INSTITUTE OF AGRICULTURAL ECONOMICS, BELGRADE, SERBIA

# SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT IN TERMS OF THE REPUBLIC OF SERBIA STRATEGIC GOALS REALIZATION WITHIN THE DANUBE REGION

## - support programs for the improvement of agricultural and rural development -

## Thematic Proceedings

Belgrade, 2018

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# THEMATIC PROCEEDINGS


**Belgrade, 2018**

*Publisher:*

**Institute of Agricultural Economics, Belgrade, Serbia**

*Editors:*

**Jonel Subić, Ph.D.**
**Boris Kuzman, Ph.D.**
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*Technical arrangement and printing:*

**SAJNOS DOO NOVI SAD**
**Momčila Tapavice 2**
**Phone: +381 (0) 21 499 088**

*Technical preparation and page breaking:*

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*Number of copies:*
**300**

**ISBN 978-86-6269-061-6**



***Publication of Thematic Proceedings was financed with the support of the Ministry of Education, Science and Technological Development of the Republic of Serbia.***

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## PREFACE

The Thematic Proceedings was prepared as the result of the scientific research on the integrated and interdisciplinary project no. III 46006: *Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region.*

Thematic Proceedings includes selected papers presented at the International Scientific Conference - Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region: Support programs for the improvement of agricultural and rural development, which was hold in Belgrade on 14-15$^{th}$ December 2017.

Besides the papers from Serbia in Thematic Proceedings are also included the invited papers prepared by foreign authors, which are associates of the IAE Belgrade and whose institutions have close scientific, business and technical cooperation with IAE Belgrade.

The Thematic Proceedings addresses the wider audience of stakeholders scientifically and practically focused to all segments of agriculture.

Publisher and editors are not responsible for the content of the scientific papers and opinions published in the Thematic Proceedings, as they represent the authors' point of view.

Publishing of Thematic Proceedings was financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

In Belgrade

February, 2018

**Editors:**

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## *Contents*

# EMPOWERMENT OF WOMEN'S STATUS IN THE RURAL SURROUNDINGS THROUGH SELF-EMPLOYMENT

*Aleksandra Vujko*[1], *Goran Maksimović*[2]

## Abstract

To enable the more empowered and become independent in their goals, women have established some associations (Self Help Groups). Women in these groups find out that if they pool their resources together they can radically change their lives and the lives of their families and communities, so contribution of women in self-help group has a role as opportunity structure which empowers women economically and socially. The aim of this paper is to demonstrate the effects of women's empowerment in rural tourism, as well as a self-help groups (SHG) on female entrepreneurship and self-employment, with survey research conducted on a sample of 513 women. The results will present a specific formula for women's empowerment: self-employment as the goal of women's empowerment directly dependent on the *motives* for starting a business (22,8%), *business environment* (23,6%) and *the support of SHG's* (53,6%).

**Keywords:** *rural tourism, women's empowerment, self-employment, women's entrepreneurship, self-help groups*

## Introduction

Social systems and cultures interpret biological differences between women and men in different ways and summarize them in sets of social expectations in the form of preferred and acceptable activity and behavior. Different social establishment, legislations, standards, and amenities as well as model of social behavior between men and women determine the range of dominations which certain groups have. Women can receive such power, if their overall status improves. According to

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Agarwal (1997) such type of overall status improvement is known as "women empowerment". The empowerment of women is one of the most important issues in the process of emancipation of women (Agarwal, 1997). According to Rao (2011) "women's empowerment is the process in which women individually and collectively become active, knowledgeable and goal oriented actors who take/or support initiatives to overcoming gender inequalities" (Rao, 2011). Hence, women's empowerment initiates a strategy to realize gender equality (Floro-Maria, 1995; Reddy, Galab & Rao, 2003).

The empowerment of the women is the strongest expressed through various associations of women (Self Help Groups – SHG). Association in the SHG has enabled women to gain greater control over their life (Hashemi, Schuler & Riley, 1996; Orser, Riding, & Manley, 2006). Membership in such a groups gives women the "the state of being able to see or be seen" and provides them a sense of control over their lives.

