 0.64 and so we can say that the regression model is good. Checking the accuracy of the multiple regression models and of the multiple correlation ratios, based on "Fisher" criterion, leads to the following conclusion: because the probability Significance F is less than 0.05 the multiple regression models is valid, with a significance threshold of 0.05.The coefficient β_0 has the value -12727,08. It does not have economic significance. It represents the current domestic environmental expenditure when the others factors do not have influence. Since t = 0.78 and p-value = 0.98 > 0.05 it means that the coefficient β_0 is not valid for a significance level of 0.05.

The slope β_1 has the value 0.66. It represents the current domestic environmental expenditure when the real investment for the environment increased by one million euro. Since t = 1.54 and p-value = 0.03 < 0.05 it means that the coefficient of regression is valid for a significance level of 0.05.

The second slope has the value 255.74. It represents the current domestic environmental expenditure when the real GDP/capita increased by one million euro. Since t = 0.71, and p-value = 0.03< 0.05 it means that the coefficient is valid for a significance level of 0.05.

From correlation chart we estimate that the points in the network graph (Figure 4.a) are uniformly distributed without gaps between them, so we can conclude that the link between Gross Domestic Product/capita (GDP) and Investment for the environment (exogenous variable) and Current domestic environmental expenditure (endogenous variable) is linear, direct and significant.

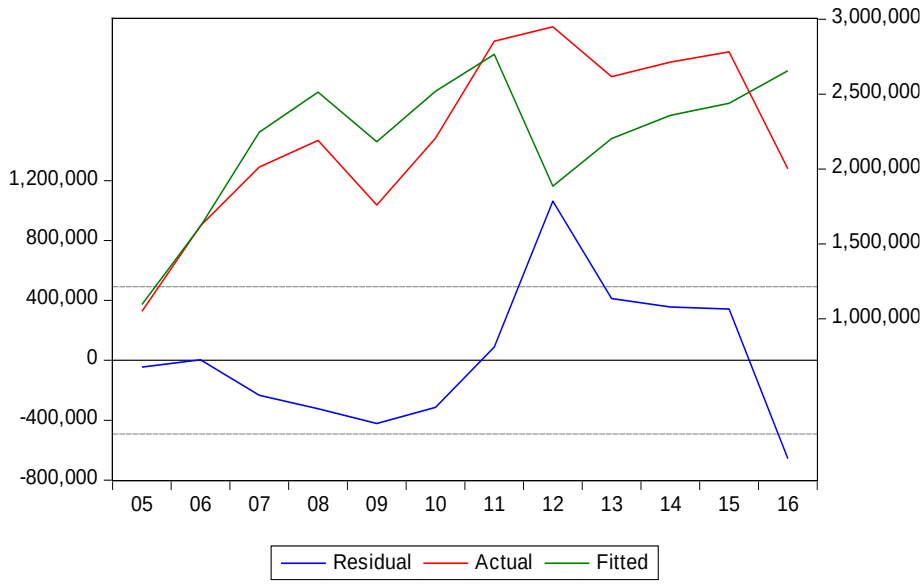


Figure 4a. Actual, Fitted, Residual Graph

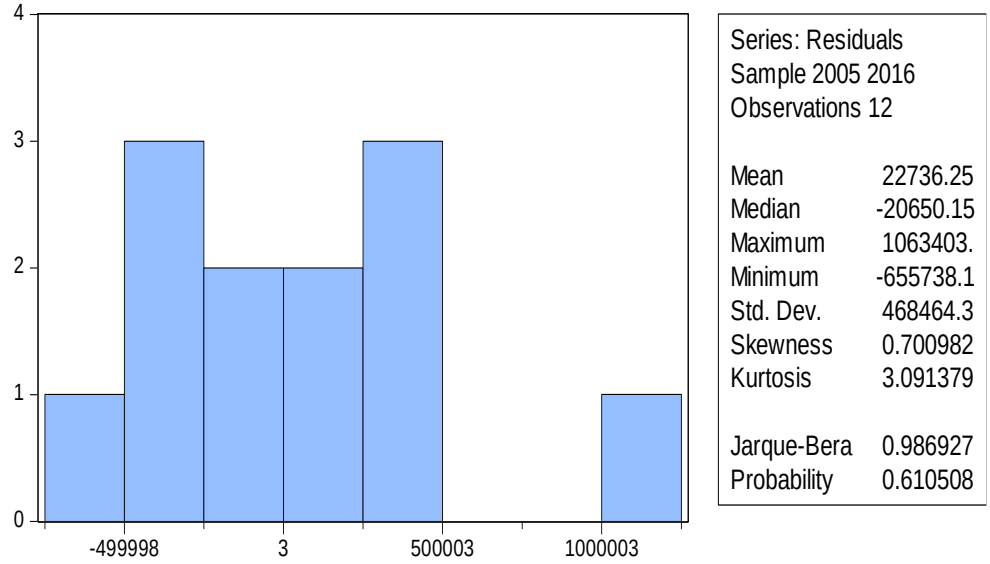


Figure 4b. Histogram Normally Test

The **Durbin Watson test** is used for detecting the self-correlation of order 1 between residuals. Using a level of significance of $\alpha = 0{,}05$, the number of exogenous variables $k = 2$ and the number of observations $n = 12$, from the Durbin-Watson distribution are identified the values (for the case $n = 12$): $d_1 = 1{,}08$ and $d_2 = 1{,}36$. Because $0 < DW = 0.91 < 1.36$, we can accept that the errors correlated positively (see table 1). By verifying the normality of errors using **Jarque-Bera tes**t one observes that $JB_{calc}=0.98 < \chi^2_{tabel}=7.81$ which means that the errors are normally distributed (see Figure 4.b). Because errors occur evenly scattered around the environment of the regression line (see figure 4.a), the data shows heteroskedasticity, so the variance is constant. To detect errors autocorrelation using empirical methods that test Breusch-Godfrey. With this test will analyze the existence of autocorrelation of order k, $k \neq 1$. It is assumed that the error of the regression model is given by the equation:

$$\varepsilon_t = \rho_1 \varepsilon_{t-1} + \rho_2 \varepsilon_{t-2} + ... + \rho_k \varepsilon_{t-k} + v_t \text{ , for t = k,...,n, but } v_t \sim N(0, \sigma_v^2)$$

In order to evaluate the statistical presence of an autocorrelation of the order k, we shall use the following statistical hypotheses:

H_0: $\rho_1 = \rho_2 = ... = \rho_k = 0$;the residuals are not correlated

H_1: $\rho_1 \neq 0$ or $\rho_2 \neq 0$ or $\rho_s \neq 0$, the residuals are correlated

We noticed, by applying the statistical software (EViews), that the statistical probability F is 0.19 (high) and models do not show an autocorrelation of order 2.

Table 2. Breusch-Godfrey Test for multiple regression model

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.056317	Prob. F(2,8)	0.1903
Obs*R-squared	4.054025	Prob. Chi-Square(2)	0.1317

The White test is a statistical test which starts from explaining the observed errors in relation to one or more exogenous variables. (Voineagu V. at all, 2007). The analysis of the application management software and the database analysis (EViews) show that $LM = 9.64 > \chi^2_{0,05;3} = 7.81$, so that the homogenity hypthese is checked.

Heteroskedasticity Test: White			
F-statistic	4.909348	Prob. F(5,6)	0.0392
Obs*R-squared	9.642957	Prob. Chi-Square(5)	0.0860
Scaled explained SS	3.872929	Prob. Chi-Square(5)	0.5679

The disadvantage is that the regression method does not take into account the relationships between independent variables.

5. Conclusions

Romania will continue to effectively contribute, under the current international and communal agreements, to the implementation of common EU objectives on climate change, by reducing emissions of greenhouse gases and by implementing adaptation measures to climate change. Romania has significantly improved her environmental performance since joining the EU, in 2007. Although Romanian legislation accurately reflects environmental requirements agreed at EU level, their implementation constitutes a challenge, due, among other things, to the lack of planning, of coordination and of adequate funding. Therefore, in accordance with the Europe 2020 Strategy, Romania is encouraged to make better use of EU funds.

At the same time, Romania missed many opportunities because she fails to recycle her own waste, leaving it to the private segment to import recycled materials for production. At legislative level, we noted a series of new legislative initiatives aimed at waste management, reducing carbon dioxide emissions and at protecting the biodiversity. From an institutional perspective, we noted the establishment of public bodies and institutions responsible for specific environmental protection policies, which were listed in the work. In conclusion, we can say that, in order to assure the health and wellbeing of the citizens, we need a clean environment that is based on the rational use of natural resources. In order to develop programs for the protection of the environment, we need to identify all the environmental factors and areas where pollution issues may occur. We also need to evaluate costs and to assign people in charge of their development.

In terms of the means for protecting the environment, it is necessary to solve three categories of problems: the development of a proper legislative and institutional framework so as to ensure compliance with the laws in force; the evaluation of the costs of actions meant to protect the environment and to identify their sources of funding; developing long-term programs, correlated nationally and internationally, so as to have an overview.

In conclusion, in 2014-2020, investments will be used in Romania to improve the environment quality and to promote the efficient use of natural resources. In this context, waste management, water and wastewater treatment, biodiversity and the protection of nature, risk prevention and management will be the main segments targeted for investment. The main conclusion of this paper is that such a complex approach will help the EU thrive in a low-carbon world with limited resources and, at the same time, prevent environmental degradation, biodiversity loss and an unsustainable use of resources.

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RURAL POPULATION INCOME INCREASE METHODS

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Abstract
Nowadays, the main topic in regards to the rural areas is the low development and the population migration. The necessity of studying the phenomena arise from the above and makes the studies in this direction mandatory. This research is based on data collected from Romanian National Statistics Institute and European Commission reports. The main objective is to analyze the general situation from 1989 up until now, with emphasys on the period 2012-2016. We can notice a descending trend registered regarding the population migration, mostly due to the lack of opportunities and lack of investors that can create jobs. This paper aims to find the most effective ways that can contribute to a harmonized development of rural areas by adding values added to the involved sectors.

Key words: rural population, rural income, rural development, Romania

Introduction

In Romania, about 9.6 million people live in the rural areas. Romania is a country where the countryside is almost equal in terms of number population with the urban area. Throughout the world, rural development focuses its attention the resources not only of the national authorities but also of the community International. Rural development is an area of interest, not only for countries with a large population in the rural area, but also for economically developed countries, where things are not only driven by differences in the standard life of different categories of population. For example, the old countries in the European Union have exceeded the stage in which the countryside is find out in the early years of the foundations of agricultural policy Community. The standard of living in rural areas is today comparable to the urban one, the incomes obtained here are comparable to those in urban areas and profits from economic activities in rural areas are close to others industries. In order to achieve a social and economic development of the rural areas several factors should be taken into consideration, one of them being the particularities of the rural areas.

The case study is centred on identifying Romania situation in term of rural incomes in the period 2012-2016 and the ways in which an increase can be achieved.

Literature review

The research is based on the data from the National Statistics Institute and Eurostat. We've noticed that the income in rural areas registered an increase mostly by the fact that the medium wage increased in the past few years and that the European funds were accessed.

The situation of the Romanian countryside

In any scenario for the future, the key to success lies in the human factor, the quality of which can be raised by the accelerated modernization of higher education, research and the health care system. A population well educated and informed miss many an opportunity is functioning of the institutions of democracy. Only this way, the people can become immune

to the intoxication and handling, so that later can be raised a society on the fascinating way of civilization. In 2017, we are witnessing an unprecedented attack on the national being. Romania has come to be at a level similar to that of now 46 years and 25 years, unfortunately to falimenteze himself continuously. The rate of decline in the birthrate is 3 % lower than that of the mortality and, if the state will not act accordingly, will be followed by a future grimly.

In 1989, in Romania, the population in the rural areas decreased due to aging, migration to the urban area or most of the times by other Member States with a view to seeking a job well paid especially after the accession to the European Union, which offered them unlimited accces Romanian citizens to places of employment in the Western countries. In the 21st century, the number of Romanians abroad grew by an average of 7,3 % per year. Is an estimate of the United Nations Organization, which places a single country over Romania in the pace of migration, Syria, whose diaspora has increased by 13 % per year. But the percentage Syria is higher because of the exodus triggered by the civil war in that country. Romania is the country with the highest increase of migration on economic grounds.

The UN data shows that last year 3.4 million of Romanians live abroad, most of the people in Spain and Italy. From the point of view of the numeric, Romania has come to have the greatest diaspora from the European Union after the Great Britain, Poland and Germany. But all of these countries in front of Romania from this ranking have a population several times higher than that of Romania. If the data are reported to the number of inhabitants, in the Romanian diaspora represents 17% of the total population who remained in the country, and in Poland only 11%. How do those who go abroad are the worthy people. It can be said that Romania has lost 3.4 million of potential employees because of migration.

However, the Romanians abroad have continued to have a significant impact on the economy by the money sent to the relatives of the remaining in the country. The Romanian National Bank data shows that, from 2000 to 2016, the Romanians in the diaspora have sent home over 70 billion euros. The top was reached in 2008 when the remittances in the diaspora amounted to 8.6 billion euros. However, after 2008 have gradually began to fall.

Mostly due tpo the crisis, but, at the same time, some of the employees of the Romanians from abroad have begun to move their families in the countries abroad and have had no reason to send money in their residence countries. Remittances are hard to follow by economists because money is not transferred from abroad directly to Romania through specialized services, sometimes being taken in luggage during holidays in the country. However, the presence of the Romanians in the diaspora on the labor market in the country could have an impact greater than the remittancesare obtained by sending money.

The privatization of the undertakings has resulted in the reduction of jobs, since most of the times the interest of entrepreneurs was the purchase of land and not the continuation activity of jobs generating. At present, the population in the rural areas is characterized by persons working in the subsistence farms or pensioners who have offered agricultural land rented by a local entrepreneur(Istudor, 2006).

It can be seen in the following table, the migration of the rural population, but also by the urban environment in the period 2012-2016, determined by persons within a specified period of time and have established his residence on a specified territory. From the point of view of statistics shall be pursued only changes of residence from one location to another. Not included are the changes of residence within the same city, sector in case of Bucharest or a village within the same policy.

Table 1. The structure of internal migration in urban and rural areas, determined by the change of residence

Internal migration flows	Years				
	Year 2012	Year 2012	Year 2013	Year 2013	Year 2014
	UM: Number of people, Rate per 1000 inhabitants				
	Number of people	Rates per 1000 inhabitants	Number of people	Rates per 1000 inhabitants	Number of people
Total	372197	16,6	350556	15,7	371677
From rural to urban	74470	5,9	74023	5,9	78411
From urban to urban	106724	8,4	108370	8,6	111545
From rural to rural	72620	7,5	65453	6,7	71063
From urban to rural	118383	12,2	102710	10,6	110658

Internal migration flows	Years				
	Year 2014	Year 2015	Year 2015	Year 2016	Year 2016
	UM: Number of people, Rate per 1000 inhabitants				
	Rates per 1000 inhabitants	Number of people	Rates per 1000 inhabitants	Number of people	Rates per 1000 inhabitants
Total	16,7	361083	16,2	389373	17,5
From rural to urban	6,2	77878	6,2	82612	6,6
From urban to urban	8,9	105292	8,4	108872	8,7
From rural to rural	7,3	71266	7,4	76939	7,9
From urban to rural	11,4	106647	11	120950	12,5

Source: National Institute of Statistics

It can be seen in the table above that of the 5 years review the migration of most of the population was carried out in the years 2014 and 2016. The trend of the population by the rural areas to the urban areas is on the rise, increasing to approximately 3000 people every 2 years. It is assumed that in the year 2017, the migration of the population will be approximately the same as in the previous year.

The highest percentage can be found in the population of urban migration to rural areas and not necessarily because of the creation of jobs or agricultural activity. Moving in the near areas of big cities, where they have been built several residential districts is the main cause. This indicates that the population search nature, fresh air, freedom, things that have been and will can be offer only in the framework of such a settlement. The highest migration was in the year 2016, respectively 2012, so it is estimated that in the next 2 years, the number of persons who will move from town to the village will be in the decrease.

There are also cases in which the population has migrated from one city to another, from one village to another or even within the same type of environment, whether rural or urban areas. The highest percentage can be found at the moving from urban areas in urban areas in the years 2014 and 2016. Migration from rural areas by rural areas has reached the maximum thresholds in the years 2012 and 2016. Once moved in the rural areas, the population is harder to change their residence, since before taking this decision takes into account several aspects such as the distance from the place of work, the future of the family, the potential development of the area or the specific activities of the area.

Medium income in rural areas

With the end of the communist period, the collapse of the industry made the big factories and the combined to be closed. As a result, many jobs have disappeared. At the same time, the action of restitution of agricultural land was carried out, creating a fragmentation of the surfaces. To secure their livelihood, the population migrated to urban areas, agriculture remaining in the care of older members of the family(Ciuva, 2014). As a result of these changes, the rural population has experienced a sharp decline but also an aging as a result of migration to urban. Another phenomenon which rural population faced after 2007 was the external migration as a result of joining the European community.

The income of the rural population consists of: salary income, income from agriculture, income from independent activities, income from social benefits, income from property and sale of assets in the patrimony of the household, incomes in kind, other income. The most important source of income is wage, 51.1% (INNSE 2017).

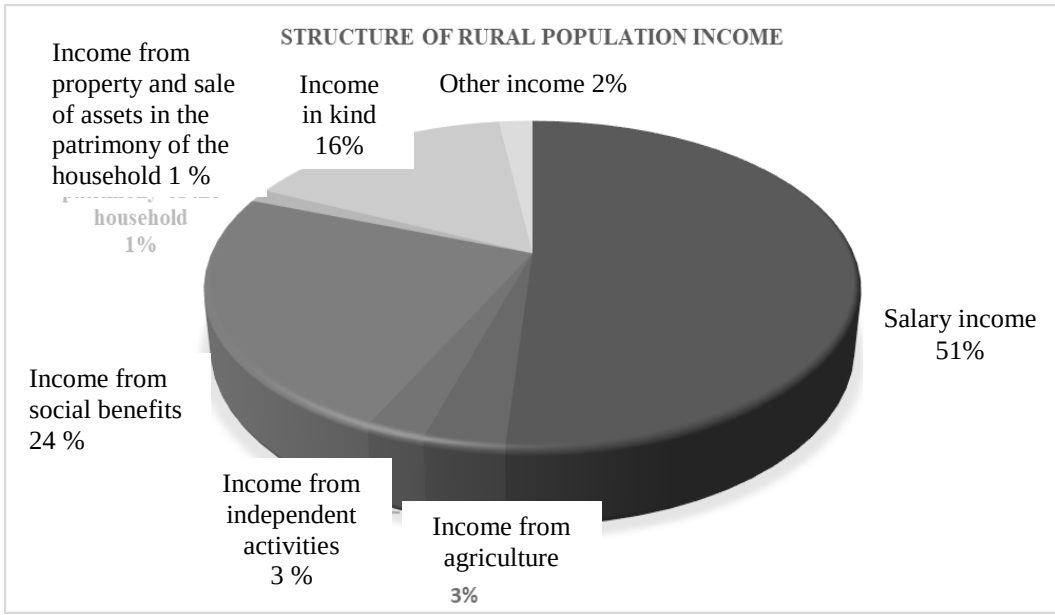

Fig. 1 Caption: Structure of rural population income

Source: National Institute of Statistics

Rural spending consists of: consumer spending, investment costs, production costs, taxes, fees, charges and other expenses. The main destinations of household spending are the consumption of food, non-food goods, services and transfers to the public and private administration and to social security budgets in the form of taxes, contributions, contributions and household needs (animal feed and poultry, work pay for household production, sowing products, veterinary services, etc.).

Table 2. Median equalized net income in Romania 2012-2016

-EURO-

Romania	**2012**	**2013**	**2014**	**2015**	**2016**
Rural areas	1,479	1,603	1,613	1,676	1,772
Urban areas	2,199	2,195	2,379	2,467	2,589

Source: Data processed by the European Commission

It can be noticed an ascendant trend in the analyzed period, from 1.479 EUR in 2012 to 1.772 EUR in 2016. The increase is due to European funds absorption and due to the fact that the minimum wage increased in the past few years. If we were to consider the medium monthly expenses in a rural household, they are very close to the income. Considering the above, rural population is not able to save money in order to invest in any business or in even in their comfort. Regarding urban areas, we can notice that the income is almost 40% higher but the expenses are slightly higher as well.

Table 3. Median equalized net income in Poland 2012-2016

-EURO-

Poland	2012	2013	2014	2015	2016
Rural areas	4,321	4,373	4,479	4,781	5,111
Urban areas	5,261	5,483	5,646	5,798	6,199

Source: Data processed by the European Commission

In Poland we can notice that the median income trend in rural areas is ascendant as well, almost 4 times higher than in Romania. We can't tell the same when it comes to urban areas as the net income is only double. There it can be seen that the disparities are more accentuate in Romanian rural areas as the infrastructure is low developed. In order to reduce the high differences a high developed infrastructure is the first step that can be made.

Ways of increasing rural population incomes

In order to achieve an increase in the rural areas income there are several factors that we should take into consideration. 2014-2020 National Development Plan identified some needs in which the government should take action:

- Reducing school dropout in rural areas;
- Modernization of the agricultural education system;
- Solution for market functioning issues, including measures of mowing agricultural land;
- Development of adequate local, regional and national e-government services;

In addition, infrastructure development is a major factor that is an obstacle in attracting the national and foreign investors. The second to be considered is the bureaucracy when trying to create a local business.

The actual way in which rural population can increase their income is creating businesses. Using their land and their knowledge from the elder and the knowledge that is available now from researches they can create viable businesses (Man, 2007).

At first sight, the development of agribusiness can generate in less developed economies growth and reduction poverty. Directly or indirectly, immediate positive effects of modernization of agro-industrial systems are in the form reducing food costs, diversifying incomes and growth employment opportunities for the rural and even urban population, productivity gains for small producers and integration their local, national or international markets.

Agribusiness does not develop spontaneously. He depends on the structural changes taking place sooner or later slowly into an economy and is directly influenced by geographic factors, demographic, business culture existing in a certain space or environmental factors and even historians (Popescu, 2013). Institutional and innovation technological advances are accelerated or delayed by these factors. Even big international companies that have financial resources of power of innovation, know-how, tradition and, last but not least, great power of negotiation in relations with the authorities and who do part of the agribusiness system sometimes considered difficult to expand and operate in Romania.

Conclusions

In 2017, we are witnessing an unprecedented attack on the Romanian population. Romania has come to be at a level similar to that of now 46 years and 25 years, unfortunately to falimenteze himself continuously. The rate of decline in the birthrate is 3 % lower than that of the mortality and, if the state will not act accordingly, will be followed by a future grimly. In 1989, in Romania, the population in the rural areas decreased due to aging, migration to the urban area or most of the times by other Member States with a view to seeking a job well paid especially after the accession to the European Union, which offered them unlimited accces Romanian citizens to places of employment in the Western countries. In the 21st century, the number of Romanians abroad grew by an average of 7,3 % per year. Is an estimate of the United Nations Organization, which places a single country over Romania in the pace of migration, Syria, whose diaspora has increased by 13 % per year. But the percentage Syria is higher because of the exodus triggered by the civil war in that country. Within the period 2012- 2016,it can see that in Romania, migration of the population was carried out more than in the urban area to the rural and unfortunately, not necessarily because of the desire to develop the Romanian village and change of residence near big cities.

The population has migrated from one city to another, from one village to another or even within the same type of environment, whether rural or urban areas. The highest percentage can be found at the moving from urban areas in urban areas in the years 2014 and 2016. Migration from rural areas in rural areas has reached the maximum thresholds in the years 2012 and 2016. Once moved in the rural areas, the population is harder to change their residence, since before taking this decision takes into account several aspects such as the distance from the place of work, the future of the family, the potential development of the area or the specific activities of the area. As regards people's income, we can notice that in Poland, median income trend in rural areas is ascendant as well, almost 4 times higher than in Romania. We can't tell the same when it comes to urban areas as the net income is only double. There it can be seen that the disparities are more accentuate in Romanian rural areas as the infrastructure is low developed. In order to reduce the high differences a high developed infrastructure is the first step that can be made.

In conclusion, we can state that in order to achieve an increase in the rural areas income there are several factors that we should take into consideration. 2014-2020 National Development Plan identified some needs in which the government should take action as reducing school dropout in rural areas, modernization of the agricultural education system, solution for market functioning issues, including measures of mowing agricultural land or development of adequate local, regional and nation. All these must be based on a reduction of bureaucracy and the establishment of a solid infrastructure (a major factor which is a barrier to attracting domestic and foreign investors).al e-government services.

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THE EVOLUTION AND PROSPECT OF ORGANIC PRODUCTS – ROMANIA AND POLAND

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Abstract
There is no clear definition of organic farming in the literature, but this concept is based on sever production rules and principles, regulated by the legislation in the area. The organic production requires to build a sustainable, balanced and diversified system, aiming at protecting the environment and the supply of agro-food products with certain nutritional and sanitary quality. In the present age, the knowledge about vital processes from plants and the mechanisms that control them have evolved enormously. This study shows the impact of human activity on organic food production and the evolution of organic farming in Romania and Poland.

Key words: organic products, agriculture, Romania, Poland

INTRODUCTION

If we were to define organic farming in the easiest way, it would be agriculture that provides consumers with fresh, authentic and tasty food, while respecting the life cycle of the systems. The US Department of Agriculture has set the following for organic farming: "Organic farming is a production system that avoids or excludes the use of synthetic fertilizers, pesticides, growth regulators and additives in animal nutrition"(Stan V.). Organic farming (also called Organic or Biological) has emerged in Europe as a result of negative experiences caused by the use of synthetic chemicals generated by intensive, industrial farming technologies based on the excessive mechanization and automation of production technologies, and due to the large use of pesticides for the protection of plants and bio-stimulators in animal feed, antibiotics or hormones(Mihai D.).

Organic products can have more synonyms, but they can likewise be easily mixed up with other conditions, such as natural products, healthy products, and so on. In the food industry, the term "natural" is often used to indicate that a food has been processed to a minimum and that preservatives are not added. This does not mean, however, that these foods are also environmentally friendly. In order to be able to say that a product is organic, it means: it was obtained without the use of synthetic chemicals or genetically modified components, it was not exposed to irradiation and, after its production, and the environment did not suffer. In order to be considered organic, agricultural or livestock production must be carried out according to the minimum ecological principles for a period of time that differs from one product to another.