The SHG has paved attention on skill improvement, facilitating invention, gaining access to credit from financial institutions for micro enterprises/projects, inculcating of frugality: and supervision of credit for the economically destitute sections of women. Study investigates the effect of the SHG on female entrepreneurship and self-employment. The concepts of empowerment have overlapping dimensions, particularly in the context of women's entrepreneurship and self-employment.

In this paper, the formula for women's empowerment will be obtain, that is, with the help of research results arrive at the data what it is to women members of SHG's needed as an incentive for starting your own business and self-employment. The survey was conducted on a sample of 513 women, members of 32 different woman assets (SHG), from 25 locations on the Fruška Gora Mountain (Northern Serbia). It has been concluded that the most important factors that influence female empowerment are the motives, the business environment and the impact of the SHG in the form of support.

Further, the results have shown that women members of the SHG are very empowered. More precisely, this empowerment can manifest itself in the form of starting your own business in the field of handicraft souvenir production and rural types of tourism (e.g. agritourism, cultural tourism, eco-tourism, etc.) and that is actually the greatest significance of the SHG in informative financial support.

## Literature review

*What is women's empowerment?*

Over the past two decades the issue of women empowerment has evolved (Kabeer, 2005; Narayan, 2002). Moreover, Kabeer skilled her argument by suggesting three interrelated dimensions for women empowerment: (1) access to resources, including preconditions; (2) agency, including process; and (3) achievements, including outcomes. It is important to know that "women's empowerment" commonly commence with an attempt to understand how and why women are tyrannized and "not empowered" (Bhatt-Datta & Gailey, 2012). Moser (1991) defined women empowerment as: "giving women the right to determine choices in life and to influence the direction of change through the ability to gain control over crucial material and non-material resources".

Osirim (2001) suggested that "social well-being, self-esteem, and autonomy coupled with the striving for or achievement of economic independence" all define empowerment for women. In considering definitions of the term, it can be concluded that Women's empowerment is the process (Seguino, 2000; Soroushmehr, Kalantari, Fami & Sarani, 2012) by which the womens gain greater control over their lives. It means greater self-confidence and "backbone" for their ideas and creativity (Batliwala, 1994). Mosedale (2005) exposed that empowerment has four aspects: firstly, to be empowered one must have been disempowered; secondly, empowerment cannot be bestowed by a third party; thirdly, definitions of empowerment usually include a sense of people making decisions on matters which are important in their lives and being able to carry them out and finally, empowerment is an ongoing process rather than a product. According to Hashemi and Schuler (1993), the dimensions of women's empowerment include: sense of self and vision of future, mobility and visibility, economic security, decision making in household, ability to interact effectively in public sphere and participation in non-family groups. There is a general attitude that women's empowerment is a course that is manifested in more than one direction.

One of the most important forms is women's absolute wellbeing, where women's empowerment is seen as the process of improving the prosperity of women and girls (Ali & Hatta, 2012). At the end, The conclusion is that women's empowerment is defined as the achievement of "unwritten rights" including: education, economic self-reliance, ownership and

inheritance of property, political participation, and the elimination of all forms of gender-based discrimination, violence, abuse, harassment, and exploitation (Harriet & Sen, 2003).

*What is women's entrepreneurship and self-employment?*

The field of entrepreneurship is increasing its theoretical focus on the unique contributions of women's entrepreneurs to business and society (De Bruin, Brush, & Welter, 2006; 2007). Women's entrepreneurship is a multidimensional phenomenon, which can be accessed from different angles: from the perspective of women's activism, when it is seen as a way that women activate resources in favor of women themselves (Calás et al., 2009); from perspective of economic development, when treated like the way it is possible to activate women's resources, particularly in the area of small and medium-sized enterprises (Heilman & Chen, 2003; Hania, Rachmaniaa, Setyaningsiha & Putria, 2012); from the perspective of social policy - when the strengthening of women's entrepreneurship aims to achieve a reduction of women unemployment, especially women from the middle generation who are in the process of transition at high risk of losing jobs (Godwyn, 2009); and from the perspective of ensuring sustainable development, by the fact that women's entrepreneurship can be seen as a way to harmonize economic development with environmental and social development, through socially responsible business (Markantoni & van Hoven, 2012).