LITERATURE REVIEW

The literature shows a significant development of organic farming in Europe, but with considerable differences between countries. These depend on general agricultural policy (the set of regulations and laws), specific policy incentives, and also on differences in

consumer behavior. This paper reviews the scientific literature on the evaluation of the technical, economic and environmental aspects of conversion from conventional towards organic production. There are many definitions of organic farming. Mannion (1995) refers to it as a holistic view of agriculture that aims to reflect the profound interrelationship between farm, agricultural production and the overall environment. Scofield (1986) stresses that organic farming does not simply refer to the use of living materials, but emphasizes the concept of 'wholeness', implying the "systematic connection or co-ordination of parts in one whole". As Scofield points out, the concerns that motivated the early adopters of organic farming include issues of soil health and structure, the exhaustible nature of artificial fertilizers, and human health. According to the Codex Alimentarius (Le Guillou & Scharpe, 2001), organic farming involves holistic production management systems (for crops and livestock) emphasizing the use of management practices in preference to the use of on-farm inputs. This is accomplished by using, if and when possible, cultural, biological and mechanical methods in preference to synthetic materials.

The current growth of organic farming is being fueled by market demand. Nicolas Lambkin's book in 1990, Organic Farming, spells out both the principles underlying organic farming and the practical ways in which farmers can respond. He is particularly concerned with the economics of organic farming – a key point for farmers thinking of converting their land. He said that organic farming claims have the potential to provide benefits in terms of environmental protection, conservation of non-renewable resources, improved food quality, reduction in output of surplus products and the reorientation of agriculture towards areas of market demand. Some European governments have recognized these potential benefits and responded to them by encouraging farmers to adopt organic farming practices, either directly through financial incentives or indirectly through support of research, extension and marketing initiatives. However, farmers' decisions on whether or not to make the switch from conventional to organic farming have not been studied extensively thus far. The information was provided from the Food and Agriculture Organization of the United Nations (FAO) Organic Agriculture program, whose primary objective is to develop sustainable livelihood, encourage rural development and provide food safety by encouraging organic farming in the member nations and also Eurostat Database.

ORGANIC FARMING – THE BASIS OF ORGANIC AGRO-FOOD PRODUCTS

Ecological agro-food production aims at achieving sustainable, diversified and balanced agricultural systems that ensure the protection of natural resources and consumer health and refers to the production of unprocessed products, processed animal and plant products and feed materials for animal feed on farms organic production. Respecting the following principles:

a. The principle of health: Organic farming must ensure and enhance the health of the soil, plants, animals, humans and the entire planet as a whole and indivisible. This principle reveals that the health of individuals and communities cannot be separated from the health of ecosystems – healthy soils produce healthy crops that support the health of animals and humans. Health means the fullness and integrity of living systems. This does not just mean the simple absence of diseases, but also maintaining well-being under the physical, mental, social and ecological conditions. The essential features of this concept are: immunity, elasticity and regeneration. The role of organic farming in production, processing, distribution or consumption is to ensure and enhance the health of ecosystems and organisms, from the microscopic ones existing in the soil to the beings human. Particularly, organic farming is intended for the production of foods

of superior nutritional quality, which contribute to disease prevention and well-being. In this respect, the use of fertilizers, pesticides, medicines and food additives which may have harmful effects on health should be avoided.

b. Ecological principle: Organic farming must rely on living systems and ecological cycles, work with them, try to stimulate them and support them. This principle specifies the place of organic farming within the living ecological systems. According to him, production is based on ecological processes and recycling. Nutrition and well-being are achieved by greening the specific production environment. For example, for crops, the specific environment is soil; in the case of animals, this is the ecosystem of the farm; in the case of fish and marine organisms, this is the aquatic environment. Systems of organic farming, shepherding and harvesting of products from nature must correspond to ecological cycles and ecological balances. These cycles are universal, but their operation has a local specificity. Ecological management must be adapted to the local environmental conditions, the methods of cultivation and the place occupied by it. It is necessary to reduce inputs through the reuse, recycling and efficient management of materials and energy, in order to maintain and improve the quality of the environment, as well as to preserve resources. Organic farming must achieve an ecological balance by organizing agricultural production systems, managing habitats and maintaining genetic and agricultural diversity. It is necessary for all those who produce, process, market or consume organic products to protect and help the environment that belongs to everyone, including the landscape, climate, habitats, biodiversity, air and water.

c. The principle of fairness: Organic farming must develop relationships that ensure fairness in terms of the common environment and living conditions. Fairness is expressed through equity, respect, justice, and respect for the surrounding world, both in human relationships and in relationships between humans and other living beings. This principle emphasizes that everyone involved in organic farming must develop human relations in a manner that ensures fairness at all levels to all involved – farmers, workers, processors, distributors, traders and consumers. Organic farming must ensure that everyone involved has a good quality of life and contributes to their food independence and poverty reduction. The goal of organic farming is to produce sufficient food and other good quality products. This principle insists that animals must provide life conditions in accordance with their physiological characteristics, natural behavior and well-being. The natural and environmental resources used for production and consumption must be managed in a socially and environmentally sound manner and must take into account the responsibility towards future generations. Fairness requires fair, equitable production, distribution and marketing systems that take into account real social and environmental costs.

d. Administration principle: Organic farming must be managed in a prudent and responsible manner to protect the health and welfare of current and future generations and the environment. Organic farming is a living and dynamic system that responds to internal and external requirements and conditions. Those who practice organic farming can increase efficiency and productivity, but not at risk of endangering the health and well-being of living organisms. As a result, new technologies must be evaluated and existing methods reviewed. Care must be taken to ensure that the understanding of ecosystems and agriculture is not incomplete. This principle establishes that prudence and accountability are essential elements of strategies for the management, development and choice of technologies in organic farming. Science needs to ensure that organic farming is sound, safe and environmentally sound.

ORGANIC FOOD MARKET IN ROMANIA AND EU

The essential feature of the Romanian organic product market is that most domestic products do not reach the Romanian market, being exported mainly in the form of raw materials and, on the other hand, a series of organic food products as finished products. One of the most important aspects of the development of the organic products market in Romania is the consumer. Producers say that the main problem they face is related to the lack of consumer information, most Romanians preferring to buy cheaper products at the expense of more expensive but healthier organic ones. Ignorance of what the ecological product means by the consumer is a big barrier for these products on the Romanian market. Even when they have lowered the price, below the real level to which it should have been set, in order to get closer to the prices of conventional products, vegetable producers have found that they cannot sell their products. There are small organic vegetables, primarily in big stores, generally coming from small producers who cannot afford to export.

On the Romanian market of domestic products are added a series of organic products imported from Germany, Brazil, Poland, Italy and the Netherlands such as: sugar cane brown sugar, chocolate cream, natural oil, whole rye bread, soy, rice and oats, organic coffee and tea, maple syrup, fruit juices, whole pasta, organic biscuits and waffles, dietary sweets, canned vegetables and fruit. The main imported products demanded by Romanian consumers in recent years were organic brown sugar, imported from Brazil, rye bread, pudding and vegetable milk. Although most of the organic products obtained in Romania are currently being exported, it is intended that an increasing share remains and is sold on the domestic market.

In the recent years, the demand of European consumers for organic products has grown enormously. By "organic" product we mean food and agricultural products that have been obtained without the use of pesticides, chemical fertilizers, and zoo-veterinary drugs and medicines in large quantities. Sales of organic farming grew 40% a year. In order to encourage organic farming, the European Union has developed a set of regulations to this end, including the labeling of these products under the sign of "Biological Agriculture". Due to the remaining residues in the soil over time, products are considered environmentally friendly only after two or, in some cases, many years from when farmers apply the principles and rules of organic farming (Gruia R.). In this transition period from intensive farming to organic farming, farmers receive financial aid from the Union budget, up to 8% of the budget allocated to agriculture and the environment. Farmers can receive aid up to EUR 900 per hectare to compensate for the income loss resulting from the shift to organic farming (Healthy food for Europe's citizens – The European Union and food quality, European Commission, 2000, Brussels).

The European Union is promoting a policy of the qualitative diversity of agricultural and food products to meet the changing demands of consumers. Quality assessment of a product is highly subjective. If the diversity of consumption patterns in the Member States adds to it, a harmonious policy on quality and composition of food is very difficult to achieve. The European Union operates with the principle of mutual recognition, a Member State recognizes the quality of food products in other Member States, even though the way of preparation and composition are very different from those used in that Member State. Many agricultural and food products are protected by special regulations, such as wine and strong alcoholic beverages. Certain strict rules on the area of provenance of wine and how to obtain it should be observed. Similar rules exist for beer. Consumers benefit from the quality assurance of agricultural products and other indirect regulations. In agricultural legislation, there are strict rules on the quality and practices of cultivation used in the production of vegetables and fruit. Other products, such as beef and cereals, must comply

with certain technical specifications to enter the public intervention system. This justifies that farmers do not only produce to receive financial aid from the Union budget but to obtain quality goods that can be successfully sold on the market.

ROMANIA AND POLAND – WITHOUT PERFORMANCES IN ORGANIC AGRICULTURE

According to a study by FIBL Switzerland (Switzerland's Institute for Organic Farming Research – FIBL, the world's best-known research organization in the world), Romania is showing modest performance in the organic farming sector, compared to other East European countries and together with Poland, there is a decline in ecologically certified areas, with only 0.7% of the world's total area cultivated and bio-certified. The event was held at the "Innovation Networks in the Central Eastern European Region", organized on February 14, 2018 at ExpoBiofach Nürnberg, the world's largest international environmental fair. However, according to a USH Pro Business website, the two member countries are among the top 10 countries as the total organic agricultural area (Poland 1st place, Romania 7th place). Analysts say that if we are to report the share of organic areas to total cultivation areas, Romania is not in the top 10 places, the leading places being occupied by smaller countries such as Estonia, Lithuania or the Czech Republic. "In fact, these countries are among the top 10 and world-class organic farming intensities, relative to total organic farming," the document added.

Along with Poland, Romania is in decline as well as the total number of organic farmers. Slovenia, followed by Croatia, the Czech Republic, Poland and Romania, has the largest sales of organic products in their countries. This shows that the last two countries benefit from a larger volume of domestic sales, based on increasing consumer interest in the population, even though they are declining as surface and economic operators. The findings of the FIBL report, using comparable 2016 statistical data, is that the area is growing at a lower rate than other regions of the world in terms of the environmental sector, with developments being marked by lower consumption and export-oriented raw materials, rather than products processed under their own brand. Croatia has been given an example in terms of the relationship between export performance and the development of the internal market. In low-performing countries, including Romania, the lack of subsidies, instability of regulations and the internal market as well, represent the modest or negative image of external performance of the sector. Also, lack of knowledge and technology in the field, financing, coherent national support networks, lack of understanding of principles and value chains in this field and knowledge of export markets have been highlighted as possible explanations. Last year, subsidies for organic farming were also paid out of European funds, allocated through the 2014-2020 National Rural Development Program. The amounts per hectare have remained consistent, but the conditions that farmers have to respect were very strict.

Subsidies for organic farmers were included in Measure 11 – Organic Farming and were paid through the Agency for Payments and Intervention in Agriculture (APIA). Measure 11 promotes the application of organic farming practices by providing financial support for both conversion to organic farming methods and for maintaining organic farming practices. According to Eurostat database, Romania recorded a decline in organic production, with a decrease of 204.971, in 2014-2016. In 2015, higher values were recorded for oats and spring cereal mixtures, rice, root crops and fresh vegetables, compared to the previous year, but unfortunately lower than in 2016, except for root crops, which have grown steadily.

Table 1. Organic crop production by crops in Romania (ha.)

	2014	2015	2016
Cereals for the production of grain (including seed)	290081	254867	218318
Wheat and spelt	137474	127231	110552
Cereals (excluding rice) for the production of grain (including seed)	277560	239394	208575
Rye and winter cereal mixtures	298	154	327
Barley	34916	20259	10571
Oats and spring cereal mixtures	2394	3486	29464
Grain maize and corn-cob-mix	95403	86581	55405
Rice	12521	15473	9743
Dry pulses and protein crops for the production of grain	3659	2276	2009
Root crops	6571	7766	9936
Fresh vegetables (including melons)	2315	3639	3321
Total	**863192**	**761126**	**658221**

Source: Eurostat

Table 2. Organic livestock of animals in Romania

	2014	2015	2016
Live bovine animals	33782	29313	20093
Live swine, domestic species	126	86	20
Pigs	126	86	20
Sheep	114843	85419	66401
Goats	6440	5816	2618
Poultry	57797	107639	63254
Total	**213114**	**228359**	**152406**

Source: Eurostat

Analyzing the tables above, is the green business a profitable segment? Or rather risky business? Regarding the number of agricultural products and animals grown in ecological system in Romania, the number of these products shows a major decrease in the 2014-2016 period. One factor that influences this can be the number of organic operators, which also show a downward trend for both analyzed states. In the figure below, it can be seen an easy upward for Poland in 2015-2016 period.