Analysts have also raised questions about why microfinance programs target women, and why in some cases women exhibit higher repayment rates than men (Tassel, 2004). International aid donors, governments, scholars, and other development experts have paid much attention to microfinance as a strategy capable of reaching women and involving them in the development process (Ali & Hatta, 2012). Female entrepreneurship is most commonly saw from the standpoint of social welfare, although it is essentially "par excellence" individual strategies of women's emancipation. Namely, any woman who chooses to be entrepreneurs, or who has been, is also a woman who realizes herself, risen its awareness and strengthens.

*Serbian Case Study*

Serbian society has been described as a patriarchal one. In such a environment women often lose their self-confidence and become victims

of social "silent violence" (Ramanathan, 2004). In such a scenario, entrepreneurship and self-employment can empower women and helps them to feel important and useful (Calás et al., 2009; Bhatt-Datta & Gailey, 2012). Women's entrepreneurship was first mentioned in Serbia in the first half of the 1990s, in relation to support programs of international organizations aimed at faster economic and social inclusion of women refugees. Education for women was organized in order to raise their awareness about start-up, particularly sole traders and manufacturing workshops so they could become self-employed and provide for their own and existence of their families. In the last 10-15 years, things have gradually changed. The number of women enterprises has increased, and the structure has changed so apart from traditional "female" activities, women's enterprises have appeared in the areas of business which are less labor intensive, mostly in the area of services, such as ICT, bookkeeping, intellectual services (financial consulting, human resource management, education), etc.

The rural tourism in Serbia is a new phenomenon, in which agricultural workers and people living in rural areas are looking for some alternative sources of income (Dimitrovski et al. 2014; Vujko et al. 2016; Petrović et al. 2017). Rural tourism enterprises are linked to a local/regional community via purchasing physical material (goods), business services and employment (Ateljevic 2009). According to Dimitrovski et al. (2014), rural accommodation is organized according to the type of the rural homes (fam-based accommodation). Some rural households are on agricultural land and the owners; rarely stop their work while involved in rural tourism. The other, more common type, are rural homes not involved in agriculture, as well as small non-agricultural rural settlements, which may suggest that agriculture alone is not a necessary factor in rural tourism growth (Vujko et al. 2017).

## Research methodology

*Study area*

Fruška Gora Mountain is located between 45° 00' and 45° 15' north latitude and between 16° 37' and 18° 01' east longitude. It is a Mountain in the northern part of Srem District (South-western part of Vojvodina Province in Northern Serbia), i.e. south-eastern periphery of the vast Pannonian Plain. It has a total surface area of 21,500 $km^2$, which makes 24.3% of the whole territory of the Republic of Serbia (Đurđev, Arsenović & Dragin, 2010).

Since this part of Vojvodina is situated between the Danube and the Sava rivers, this means that Fruška Gora Mountain is situated in Srem, mostly in Serbia, with only a small part, in the far west, situated in Croatia (Bukurov, 1978). In its west-east direction it has the length of about 80 km. This low island type mountain, with the peaks Crveni čot (539 m), Orlovac (512 m), and Iriški venac (490 m), represents a mountain with a special benefit for the development of sport and recreational tourism (Jovičić, 1962; Milić, 1973; Vujko, Plavša; 2010; Vujko et al. 2017). Fruška Gora Mountain is proclaimed as a national park in 1960, as the first national park in Serbia.

*Sources of data and methods*

The survey was conducted on a sample of 513 women in 25 rural settlements on Fruška Gora Mountain in which there are 32 women's associations. The associations are formed mainly in the period from 2000 to 2012, in order to empower women within the association in both economic and social terms. The associations usually numbering about 30 members of different ages and education. They are involved in humanitarian work and activities in the field of culture and handicrafts (making of handicrafts and food products, souvenirs). Participating in gatherings, fairs and other events in connection with the preparation of food and other products of women's handicrafts. The rural settlements involved in this research are: Čerević, Banoštor, Lug, Irig, Rakovac, Susek, Jazak, Neradin, Vrdnik, Adaševci, Bačinci, Berkasovo, Bikić Do, Erdevik, Gibarac, Ilinci, Jamena, Kukujevci, Ljuba, Molovin, Morović, Privina Glava, Sot, Vašica and Višnjićevo. All the interested female respondents in the observed villages participated in the survey. The only condition was that their domicile address was in the researched villages. The poll was anonymous, i.e. the names of the examinees were not relevant for the selected data. The examination of the target groups was done with the technique “face to face” interview.

Involvement in the Self Help Groups has enabled women to gain greater control over resources like material possession, intellectual resources like knowledge, information, ideas and decision making in home, community, society and nation. Control over resources leads to the satisfying of different needs, and characteristics of satisfying the needs are shaped the lifestyle and determine the quality of life. Thus, empowerment means moving from a position of enforced powerlessness to one of the power. In order to test the hypothesis H that self-employment is an ultimate goal of women’s empowerment and to determine what would be an adequate incentive for women to establish their own enterprises (setting the specific formula), it was necessary to answer to the specific questions and

to set certain low-level hypotheses. One of the most important questions that needed to be answered is: What are the factors that influencing on women empowerment? And to answer it, three low-level hypotheses were formed: h1 – on women's empowerment to starting their own business largely influenced "care for others" motive; h2 – on women's empowerment to starting their own business is mostly affected the lack of initial capital as part of the business environment and h3 – on women's empowerment affects support of SHG's. In addition, if any of these factors affect the empowerment, the paper sought to verify to what extent they affect. Emphasis is placed on the support of the SHG's to women's empowerment. In order to test the low-level hypothesis h3, it was necessary set up a few more low-level hypotheses: h4 – women members of the SHG's are empowered; h5 – women members of the SHG's are empowered to start their own business in the field of handicraft souvenir production and rural tourism; h6 – The greatest significance of SHG's is in the information and financial support. The study exposes the facts based on survey method.

The study attempts to measure the empowerment of women. Numbers of 513 women were interviewed for this study, and their qualitative responses provide the basis on which we deduce our research findings (Eisenhardt & Graebner, 2007). An interpretive approach to the women's answers was used to help define the meaning of "empowerment" in Serbia. Through the interview process and document analysis, we sought to better understand how the women felt about their own empowerment (Calás et al. 2009; Bhatt-Datta & Gailey, 2012). These empowerment scores and dimensions scores have been used for further analysis. After analysis, inferences as to empowerment of women, relationship between variables and role of SHGs in women empowerment have been made. In the process, the hypotheses have been tested.

## Results and discussion

Regarding the age structure of the women survey, the largest percentage of them (202) 39,4% was aged from 26 to 35, followed by (156) 30.4% over 56 years of age, followed by aged from 46 to 55 (92) 17.9%, aged from 36 to 45 (51) 9,9% and the lowest participants were aged from 15 to 25 (12) 2,3%. The largest percentage of them (360) 70,2% was with high school education, followed by (83) 16,2% with university degree, (21) 4,1% with college, (45) 8,8% with elementary education, and (4) 0.8% with MSc/PhD degree. The paper deals with data related to family status

of women and their achievement as parents. The study showed that the (396) 77,2% women are in marriage status, (58) 11,3% women are not in communion, (48) 9,4% are divorced and (11) 2,1% are widows. Thus, the study showed that the (430) 83,8% of women are parents, and (83) 16,2% of women has no children.

**Table 1.** *Results of interview*

| **Attachment 1. What was your motivation to found your own enterprise?** | | |
|---|---|---|
| | Frequency | Percent |
| Care about others. | 269 | 52.4 |
| The pursuit for achievement. | 50 | 9,7 |
| Higher degree of freedom and independence | 98 | 19,1 |
| Dissatisfaction with previous work (working location, co-workers, working conditions). | 83 | 16,2 |
| Something else. | 13 | 2,5 |
| **Total** | 513 | 100,0 |
| **Attachment 2. How do you see the business environment in Serbia?** | | |
| Women have greater responsibilities in the family and in the upbringing of children. | 43 | 8,4 |
| The problem is the lack of initial capital. | 393 | 76,6 |
| Unfavorable attitude of the social environment for the woman who enters business. | 33 | 6,4 |
| The problem of the marginalization, humiliation of women and sexual harassment. | 26 | 5,1 |
| Disadvantages come from high levels of corruption and strong male network. | 18 | 3,5 |
| **Total** | 513 | 100,0 |
| **Attachment 3. Do you feel empowered as members of self-help groups?** | | |
| Yes. | 497 | 96,9 |
| No. | 10 | 1,9 |
| Do not know. | 6 | 1,2 |
| Total | 513 | 100,0 |