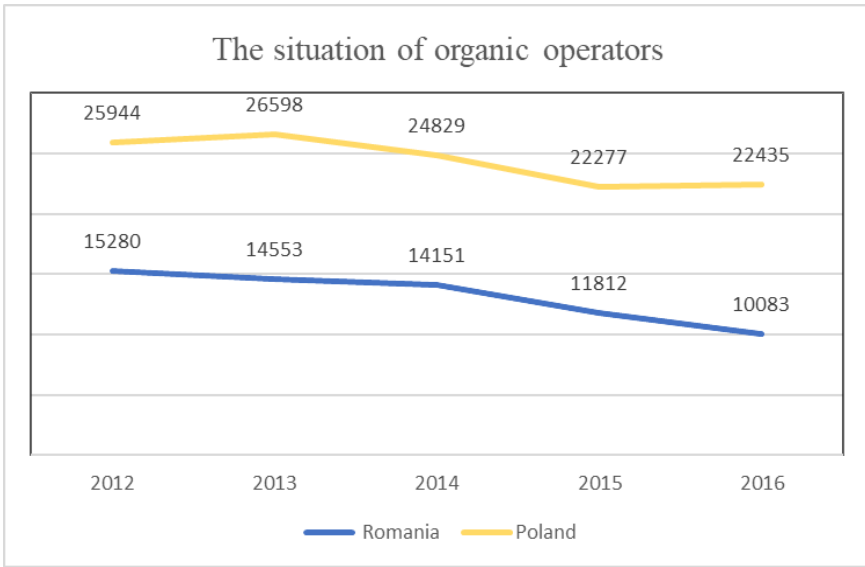

Figure 1. The situation of organic operators in Romania and Poland

Source: Eurostat

According to the Eurostat database, the number of organic operators declined in both countries in the period 2012-2015, and in 2016 Poland shows an increase of 158 more than in the previous year, while Romania is continuously decreasing. One of the factors influencing this decline in Romania is the small number of agricultural high schools, of which only one specialized exclusively on organic farming, which narrows the chances of young people to become organic farmers. Rural areas are already struggling to create attractive jobs in general, pushing for ongoing migration to urban or foreign centers, where wages are higher.

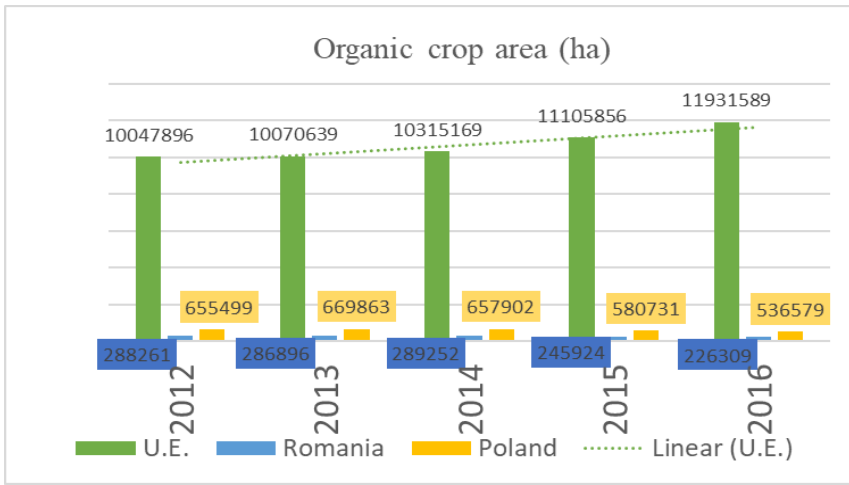

Figure 2. Organic crop area (ha)

Source: Eurostat

Romania and Poland record a decline in organic certificated areas and agricultural operators in the sector, although countries are in the top 10 as the total organic farmland. If at European Union level the areas cultivated with organic methods have grown annually in the last decade by 500.000 ha, the upward trend is not found for Romania and Poland where the eco-cultivated areas have fallen from 288.261 ha in 2012 to 226.309 ha in 2016 in Romania and from 655.499 ha in 2012 to 536.579 ha in 2016 in Poland. Farmers say organic farming is not sustainable in our country. The area where organic farming is practiced in Poland represents 5.2% of the organic area cultivated in the European Union. The organic farming area amounted to 657.902 ha in Poland. The proportion of the area already transformed into organic farming and the area still undergoing transformation shows good potential for the future growth of organic farming in Poland. Surface growth between 2004 and 2014 was spectacular, ranging from 84.000 ha to 658.000 ha. In spite of this rapid increase, the share of organic farming is still much lower than in the most important countries producing organic products in the European Union. An upward trend in the green area is expected in the near future, as demand for organic products and the organic market is projected to grow in Poland (www.europa.eu/eurostat).

Romania has been mentioned in a study FIBL Switzerland, the most prestigious environmental research organization in the world, with modest performances compared to other Eastern European countries. Thus, out of the 23 Eastern European countries analyzed in the study, which together account for only 0.7% of the world's total area cultivated and certified ecologically, only Romania and Poland are declining ecologically certified areas, being considered from this point of view counter-performances (USH Pro Business, February, 2018). Even so, Poland and Romania are still among the top 10 countries as total organic agricultural area (Poland 1st place, Romania 7th place). The real potential was shown According to European statistics, between 2010 and 2015, where the number of organic farms in Romania increased by almost 300 percent, reaching 11.869 organic farms in 2015, from 2.989 of such farms in 2010.

CONCLUSIONS

The most important thing that emerges from the study above is that we need agriculture, farming jobs, healthy eating, and great confidence that we have a huge potential. Romania has, perhaps, the greatest ecological potential in Europe, possessing large areas of arable land. The programs developed by the Government, as well as the Associations of Professionals, should lead to a better information of the people about both the importance of organic food consumption and the opportunities that exist in the development of business in the environmental field, of the road to the other states of the Union. The case study presented above is the best proof that we still have needs that we can satisfy with some courage and patience. It brings to light the return to the base, that is, to an agriculture capable of bringing back the wheat from which the grandmother's bread comes, but in a way worthy of this century. Also, the reunion of organic associations can generate a favorable result for increasing organic productivity.

In general, the organic transformed products are more efficiently than the cultivations and the olive cultivation have had the lowest level of efficiency. Organic farms have underscored a lower level of efficiency than normal farmers underling as some parameters such as the agrarian capital and labor force may be two pivotal variables in improving the level of economic and allocative efficiency.

For the future it is pivotal to implement funds and subsides allocated by the European Union in the Common Agricultural Policy towards organic farmers, in particular in favor of

many of them living in less favored areas, where are located a significant percentage of organic farms in order to reduce the marginalization and the out-migration from the countryside. Romanian and Polish farms should have positive consequences by the introduction of incentives correlated with the level of greening, in the new process of rural planning proposed by the European Union, aimed in stimulating the intensification of crops and in reducing the negative impact on the environment.

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THE NATURAL GAS TRANSPORTATION SYSTEM – THE RURAL STAKEHOLDERS

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Abstract
The purpose of the following article is to highlight the level of interest of the local stakeholders regarding the construction and development of the natural gas transportation system.
The European Council highlighted the need to modernize and expand the gas transportation infrastructure along with the importance of interconnecting the energy systems of the European Countries in order to ensure a secure and competitive energy market for all its members.
In Romania the natural gas transportation system is owned by Transgaz S.A. Medias, company which is listed on the Bucharest Stock Exchange market. The ministry of Economy is the majority stockholder, with 58,51% while the rest of the stocks being in the hold of legal entities and individual persons. Because of its important strategic position, Romania can benefit from important amounts of European funds in order to expand the gas infrastructure. At this time, the company managed to secure an 179,32 million euro grant and is on its way to build one of the largest gas pipelines from Romania, the BRUA pipeline which will create a gas highway between Bulgaria, Romania, Hungary, Austria.

Key words: natural gas, gas pipeline, BRUA, stakeholders

1. Introduction

The EU development strategy for 2020, places the energy infrastructure on the first place, highlighting the urgent need to update the European energy networks and their interconnections at continental level in order to integrate different renewable energy sources.[1]
All the EU states aim to diversify their energy sources and encourage the exploitation of natural gas resources and the development of the gas transportation and distribution systems.[2]
Therefore, the European Parliament and the Council of the European Union are implementing a new policy regarding the energy infrastructures in order to optimize the network development at European level during 2020 and beyond and to enable the Union to achieve its key energy policy objectives of competitiveness, sustainability and security of natural gas supply.[3]

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[1] Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009 Text with EEA relevance
[2] Sturm, J., F., (1997), Trading Natural Gas: Cash, Futures, Options and Swaps, Penwell Publishing Company, Tusla, Oklahoma, p. 1.
[3] Regulation (EU) No 347/2013, Art. 4

Thus, the European Commission establishes guidelines for trans-European energy networks, guidelines which are intended to help completing the internal energy market of the EU, while encouraging the rationalization of production, transport, distribution and use of energy resources, reduce the degree of isolation of the less-favored countries, ensuring security and diversification of energy supply cooperation between countries and contribution to sustainable development and environmental protection.
In order to achieve its goals, the EU finances the development of natural gas transportation systems of the Member States.[4]
One of the projects financed by the EU in Romania is the BRUA gas pipeline.
The BRUA project aims to create a link between Bulgaria, Romania, Hungary and Austria, a gas highway that will facilitate the gas transport from the south to the central Europe region.

2. The BRUA Natural Gas Pipeline

The "Development on the Romanian territory of the National Gas Transmission System on the Bulgaria — Romania — Hungary — Austria Corridor — transmission pipeline Podișor — Horia GMS" is a PCI project, that aims to interconnect the Romanian natural gas transportation system and the similar systems of Bulgaria, Hungary and Austria, more precisely, the construction of a new gas pipeline linking the Technological Node Podișor and GMS Horia. [5]
The project has an important role for the Romanian energy system and economy and it is included not only in the Development strategy of Transgaz but also in the Romanian Energy Strategy 2016-2030 and in the EU's development strategy at position 6.24.2 in the "COMMISSION DELEGATED REGULATION (EU) 2016/89 of 18 November 2015 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest".[6]
Through the implementation of the BRUA project, the following objectives will be achieved:

1. Diversification of the natural gas supply resources of the EU member states;
2. Will transport the gas from the Central Europe to the Caspian region;
3. The new pipeline will ensure a natural gas transport capacity to Hungary of 4.4 billion m3/year and 1.5 billion m3/year to Bulgaria;
4. Will ensure the energy security of Romania by enabling our country to have access to new gas suppliers;

Taking into account the new gas findings in the Black Sea region, in the future, the BRUA pipeline will transport those volumes of gas as well.[7]

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[4] IBIDEM, Art 5.

[5] Transgaz S.A. Medias, Planul de Dezvoltare al Sistemului Naţional de Transport Gaze Naturale 2014 – 2023, Available at: http://new.transgaz.ro/sites/default/files/uploads/users/admin/Temp/plan_de_dezvoltare_pe_10_ani_2014_-_2023_14.12.2014.pdf, [Accesed 12. Sept. 2017], p. 36

[6] Regulations Commission Delegated Regulation (EU) 2016/89 of 18 November 2015 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest, Letter B, Art. 6

[7] BRUA, Un proiect TRANSGAZ pentru Romania și Europa, Broșura informativă, Available at: http://www.transgaz.ro/sites/default/files/brosura_transgaz_varianta_finala.pd, [Accesed 11. Sept. 2017]

The route of the pipeline is from SE-V and will cross the territory of the Giurgiu, Teleorman, Dâmboviţa, Argeş, Olt, Vâlcea, Gorj, Hunedoara, Caraş-Severin, Timiş and Arad counties.
The pipeline route will generally be parallel to existing pipelines in the South-Oltenia and West Transit Systems belonging to the National Gas Transmission System. When selecting the route, some sections have been diverted from the route following parallelism with existing pipelines for reasons of safety, environmental impact reduction, etc. The length of the natural gas pipeline route on the territory of the 11 counties is approximately 529 km, as follows: 21,657 km on Giurgiu County, 19,946 km on Teleorman County, 3,087 km on Dâmboviţa County, 35,081 km on Argeş County, 49,399 km on Olt County, 56,524 km on Vâlcea County, 98,621 km on Gorj County, 79,015 km on Hunedoara County, 58,785 km on Caraş-Severin County, 80,112 km on Timiș County, and 26,724 km on Arad County. [8]

2.1 Natural gas pipeline – construction work
The construction phases will start by making temporary paths in order to access the working fronts and to arrange the working sites and areas. After the working fronts have been delimited, the vegetation layers and the fertile topsoil layers are removed and stored separately from the rest of the soil that will be excavated. Only after they secure the fertile topsoil, the constructor can start the excavation of the trench and the preparation for the pipeline laying. After the trench is prepared, the constructor can start on assembling the gas pipeline and launching it in the trench, following the backfilling of the trench, leveling and morphological restoration of the affected areas.
After the pipe is installed and tested, the working site and area is being cleared.
The last part of the construction is represented by the environmental reconstruction of the affected area and bringing it to its original state[9]
All the stated actions have an impact on the environment and on the population.
For the BRUA pipeline, the width of the working lane is 21 m and in the forests, orchards and difficult are was, the working lane will be narrowed at 14 m.
All the construction works will interact with the environment on all its factors, soil, water, air, noise and vibration. These interactions may cause negative effects on the life quality of the local population from the area where the project is being implemented.