**Table 2.** *Results of interview*

| **Attachment 4. In which areas is the strongest empowerment?** | | |
|---|---|---|
| Humanitarian work and care for the local community. | 18 | 3,5 |
| The food preparing. | 17 | 3,3 |
| Cultivation of traditional crafts and make handicrafts. | 334 | 65,1 |
| Dealing with ecology and environmental improvements. | 28 | 5,5 |
| The focus on rural tourism. | 95 | 18,5 |
| Agricultural activities: products are made from herbs, dried herbs for tea, make brandy, produced tinctures. | 11 | 2,1 |
| I do not feel the support. | 10 | 1,9 |
| Total | 513 | 100,0 |
| **Attachment 5. Would you have started your own business and what would you do?** | | |
| I would like to dealt with the production of embroidered items. | 80 | 15,6 |
| I would like to like to deal with the production of souvenirs. | 104 | 20,3 |
| I would like to dealt with the weaving and crocheting. | 76 | 14,8 |
| I would like to dealt with the production of jewelry. | 91 | 17,7 |
| I would like to dealt with the development of traditional clothing and footwear. | 31 | 6,0 |
| I would like to dealt with the products from plants. | 25 | 4,9 |
| I would like to dealt with the rural tourism. | 98 | 19,1 |
| No. | 8 | 1,6 |
| Total | 513 | 100,0 |
| **Attachment 6. What is the essence role of the Self-Help Groups?** | | |
| Organization of gatherings, fairs and other manifestation. | 47 | 9,2 |
| Participation in projects. | 64 | 12,5 |
| Providing information on loans and other financing conditions. | 212 | 41,3 |
| Provide the documentation required to start a business. | 57 | 11,1 |
| Empowerment through education and organizing forums. | 76 | 14,8 |
| The possibility of a common selling in the market. | 49 | 9,6 |
| Do not know. | 8 | 1,6 |
| Total | 513 | 100,0 |

*Motives*

The balance of biological functions in the human body is referred to as hemostasis (Woods & Wilson, 2012). Any deviation from this equilibrium is manifested in behavior as the need to establish a balance. This leads to activities focused on the satisfaction of certain needs. In everyday speech, there are many terms that are related to the startup of activities. The most general concept is the "motive". Other terms are need, desire, aspiration, intention etc. The results seen in Table 1 (Attachment 1) show that the most common reason for starting your own business was the motive "care for others", which implied that women enter entrepreneurship to be able to do something for her family (Jain & Joy, 1997; Tatzel, 2002), usually children (52,4%). In addition to financial motivations, very important was the motivation that is related to self-realization (Dur & Glazer, 2008), i.e., proving their capabilities (higher degree of freedom and independence – 19,1%). Unlike previous motives, which the most important was the urge to "have" to help others, this motif runs a woman in the fulfillment of their human essence. The self-realized people are "what they are" and not "what they have". So, the analysis of the data confirmed lower-level hypothesis h1 - to the female empowerment of starting your own business is mostly influenced by motives of "caring for others". According to the women thanks to which the research was conducted, *"Motive"* in their decision on whether or not to establish their own business, affects with the percentage of (22,8%).

*Business Environment*

Women have generally opted for those jobs that did not require an initial capital. Research has shown that women do not have enough information about loans, even other information necessary for the start-up businesses. In general, a very small number of women had personal assets that they can invest in the business. That should see the reason of the women emphasized the interest in the possibilities of various types of support and assistance, which appear in various institutions such as SHG. The research has shown that women have several obstacles for the development of their own business, and all these obstacles proved to be the typical problems of women in business (Shabbir & di Gregorio, 1996; Heilman & Chen, 2003). The results seen in Table 1 (Attachment 2) show that on starting their own businesses affects the business environment in several ways. The first factor is the lack of initial funds to start a business (76,6%). Another factor was that women in Serbia still have an increased commitment to family and child-rearing (8,4%). Third is the unfavorable attitude of the social environment