2.2 The social impact of the BRUA pipeline
The BRUA project will have both positive and negative effects on the population.
A. Negative impact
1. Permanent land occupation, resulting in a loss of income sources for the population;
2. Temporary land occupation, resulting in a loss of income source for the population;
3. Possible damage of local roads as a result of pipeline construction phase (material transport);
4. Noise and vibration generated by the pipeline construction activities;
5. Negative impact over the landscape during the construction period.

[8] Dezvoltarea pe teritoriul României a Sistemului Național de Transport Gaze Naturale pe coridorul Bulgaria-România-Ungaria-Austria (RIM BRUA), Available at: http://www.anpm.ro/documents/12220/2231306/Raport+privind+Impactul+asupra+Mediului+-BRUA.pdf/fc9a15b1-b22b-42fc-8f5a-b79158ee6f31, [Accesed 11. Sept. 2017], pp. 37, 38;
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B. Positive impact
1. Possible use of local labor;
2. Construction and / or rehabilitation of access roads used by the constructors;
3. Ensuring the energy security and safety for the population;
4. Stimulating the internal gas market;
5. Stimulating the economy by rising the demand of consumption goods;
6. Offering new economic opportunities;
7. Stimulating the investments in related businesses;
8. Rising the number of houses that can use natural gas.

2.3 Consulting the stakeholders

In accordance with the provisions of Regulation (EU) No. 347/2013, stakeholders affected by a project of common interest need to be informed and consulted extensively at an early stage where potential public concerns may still be considered openly and transparently.[10]
The stakeholders represent „any group or individual who can affect or is affected by the achievement of the organization's objectives".[11]
By involving all the stakeholders, the company can develop better solutions for its problems, taking into account that each pipeline project is different, as size and location.
Therefore, the pipeline companies should seek involvement from various groups since the planning of the project so those who are interested can participate in the decision making process. [12]

The main stakeholders that can be affected by the project consist in:
- Land owners (public / private) affected by the exercise of access rights in the field;
- Land users affected by the exercise of access rights on the ground;
- People who exploit natural resources;
- Local authorities;
- Unofficial local leaders, community representatives and opinion leaders;
- Workers and employees of landowners and users;
- Local communities in the Project area;
- Vulnerable groups identified in the area;
- Proprietary third party lines / utilities affected;
- Local interest groups, official and informal associations and groups composed of and represented by affected parties.

In addition to stakeholders affected by the Project, there are also a number of relevant affected parties such as, Government institutions and regulatory agencies, local, county and central public authorities and administrations, NGOs and community organizations, local / national media; international & national, Scientific institutions and Association of Owners / Agricultural Companies / Agricultural Cooperatives.

[10] Regulation (EU) No 347/2013 Art. 9
[11] Friedman, A., Miles, S., (2006) Stakeholders, Theory and Practice, Oxford University Press. Inc. New York, p. 1;
[12] Federal Energy Regulatory Commission, (2001), Ideas for Better Stakeholder Involvement In the Interstate Natural Gas Pipeline Planning Pre-Filing Process, Available at: https://www.ferc.gov/legal/maj-ord-reg/land-docs/stakeholder.pdf, [Accesed 12. Sept. 2017];

Therefore, Transgaz organized in October and November 2016 a number of 12 public debates along the new projected pipelines course in order to consult the stakeholders and to hear their opinions.[13]

The locations of the debates were selected by using the following criteria:
- Number of owners affected on each ATU;
- Organizing public consultations in locations other than the locations set for public debates under the environmental assessment procedure;
- Minimum consultation in each crossing county (except for Dâmbovița County where the pipeline route crosses a single ATU and where public debates will take place in the environmental assessment procedure);
- Location of slicing taps;
- Site construction site / pipe deposit;
- The length of the pipe section in each ATU.

The debates were planned in accordance with the provisions of Regulation (EU) No. 347/2013. The date, location and hour of the debates was announced with a minimum of 20 days before they took place, at the event's locations, at the town's hall, on the web page of Transgaz and all the relevant affected parties were invited to participate by letter.

The main topics of the debate consisted in:
1. Presentation of Transgaz S.A.;
2. Description of the Project;
3. Building principles;
4. The duration of the building activities;
5. Challenges;
6. Heath and community safety;
7. Potential benefits;
8. Reactions and responses;
9. Management plans[14].

Table 1. The number of participants at the debate for each ATU

Nr.	Location	County	Total population	Directly affected	Total participants	Age	
						<40	>40
1	Mârșa	Giurgiu	2,850	242	36	12	24
2	Gratia	Teleorman	3,936	215	27	14	13
3	Bârla	Argeș	5,045	314	63	21	42
4	Potcoava	Olt	5,800	314	50	16	34
5	Gușoeni	Vâlcea	1,647	752	48	18	30
6	Bălănești	Gorj	2,173	792	37	0	37

[13] Consultare publică – Proiectul BRUA FAZA I, conceptul privind participarea publicului pentru proiectul BRUA, Available at: http://www.transgaz.ro/ro/content/consultare-publica-proiectul-brua-faza-1, p. 8;
[14] Ibidem pp. 8, 9;

Nr.	Location	County	Total population	Directly affected	Total participants	Age	
7	Măciuca	Vâlcea	1,982	603	48	24	24
8	Turcinești	Gorj	2,213	12	35	9	26
9	Totești	Hunedoara	1,869	109	44	10	34
10	Băuțar	Caraș Severin	2,577	107	43	8	35
11	Obreja	Caraș Severin	3,287	250	49	7	42
12	Costeiu	Timiș	3,422	183	29	9	20
	Total		**36801**	**3893**	**509**	**148**	**361**

Source: interpretation of data from "Consultare publică – Proiectul BRUA FAZA I"

Table 1 "The number of participants at the debate for each ATU", contains 8 columns as follows: Number, Location, County, Total population, directly affected, Total participants and Age.

The "Number" column represents the numbering for the debates.

The "Location" and "County" columns represent the location and county were the debates took place.

The "Total population" column represents the population for each locality.

The "Directly affected" column represents the number of people that have land properties in the pipeline's right of way.

The "Total participants" column represents the number of people that were present at each debate.

The "Age "column divided by age, under and over 40 years old, characterizes the age of the participants.

At ATU Mârșa, Giurgiu county, from the total number of 2850 people that live in the ATU, 242 are directly affected by the pipeline's construction work, but only 36 people participated at the debate. Regarding the age of the participants, 12, respectively 33% were under 40 years old and 12, respectively 67% were above 40 years old.

At ATU Gratia, Teleorman county, from the total number of 3936 people that live in the ATU, 215 are directly affected by the pipeline's construction work, but only 27 people participated at the debate. Regarding the age of the participants, 14, respectively 51% were under 40 years old and 13, respectively 49% were above 40 years old.

At ATU Bârla, Arges county, from the total number of 5045 people that live in the ATU, 314 are directly affected by the pipeline's construction work, but only 63 people participated at the debate. Regarding the age of the participants, 21, respectively 33% were under 40 years old and 42, respectively 67% were above 40 years old.

At ATU Potcoava, Olt county, from the total number of 5800 people that live in the ATU, 314 are directly affected by the pipeline's construction work, but only 50 people participated at the debate. Regarding the age of the participants, 16, respectively 32% were under 40 years old and 34, respectively 68% were above 40 years old.

At ATU Guşoeni, Vâlcea county, from the total number of 1647 people that live in the ATU, 752 are directly affected by the pipeline's construction work, but only 48 people participated at the debate. Regarding the age of the participants, 18, respectively 37.5 % were under 40 years old and 30, respectively 62.5% were above 40 years old.

At ATU Bălănești, Gorj county, from the total number of 2173 people that live in the ATU, 792 are directly affected by the pipeline's construction work, but only 37 people participated at the debate. Regarding the age of the participants all the 37 participants were above 40 years old.

At ATU Măciuca, Vâlcea county, from the total number of 1982 people that live in the ATU, 603 are directly affected by the pipeline's construction work, but only 48 people participated at the debate. Regarding the age of the participants, 24, respectively 50% were under 40 years old and 24, respectively 50% were above 40 years old.

At ATU Turcinești, Gorj county, from the total number of 2213 people that live in the ATU, 12 are directly affected by the pipeline's construction work, but 35 people participated at the debate. Regarding the age of the participants, 9, respectively 26% were under 40 years old and 26, respectively 74% were above 40 years old.

Only at this location the number of participants was higher than the number of directly affected people.

At ATU Totești, Hunedoara county, from the total number of 1869 people that live in the ATU, 109 are directly affected by the pipeline's construction work, but only 44 people participated at the debate. Regarding the age of the participants, 10, respectively 22% were under 40 years old and 34, respectively 78% were above 40 years old.

At ATU Băuțar, Caraș Severin county, from the total number of 2577 people that live in the ATU, 107 are directly affected by the pipeline's construction work, but only 43 people participated at the debate. Regarding the age of the participants, 8, respectively 19% were under 40 years old and 35, respectively 81% were above 40 years old.

At ATU Obreja, Caraș Severin county, from the total number of 3287 people that live in the ATU, 250 are directly affected by the pipeline's construction work, but only 49 people participated at the debate. Regarding the age of the participants, 7, respectively 14% were under 40 years old and 42, respectively 86% were above 40 years old.

At ATU Costeiu, Timiș county, from the total number of 3422 people that live in the ATU, 183 are directly affected by the pipeline's construction work, but only 29 people participated at the debate. Regarding the age of the participants, 9, respectively 31% were under 40 years old and 20, respectively 68% were above 40 years old.

All the participants at the debates were local people.

By comparing the total number of people that live in the 12 ATU's where the debates took place with the total number of directly affected people we will see that the total affected people represent only 10.57 % from the total population. This may indicate the fact that the pipeline does not use/occupy a large amount of terrain, taking into account that at the specified ATU's in general, the land loaners have small parcels of land, which they give in lease.

By comparing the total number of people that live in the 12 ATU's where the debates took place with the total number of directly affected and the people that actually participated at the debate we can see that the residents are not interested in the BRUA pipeline project.

An important factor that may have influenced the number of participants at the debate might be the fact that a few months before, a Transgaz team already organized debates in some of the ATU's that are affected by the pipeline's construction in order to obtain the environmental agreement from the National Agency for Environmental Protection.

The coverage of the debates was made online and at each of the ATU's town halls, thing that might influence the number of participants, not many people have access to the internet in the rural areas and also many of them don't visit the town hall.

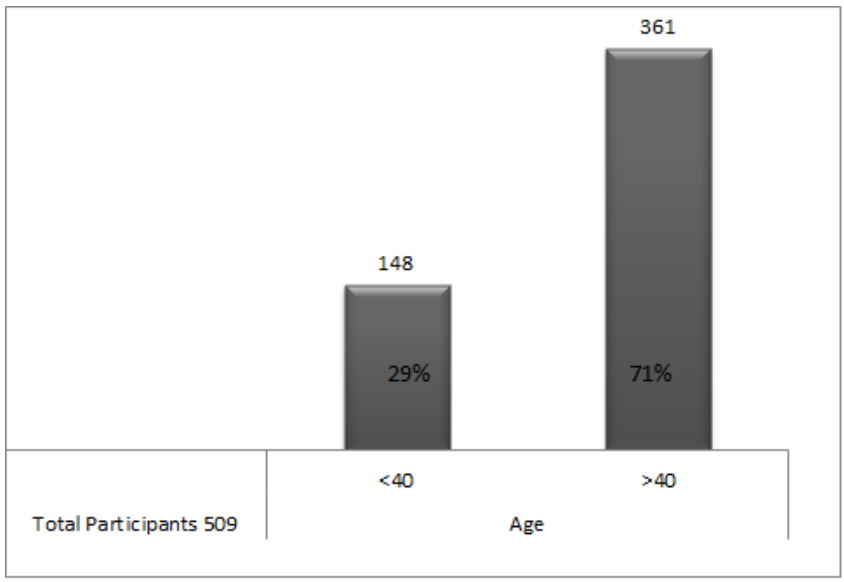

Figure 1. Graphic representation – Age groups of the participants

Source: Table 1 data interpretation.

Regarding the age of the participants at the debates, we can see that from the total number of 509, 148, respectively 29% were under 40 years old and 361, respectively 71% were above 40 years old.

The age difference is due to the fact that young people leave their rural homes in order to get a job. At country, the only source of money and living is represented by the land but the results of working the land for a regular person are far too small in order to satisfy the today's needs. This and the fact that our rural areas are not developed enough, make the young population to flee to big cities or in foreign countries in order to have a better life.

Conclusions

In conclusion, although the number of local stakeholders for the 12 regions is 36801 and the number of directly affected persons was 3893, only 509 participated at the debates and have shown direct interest regarding the construction of the largest natural gas pipeline in our country. The small number of people that showed interest would reflect the fact that people are less and less interested in the major things that happen around their communities. Taking into account the age of the participants, we can see that the population is aged, this thing reflecting an already know fact that the young people leave the rural

areas for the cities in order to get a job. Also, the aged population from rural areas, in general, has a low level of education that might contribute to the lack of interest for the debate and for the BRUA project itself.
For the fact that at the debates organized by Transgaz S.A. Medias for the BRUA project, only 509 people participated at the debate, we should ask ourselves the question, why people don't show interest regarding the projects that are being implemented in their community.

At the debates, all the public's questions were answered.

According to the official Transgaz reports, there were no questions or problems in the debates that would put the presentation team in difficulty.

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EFFECTS OF THE FINANCIAL CRISIS IN ROMANIAN AGRICULTURE AND THE EUROPEAN UNION

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Abstract
An important branch of the national economy, agriculture, is a matter of interest when we look at its contributions to the gaps in the economy. The agricultural sector experienced many falls and fluctuation as long the economic gaps happened. However, agriculture is the sector that can cope with these shifts and can face to the food needs. The paper approached indicators such as the annual average consumption of food and beverages for the period 1990-2015, the average expenses for purchasing agro-food products, the agricultural labour force, the volume of labor force in agriculture, all those indicators linked with the financial situations. This article aims to analyze the evolution of Romanian agriculture to identify areas and products that have been able to adapt to these internal and external market conditions and to propose a range of possible recovery measures for the next period.
Key words: crisis, agriculture, development, labor force

Introduction

Since 1862 Romania has gone through forty years of economic and financial crisis. As an important branch of the national economy, agriculture is a matter of interest when we analyze its contributions to the gaps in the economy.

The event of European integration can benefit the development of agriculture in Romania, an advantage mainly held by its position in the stakes of the national economy and its preservation despite the external factors that emerged during the years of accession. In modern economies, and in particular in the European Union, this sector has diminished its importance over time in favor of the industry sector, which has grown primarily through exports after the fall of 2003-2008.

Agriculture has experienced a continuous gap in the share of gross domestic product, being 5.3% in 2012, half compared to 2003, although Romania remained among the countries with the largest share of agriculture in GDP. Three major groups are being attacked by the manifestation of agriculture in the national economy, such as employment, prices and gross domestic product.

1. Theoretical Framework

It is known that once every four years we can talk about the economic crisis, having the model of the years 1862-2000 and the number of crises during this period. The work of Professor Victor Axenciuc presents moments of growth and decline through which our country has passed, which was extended until 2016 through the National Institute of Statistics database. During the period 1862-1914, in which the agricultural field was a fairly important share, the Gross Domestic Product experienced broad oscillations, depending on the agricultural years.

Almost half of the 40 years of crisis are recognized during the years 1865-1866 and 1883-1884. The first known crisis of the analyzed period was in the years 1865-1866, caused by the reforms of Cuza, which had a negative effect on the national economy and agriculture. The next economic crisis, known as between 1883-1884, was the cause of the weak years in terms of agriculture.

During the period between the two world wars, three years of economic crisis have been manifested. In Romania, the great world crisis was only a year, followed by a breakthrough in the economy. The years of the 4th decade have suffered the worst fall, being the cause of the loss of important territories following the Vienna Dictatorship. In the last years of the Second World War, the 90 years of economic growth have been covered.

The next period, the communist period, was considered the best period of economic growth in Romania, an uninterrupted financial period. The rates of growing external debt payments have brought the emotions of a further economic downturn in the 1980s, becoming incapable of paying, accentuated in 1988-1992. From this last year, the economy grew up by 1999. By the end of the period, the last crisis was in the years to come, 2009-2010, when the economy declined by 7.8% over the previous year.

This analysis shows the differentiation of the causes of the economic crises and the factors that contribute to the Gross Domestic Product affected by it.

Consumption of agricultural products has never been greatly distorted, being constant, irrespective of social factors, such as the number of employees and the value of wages. Permanently there will be changes in the culinary guidelines from quantity to quality, which is why an important factor is the factors influencing food consumption. Many of these come not only from the sphere of agriculture but have a much wider development; variables, such as socio-demographic ones, are the structure of a multitude of elements, of which the expenditures are the dimension for which the availability of food access to it, which encompasses the knowledge of food security. In fact, food security is the issue not only of poor nutrition from the point of view of quality, but also of economic development and trade.

Political incomes of the population outline patterns of food consumption, which is why a concrete analysis of food expenditure and consumption is required. This issue will also be debated in the present paper, to a lesser extent, starting from social financial factors, such as the evolution of people's incomes and their influence on consumption, on the expenditure-consumption model.

Research method consists of the empirical analysis of the available data, the analysis of current situations, the synthesis and the comparison of the deducted factors between the years. The information and data in the tables and graphs were taken from national and international statistics, the National Institute of Statistics, the FADN Portal, the World Bank, and specialized books that had a similar theme to the analysis. At the same time, own calculations and interpretations were used. The study analyzes the state of agriculture in the national economy and how it has been affected by economic crises through internal or external factors as well as comparisons with other states and their situations. Account has been taken of the social situations reported in the agriculture of that year, the contributions of agriculture to the formation of the Gross Domestic Product, as well as the contributions of the Industry and Construction sectors and how they were affected by the economic crises. In large part, the analysis has been carried out since 1990/1992, to date, a period that

has been shifted from several economic gaps at national level. There is a decline in the power of agriculture, both in GDP formation and in labor power.

It also analyzed the situation of agricultural production distribution, where the favorability of the vegetal production is observed, which the Ministry of Agriculture wants to counterbalance with the zoo technical part. A final analysis focused on consumption levels of agrifood products in the dynamics of the post-communist-present period. Consideration was given to total household expenditure, food expenditure.

2. Research

Agriculture is considered an industry in the developed countries of the European Union, being supported by public sources to achieve a high level of performance and stability. However, there are concerns about the variation of agricultural production depending on climate change and the volatility of agricultural prices. This paper follows the dynamics of agriculture in Romania after communism and its influence on the economy as a whole, given its ability to contribute to shocks from economic crises, highlighting the following important indicators of macroeconomic fluctuations: Gross Domestic Product GDP), prices and employment.

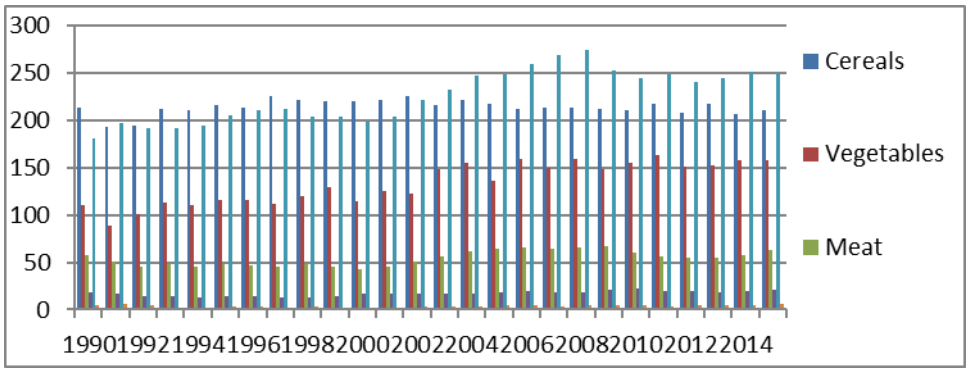

Figure 1. Annual average consumption of food and beverages, per capita, 1990/2015
Source: National Institute of Statistics

The food consumption of the Romanian population is an essential aspect of living conditions. One problem was the average consumption of food, especially the variation of the 2000s. This rhythm of food consumption is shown, which shows the following: the cereals have an annual decrease rate, decreasing by 9.19% the quantities average annual consumption (from 221.1 to 200.8 kg per capita); potatoes, vegetables and fruit have rising rhythms, compared to 1998, fruits having a high consumption of 36% followed by vegetables by about 15%; the meat and the milk have seen a rather obvious growth rate, the milk consuming 233 liters per capita, compared to 194 liters, the value of 1998 and the meat consumption increased by about 25%, reaching the amount of over 67 kg per capita, compared to 51 kg in 1998; in fish products the situation is oscillating compared to the year of refining, 1998. In the following years, consumption of the fish product declined, but now it is possible to appreciate the increase by up to 60%, reaching a level of consumption of 4.8 kg per capita. Vegetable fats have also experienced a strong rhythm of growth, from 10 kg per capita to even 16 kg. It is definitely possible to show that the main food consuming products present a consumption pattern that is diminishing the cereals, instead an increase

in fish consumption and some stability in other products. These consumption levels are different considering the social categories. An example of the differentiation of the consumption of the social categories is given by the increased consumption of vegetable fats, which reveals the poor purchasing power of the people who are in the category below the average incomes of the food.

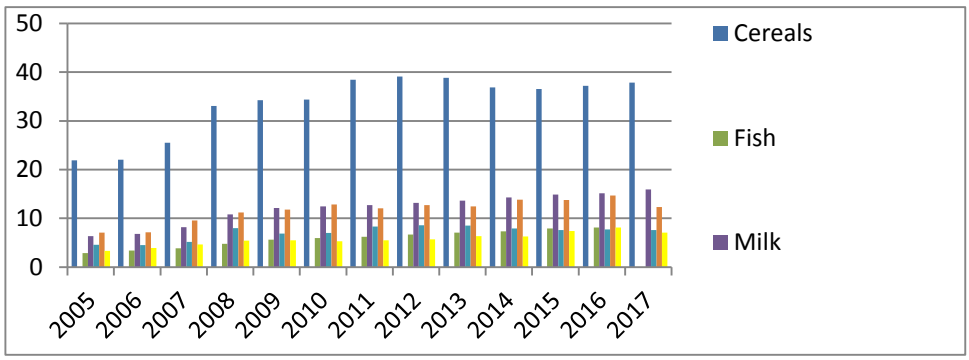

Figure 2. Average expenses for purchasing agro-food products, per person, 2005-2017

Source: National Institute of Statistics

Expenditure on food consumption, out of total expenditure, is 22%, with small differences but with a level of stability.
The evolution of consumption patterns is taken as a mobile asset of the abovementioned differentiations. Next, the share of expenditure on food consumption is taken into account, taking antithesis with the total value of consumption. It is noted that: beverage purchases reach 22% in 2007; the value of the products consumed from own resources reached only 15% compared to the level of 1998, when the weight was 200% higher and 30% respectively. In addition, during the years 1992-2016, the variation in the social situation, the working population, the total labor force and the agricultural labor force in Romania will be presented graphically, including the financial crisis during the period of sharp decrease of 2008-2010 and the period of return from 2010-2014, using data from the National Institute of Statistics.

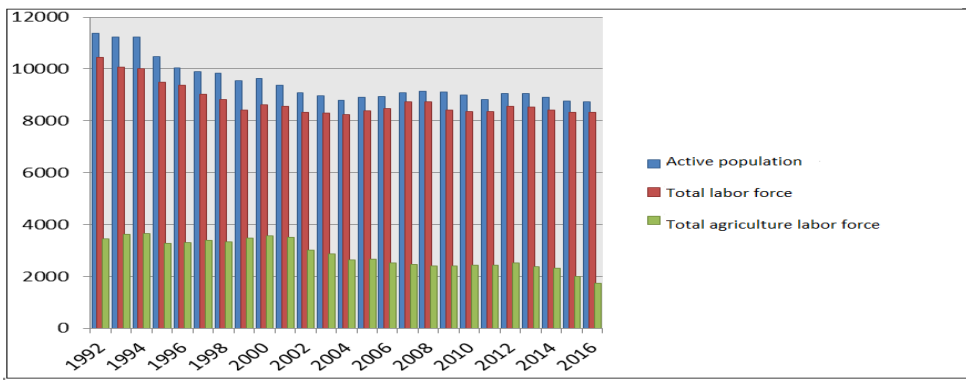

Figure 3. Agricultural labor force in Romania, 1992-2016

Source: National Institute of Statistics

Labor force in agriculture has been different since 1989, comparing with the general labor force in Romania. Until the previous year, labor force in agriculture was down from the national one. Since the 1990s, these trends have been different since this time, with a growing labor force in agriculture. However, since 2002, there has been a decrease in the labor force in agriculture, relative to the total number of employees in Romania, especially until the years of the economic crisis, 2008-2010, when there is still a stability of the number of employees in agriculture, which has been stable until 2014. Starting with 2015, both the workforce in the analyzed sector and the national workforce have fallen well below the rest of the years. The following graph refers to the volume of people employed in the agricultural sector, referring both to employees and to those working on their own farm, in order to have an image of the importance of agriculture in terms of labor power. In real terms, these data reveal that the decline in the agricultural labor force is obvious, especially during the economic crisis. Thus, at the peak of the economic crisis, respectively in 2010, the most delicate negative balance of the number of persons involved in the agricultural sector is observed. Stability has resumed since 2015, however unmatched by the values of the 2000s, when the labor force exceeded 3.5 million, at present being even less than half, slightly exceeding 1.6 million people.

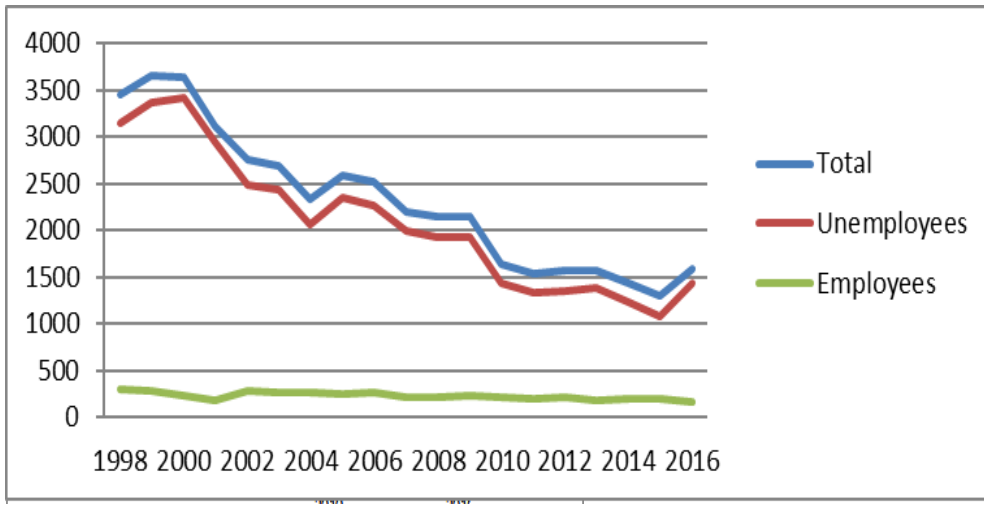

Figure 4. Volume of labor force in agriculture, 1998-2016, 1.000 annual work units

Source: National Institute of Statistics

Taking into account Romania's agricultural social situation in the last two decades, we will analyze in the next part the economic situation and will highlight how it was affected by the economic crises. Table 1 shows the situation of the share of agriculture in the Gross Domestic Product, which has been in a declining situation since 1993. At present, agriculture contributes less than 4% to the formation of the Gross Domestic Product, a decrease of more than 80%.

Table 1. Agriculture's contribution to the formation of Gross Domestic Product

Year	Share of Agriculture in GDP
1993	22,6 %
1994	21,5 %
1995	21,4 %
1996	20,6 %
1997	19,6 %
1998	16,2 %
1999	15,2 %
2000	12,1 %
2001	14,5 %
2002	12,6 %
2003	13 %
2004	14,1 %
2005	9,5 %
2006	8,8 %
2007	6,5 %
2008	7,4 %
2009	7,2 %
2010	6,4 %
2011	7,5 %
2012	5,3 %
2013	6,1 %
2014	5,3 %
2015	4,8 %
2016	3,9 %

Source: World Bank

The share of agriculture in Romania's total GDP is clearly declining, being closely related to the labor force situation. The gross added value of a person engaged in agriculture in Romania is well below the EU average, especially when we are talking about Western countries. In 2013, the gross added value per person employed in agriculture reached only 18% of the European Union average. Romania has only 7% of the gross added value generated by France and 9% of the generated by Spain, although its agricultural area is one of the largest in Europe, which shows the inefficiency of the agricultural sector. Another evidence of inefficiency in the sector is the share of agriculture in Gross Domestic Product, which has seen a remarkable decrease nowadays as compared to the 1990s. Over 80% of the working population in agriculture is non-salaried, working on its own holding.

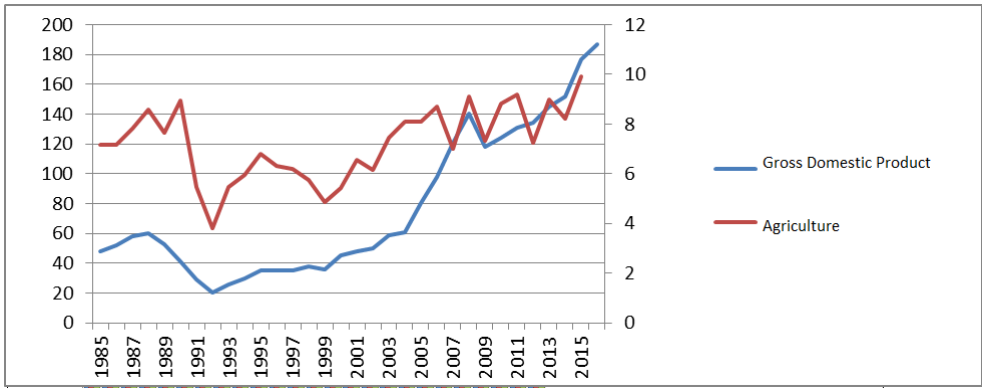

Figure 5. Agriculture sector contribution to the Gross Domestic Product, 1985-2016, billion USD

Source: National Institute of Statistics

In the Figure 5, analyzed between 1985 and 2015, the two axes are formed, the one on the left belonging to the evolution of the Gross Domestic Product and the one on the right belonging to the agricultural sector and its evolution compared to GDP. Agriculture has seen a noticeable drop in gross domestic product from 22.6% in 1993 to just 4.2% in 2015 and 3.9% in 2016, and is considered to be the weakest share. However, Romania is at the top of the EU countries' ranking when it comes to the value of the contribution of the agricultural sector to the Gross Domestic Product, which is up to three times higher than the European average.

Table 2. Annual Gross Domestic Product – volume indices % compared to the previous year

Resources	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
%										
Agriculture	107	88.37	107.82	110.87	81	132.07	102.22	93.7	100.55	102.3
Industry	108	98.47	104.47	100.175	92.82	103.8	103.95	105.45	101.7	107.3
Construction	136.05	87.75	95.9	81.65	96.3	103.07	101.77	105.325	102.92	98.6

Source: Ministry of Public Finance

Of the three sectors contributing to the formation of Gross Domestic Product, agriculture is rather a counterbalance to the economic downturn, highlighted in the sectors of industry and construction. Since the beginning of the 2009 financial crisis, there are more differences than in the previous year, but the next year, 2010, seems to be a recovery and recovery. Until today, today, the situation is relatively similar.

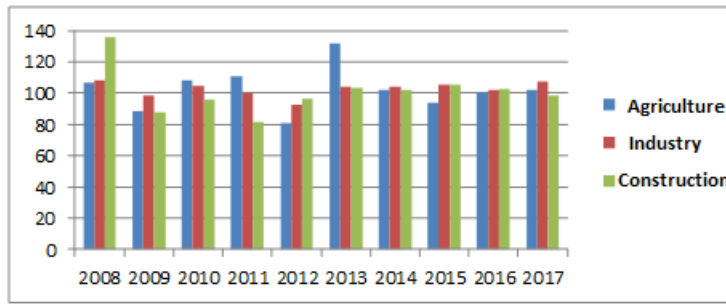

Figure 6. Gross Domestic Product Produsul intern brut anual – volume indices % compared to the previous year

Source: National Institute of Statistics

Outcome of Table 2, Graph 1.4. Shows the dynamics of the aforementioned sectors for the period between 2008 and present. The resilience of agriculture in the face of economic crises seems to be quite strong and in 2009-2010 it was about the same level of contribution to the construction sector, and in the years to come it remained somewhat stable compared to other sectors. There is a unified decline in 2009, when the economic and financial crisis had begun, and the government had decided to lower wages and raise taxes. In the following year, agriculture experienced a growth rate of over 10%, well above the other sectors. Since then, the state of contributions, through episodes of economic crises, has contracted by up to 20%, although agricultural output has fallen by only 10%. The current structure of agricultural production no longer resembles that of the 1990s when plant production exceeded 60%, and only 40% came from zoo technical production. In the 1980s, the share of the zoo technical sector reached 50% of the total production, in order to return to the history of the 1950s and 1960s. The MADR proposes that in the long run there should be a certain weighting of the animal and vegetable sector, a situation similar to that of 1989 (55% plant production and 45% animal production);

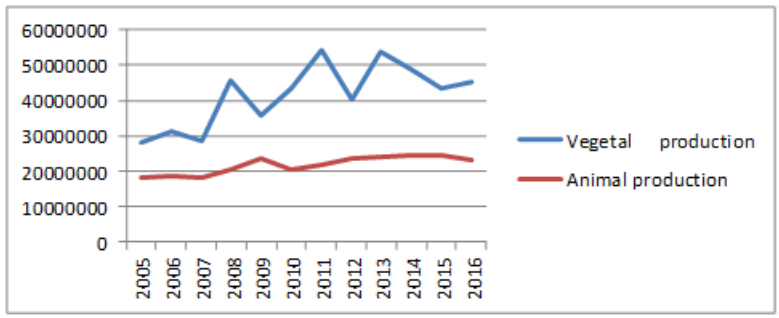

Figure 7. Agricultural production value, 2005-2016, thousand RON

Source: National Institute of Statistics

Considering the large agricultural area and the rate of utilization in Romania, it is clear that the yield is the main factor limiting the agricultural sector. Romania's orders are below the European average with 49% for maize and 37% for wheat production. Romania is

overtaken by many countries in Central and Eastern Europe in this chapter. Low yields in cereal production limit both the volume, value and contribution to the Gross Domestic Product of annual cereal production. The most drastic factor, which explains the poor yield, is the fragmentation of agricultural holdings. More than 70% of the Romanian farms are under 2 hectares, and the share of farms under 10 hectares is 98% of the total number and 39% of the total agricultural area used. On the other hand, farms with a size of more than 100 hectares account for only 0.5% of the total but exploit 49% of the agricultural area. France and the Czech Republic, with high yields on agricultural production, account for more than 25% of the total of more than 50 hectares - offering advantages such as the ability to attract trained farmers, easy access to finance and faster technology Another problem in agriculture is the level of training of farmers. Thus, according to European Commission data, more than 95% of Romanian farmers said they have learned their knowledge in agriculture strictly on the basis of practice, compared to 70% of farmers in the European Union. The level of training of Romanian farmers is below those of Member States such as Hungary and Poland, where 17.9% and 47.8% of farmers say they have had basic and full formal training in agriculture. The main problems limiting the development of the national system are: the large fragmentation of agricultural holdings, which results in many small and very small farms, lacking the resources needed to re-start irrigation systems, irrigation systems design for large farms, infrastructure and equipment of obsolete irrigation.

Conclusions

Following the analysis, agriculture's ability to cope with economic crises and not to be a dependent factor can be noticed. Although it has been through the stages of a decline of decline, reorganization and restructuring, growth and then conservation, agriculture has not declined production despite its contribution to GDP formation, which has experienced many negative gaps. It is noticed that the number of employees in agriculture is to a much lower extent than the number of owners producing for self-consumption, which again makes this sector independent of external factors. Rural systems also have a much greater capacity to adapt, being able to go through various economic stages and to harness what they have or do with agriculture. The relationship between agriculture and construction has always been inclined towards construction in the years 1990-2006, as the construction sector has experienced the largest developments, both in the large infrastructure and in the "production" of dwellings. And the agricultural sector remains behind the growth of the economy, amid the dependence on weather conditions and relatively low investment. The manifestation of the differences in food consumption and the expenditures of the Romanian households are a summation of some factors in which the food model is noted. As a result of the analysis in the paper, into the following: the dynamics of consumption of the main food primarily reflects the pattern of consumption that are reduced products grain, a large increase in the vegetable and fish consumption and constant in the other consumer products. Existence annual consumption growth rates in particular vegetable fats and especially the animals, it reflects a below average income consumers nenecsitate registering impossible or stagnation of purchasing power of food. The structure of population spending reveals a difference in purchasing food. Expenditure on foodstuffs is slightly decreasing, although for farmers' families, food consumption from own resources is a supply source of about 50%.

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REPORTING OF THE CONFERENCE SESSIONS

PLENARY SESSION I
(9 November 2017, "Virgil Madgearu" Conference Hall, 9^{00}-13^{30})

PhD Student Anca Marina Izvoranu

The conference started with nine papers belonging to authors from five different countries.
The first paper that opens the conference belongs to the authors Adam Wasilewski and Marek Wigier, from the Institute of Agricultural and Food Economics-National Research Institute from Warsaw, with the title The Efficiency of European Union financial support in terms of rural economic development. The main objective of the research was to prove the efficiency in the rural areas based on Local data bank for 2004 2013, for more than 1500 countries.
The second paper was written by the dean of The Faculty of Agro-food and Environmental Economics from the Bucharest University of Economic Studies with the title European tendency in wine quality. Considering the wine making regions, the author discovers a new challenge coming from the fact that the same grape type with the same characteristics of the crop year, will act different.
The third work from the first session belongs to PhD Professor Grigore Baltag from the State Agrarian University of Moldova and PhD student Adrian Popescu from the same university, with the title "The structural analysis of pork production in the entities of Republic of Moldova and terms of food security."
PhD student Marius Cosmin Boiangiu from the Bucharest University of Economic Studies was the author of the fourth paper with the title Climate policies differential: a policy analysis of the Paris agreement.
The next paper belongs to six authors, PhD professor Dimitre Nikolov from the Institute of Agricultural Economics from Sofia, PhD professor Adriana Mihnea from the Bucharest University of Economic Studies, PhD associate professor Teodor Radev from Agrarian University Plovdiv, PhD associate professor Petar Borisov from Agrarian University Plovdiv, PhD associate professor Ivan Boevsky from the Institute of Agricultural Economics from Sofia and the PhD student Andrei Rădutu from the university where the conference took place, Benefits opportunities cost and risks – Bocr, models and and contingency variation for estimating the provision of public goods in Bulgarian agriculture: South-central planning region.
The sixth paper belongs to PhD Nicola Galluzzo, Director of Asgear – Association of Geographic studies on rural areas, with the title Impact of CAP financial subsidies on rural development and the emigration in Bulgarian rural areas.
PhD Natasha Kljajic, PhD senior research associate Jonel Subic and M.A. researcher assistant Marko Jelocnik from the Institute of Agricultural Economics of Belgrad wrote the seventh paper with the title Production potentials as a chance for agricultural producers – case study city of Smederevo, Republic of Serbia.
The next paper belongs to the authors Drago Cvijanovic-PhD professor from the Faculty of Hotel Management and Tourism in Vrnjacka Banja, University of Kragujevac, Serbia, associate professor Svetlana Ignajaijevic and associate professor Jelena Vapa Tankosiv-Faculty of Economics and Engineer Management in Novi Sad, University of Business Academy in Novi Sad, Serbia. The title of the work was Raspberry trade as a strategic export potential of the Republic of Serbia. International trade in agricultural products is gaining importance and it happens under extremely restrictive conditions. Analysis of

raspberry production shows that agro ecological conditions in Serbia are good for raspberry crops.
The last paper from the first session belongs to the authors Sreten Jelic-PhD associate professor, Milica Vasic-PhD student and Tatjana Jovanovic-PhD assistant from the Faculty of Agriculture, University of Belgrad, Serbia. The title of the paper was Women in rural areas of Serbia and the main subject of the work was about the position of the women in rural environment, which has always been difficult and linked to her role in family.
The first session of the conference was chaired by PhD professor Dan Boboc, PhD professor Roberta Capitello and PhD professor Dimitre Nikolov.

PLENARY SESSION II
(9 November 2017, "Virgil Madgearu" Conference Hall, 15^{00}-16^{30})

PhD Student Henriette Cristiana Călin

The second session consisted of paper presentations with a clear connection to the agricultural development, chaired by Phd. Senior researcher Marek WIGIER, Assistant researcher Marko Jelocnik and Phd. Associate professor Florentina Constantin.
Phd. Associate Professor Lucia Ovidia Vreja presented the first paper and it was about "The idea of sustainability between science and philosophy", showing us that justice is a philosophical problem, not a scientific one.
The second paper, by Professor Simion Certan and Phd. Ion Certan, propose to track the evolution of agricultural policies in the last quarter of a century, the factors that made a change in the hope of formulating proposals that would make agricultural policies more efficient and bring agriculture to the demands of contemporary society.
Associate Professor Raluca Andreea Ion presented the third paper and the study highlights what statisctical data hides in respect to food security in Romania. The objective of the study was to analyze food security beyond the statistical data that show an average trend, trying to answer the question weather all people have acces to sufficient and nutritious food.
Senor Researcher Camelia Gavrilescu and it analyzing the changes in the volume and structure of Romanian and New Member State agri-food trade by groups of products presented Anoher paper.
The aim of the paper "Social Agriculture in Romania and the need for competitiveness – a critical approach", by Jean Vasile Andrei, analyze the social agriculture in Romania and the need for competitiveness from a critical perspective, understanding that agriculture should be analysed and understand beyond it classical functions.
The next article,"The European Legislative Construction on agricultural cooperative and its national transporting", by Phd. Students Maria Claudia Diaconeasa and Raluca Chirculescu, shows us that some regulations and strategies regarding the agricultural cooperative sector have been issued for both supporting and controlling it.
The paper "Climate change migration – economic consequences to the agricultural potential" belongs to Phd. Student Laurențiu Rebega and Phd. Bogdan Bazgă and it analize a series of interesting aspects regarding the economic consequences to the agricultural potential due to the climate changing.
After every presentation there were heated discussions about the topics approached by the authors of the papers.

PLENARY SESSION III
(9 November 2017, "Virgil Madgearu" Conference Hall, 18^{00}-19^{00})

PhD Student Raluca Jianu

The poster session was lunched during the first day of the *International Conference* ***Competitiveness of agro-food and enviromental economy*** *– Caffee 2017, Bucharest,* on Thursday 9, at 06:00 pm, in the "Robert Schumann" Conference Hall. Professors and students presented 11 posters on a choosen conference theme:

- PhD. Professor Mariana BRAN, PhD. Associate Professor Iuliana DOBRE, PhD. Student Ştefania Daniele BRAN, The Bucharest University of Economic Studies, Romania, Designing of nutritional foods through economical and mathematical model
- PhD. Professor Silvia Elena CRISTACHE, PhD. Student Elena Cristina ROTARU, PhD. Student Florica Georgeta ROTARU, The Bucharest University of Economic Studies, Romania, Stochastic methods of analyzing macroeconomic indicators characterizing enviromental protection in Romania, in line with the Europe 2020 strategy for sustainable development, Environmental protection encompasses several activities aimed at a better maintenance or restoration of a clean environment by collecting, recycling and treating waste, preventing emissions of pollutants, of noise, as well as by reducing the presence of pollutants in the environment.
- The European environmental policy is based upon the principles of caution, prevention, correction of pollution at source and the fact that the polluter must pay. That is why, under the Treaty of Lisbon (2009), "combating climate change" and sustainable development in relations with third party countries, have become specific objectives. At the same time, in 2011, the EU decided to slow the decline of biodiversity and the degradation of the ecosystem by 2020, in line with the EU Biodiversity Strategy.
- In May 2016, the EU Commission launched the Assessment of Environmental Policy Implementation, a new tool to help fully implement the EU legislation. The field of environment protection is closely linked to the adequacy checking (REFIT), as well as to monitoring and reporting obligations pertaining to environmental policy, in order to simplify and reduce costs.
- The Europe 2020 strategy proposed for implementation identifies three key environmental objectives: protecting, preserving and increasing the Union's natural capital; transforming the Union into a resource-efficient economy; green and competitive low-carbon economy to protect the citizens of the Union from pollution.
- The National Strategy for Sustainable Development of Romania – Horizons 2013-2020 has the following main objectives: improvement of the environmental infrastructure and reduction of the current gap between EU Member States; biodiversity preservation; reducing pollution and improving air quality and, at the same time, promoting alternative, renewable and non-polluting sources of energy production, as well as stimulating sustainable economic growth, with a focus on providing new green jobs. An essential element will be the increase of the absorption capacity of European funds through the Sectorial Operational Programme "Environment" and to prepare the Multi-Annual Financial Framework 2014-2020.

- The main purpose of the paper is to make a comparative study of the various statistical techniques used to describe environment protection in Romania: the graphical method, the structural modification method, the regression and correlation methods; methods to be implemented with database management and analysis programs: E-Views, Excel.
- The main conclusion of this paper is that such a complex approach will help the EU thrive in a low-carbon environment with limited resources and, at the same time, will prevent environmental degradation, biodiversity loss and the unsustainable use of resources.
- PhD. Student Ioana Claudia TODIRICĂ; PhD. Student Bogdan Cristian CHIRIPUCI, The Bucharest University of Economic Studies, Romania Rural population income increase methods - Nowadays, the main topic in regards to the rural areas is the low development and the population migration. The necessity of studying the phenomena arise from the above and makes the studies in this direction mandatory.
- This research is based on data collected from Romanian National Statistics Institute and European Commission reports. The main objective is to analyze the situation from 1989 up until now, especially the period 2012-2016.
- There is a descending trend registered regarding the population, mostly due to the lack of opportunities and lack of investors that can create jobs.
- This paper aims to find the most effective ways that can contribute to a harmonized development of this areas by adding values added to the involved sectors.
- PhD. Student Henriette Cristiana CĂLIN; PhD. Student Anca Maria IZVORANU (DINU), The Bucharest University of Economic Studies, Romania The dynamics of organic farming in Romania – There is no clear definition of organic farming in the literature, but this concept is based on clear and sever production rules and principles, regulated by the legislation in the field.
- The organic production requires to build a sustainable, balanced and diversified system, aiming at protecting the environment and the supply of agri-food products with certain nutritional and sanitary quality.
- In the present age, the knowledge about vital processes from plants and the mechanisms that control them have evolved enormously. The impact of human activity on organic food production is growing, in line with the demographic evolution and food requirements and other agricultural products. The concerns about the risks of chemisation in agriculture have been manifested since the 1950s and they refer to consumer's health in terms of ecological effects. At the same time, the research to find technological variants to diminish the negative impact starts and its results are focused on alternative agricultural systems, which eliminate or substantially reduce the consumption of chemical fertilizers and pesticides.
- Thus, the organic farming has experienced a rapid expansion in the European Union, where most member states show a real interest to develop this sector. The organic farming is a dynamic sector in Romania too, which has a weighted average annual growth rate of 23%, ecologically grown lands, representing 6.2% of the agricultural area in Europe, which means that there is a very high potential for growth.

- PhD. Student Laurențiu RADU, The Bucharest University of Economic Studies, Romania, The natural gas transportation system – the rural stakeholders – The purpose of the following article is to highlight the level of interest of the local stakeholders regarding the construction and development of the natural gas transportation system.
- The European Council highlighted the need to modernize and expand the gas transportation infrastructure along with the importance of interconnecting the energy systems of the European Countries in order to ensure a secure and competitive energy market for all its members.
- In Romania the natural gas transportation system is owned by Transgaz S.A. Medias, company which is listed on the Bucharest Stock Exchange market. The ministry of Economy is the majority stockholder, with 58,51% while the rest of the stocks being in the hold of legal entities and individual persons. Because of its important strategic position, Romania can benefit from important amounts of European funds in order to expand the gas infrastructure. At this time, the company managed to secure an 179,32 million euro grant and is on its way to build one of the largest gas pipelines from Romania, the BRUA (…….) pipeline which will create a gas highway between Bulgaria, Romania, Hungary, Austria.
- PhD. Student Anca Maria Izvoranu (Dinu), PhD. Student Henriette Cristiana Călin, The Bucharest University of Economic Studies, Romania Efects of the financial crisis in Romanian Agriculture – As an important branch of the national economy, agriculture is a topic of interest when we analyze its contributions to the gaps in the economy.
- The event of European integration can benefit the development of agriculture in Romania, an advantage mainly held by its position in the stakes of the national economy and its preservation despite the external factors that emerged during the years of accession.
- In modern economies, and in particular in the European Union, this sector has diminished its importance over time in favor of the industry sector, which has grown primarily through exports after the fall of 2003-2008. Agriculture has experienced a continuous gap in the share of gross domestic product, being 5.3% in 2012, half compared to 2003, although Romania remained among the countries with the largest share of agriculture in GDP.
- Three major groups are being attacked by the manifestation of agriculture in the national economy, such as employment, prices and gross domestic product. This article aims to analyze the evolution of Romanian agriculture to identify the areas and products that have been able to adapt to these internal and external market conditions and to propose a range of possible recovery measures for the next period.
- PhD. Student Ionuț Laurențiu PETRE, The Bucharest University of Economic Studies, Romania, Analysis of competitiveness on the meat market and meat products in Romania

Poster session chairs
Poster presenters were assisted by the session chairs who provided them guidance and the various topics were discussed according to academic research approach.

Session chairs:
Chairman: Associate Professor Roxana PĂTÂRLĂGEANU, PhD
- Professor Mirela STOIAN, PhD
- Associate Professor Simona BÂRA, PhD
- Associate Professor Cristian TEODOR, PhD
- Referent Raluca JIANU

Salient points/ Concluding remarks
The poster presentation session was an especially interesting event for participants who had the opportunity to expose their ideas and to share their knowledge.
Moreover, the event has been a real success since the important points highlighted by the teachers and students in the 11 poster presentations can be used as ideas for substantiating future projects.

PLENARY SESSION III (10 November 2017, "Virgil Madgearu" Conference Hall, 09^{30}-11^{00})

PhD Student Ioana Claudia Todirică

Plenary session III, chaired by PhD Professor Diego BEGALLI, from University of Verona studies have covered subjects mainly with respect to: role of markets in the development of the agricultural research, the rural development policies, sustainable economic growth, the human resource within agricultural and forestry, rural development policy in the period 2014 – 2020;

1. PhD Associate Professor Simona BÂRA, PhD Alina ZAHARIA, PhD Cristian TEODOR, University of Economic Studies, Romania
2. PhD Student Ionuț Laurențiu PETRE – The Bucharest University of Economic Studies

The main methodological approaches were quantitative and comparative analysis.

First paper of the session was presented by PhD Associate Professor Simona BÂRA, PhD Alina ZAHARIA and PhD Cristian TEODOR from The Bucharest University of Economic Studies, Romania: POSSIBLE WAYS TOSTIMULATE THE HUMAN RESOURCE WITHIN ROMANIAN AGRICULTURAL AND FORESTRY RESEARCH. During the presentation it was noted that there is a need to re-position the agricultural and forestry research and the prioritization of both the production of information and existing knowledge as well as their future activities.
On the medium and long term the implementation of measure can influence:
- research institute partnership
- designing the future of research directions/ways
- additional financial resources for re-new infrastructure and for retaining the researchers.

The revival of leadership in agricultural and forestry research institutes and resorts has to become one of the major task of the management from those institutions.

Second paper, ANALYSIS OF COMPETITIVENESS ON THE MEAT MARKET AND MEAT PRODUCTS IN ROMANIA, presented by PhD Student Ionuț Laurențiu PETRE, from The Bucharest University of Economic Studies Romania, was focused on the fact that the world's meat industry is in a phase of major structural changes, with visible advances in reproduction and genetics, slaughter and development of new automation technologies for processing. The new challenges and opportunities on this market lead to greater product uniformity and quality, and more and more emphasis will be placed on issues related to the competitiveness of the sector. Meat is an important product of human consumption, and meat consumption is an indicator of living standards. Trade has led to a strong bond between peoples, contributing to the development of economies and societies, taking into account that they are based on strong competition.

CONFERENCE'S PHOTOS