towards women that enters in business (6,4%). This one reason was cited more often among the women from smaller towns, because there is more feeling. Another reason given is the ratio of male counterparts in the business world that is often expressed in terms of marginalization, denigration of women and sexual harassment (5,1%). In addition to the patriarchal system, disadvantages come from the high levels of corruption and strong male network (3,5%). All these data confirm the low-level hypothesis h2 on women's empowerment in starting their own business largely are affected by the lack of initial capital as part of the business environment. According to the women thanks to which the research was conducted, *"Business Environment"* in their decision on whether or not to establish their own business, affects with the percentage of (23,6%).

*The support of the SHG*

This self-help group proposes a production of job such as manual production of handicrafts: weaving, crocheting, embroidery, knitting, jewelry, figurines and magnets of plaster, dried herbs for tea, make brandy, produced tinctures, make the cakes, etc. Once the business is approved by the group, one third of financing sources are matched together. Most groups don't have offices or assets; they operate and meet in members' houses. They know each other better and and support themselves. It is noticeable that these groups have almost familial relationships amongst members. The advantages of such relationships are the opportunity for collective women's identification and sharing individual experiences. The results seen in Table 1 (Attachment 3) show that 96,9% of women feel very empowered as a member of the SHG. The analysis of the data confirmed lower-level hypothesis h4 that women members of the SHG are empowered.

The results seen in Table 2 (Attachment 4) show that the empowerment of women in the SHG are the most intensive in nurturing of old crafts and making handicrafts (65,1%). This information is very important because it indicates to the possibility that most women can use in the process of self-employment (Swanson & Timothy, 2012). This is supported by the data from Table 2 and Attachment 5, according to which 79,3% of women would begin their own business in the field of production of some form of handicraft and souvenir production, while the 19,1% of women would be engaged in rural tourism. Women would usually decide to start their own business in the following areas: production of souvenirs (20,3%), rural tourism (19,1%), hand-making of jewelry (17,7%), making and selling of embroidered things (15,6%), making and selling of knitted and crocheted

things (14,8%), traditional production of footwear and clothing (6,0%) and making the products of medicinal plants (4,9%). These data confirmed low-level hypothesis h5 that women members of the SHG empowered to start their own business in the field of handicrafts, souvenir production and rural tourism.

The results seen in table 2 (Attachment 6) show the role of the SHG in women's empowerment. It can be seen that the members of the SHG perceived these institutions as places where they can get adequate information and financial support for their start-up (41,3%). This is very important because it directly abuts on the low-level hypothesis h2 (Table 1, Attachment 2). So, this data confirmed low-level hypothesis h6 that he greatest significance of the SHG lies in the information and financial support, and the confirmation of the hypothesis h4, h5 and h6, was the confirmation of the hypothesis h3 that to the female empowerment affects support of SHG's. According to the women's opinions, thanks to which the research was conducted, "*the support of SHG's*" in their decision on whether or not to establish their own business in percent is 53,6%.

## Conclusion

The importance of economic empowerment of women and the benefits that flow from it are undisputed, from the perspective of women's rights and from the standpoint of economic growth and productivity. According to Anderson & Eswaran (2009) female autonomy is defined as the ability of women to make choices/decisions in a typically male environment (Anderson & Eswaran, 2009). The Importance of women's empowerment is reflected as the vital issues in the progression and political seriousness of countries, all over the world. Women's empowerment can become a a powerful political tool that determined the existing power structure (Soroushmehr, Kalantari, Fami & Sarani, 2012; Swanson & Timothy, 2012). The true attitude of the state is visible through education. Without education women can't starting self-employed businesses (Calás et al., 2009). Patriarchal society can indirectly foster employment barriers for women (Seiz, 1991; Bhatt-Datta & Gailey, 2012).

When it comes to the business environment, research has shown that it contains a series of unfavorable conditions for the development of women's entrepreneurship, as well as the entrepreneurs often perceive it as an unsupportive environment for entrepreneurship. Namely, in addition to the unfavorable economic conditions, who follow the trends of delayed

and difficult transition in Serbia, and a few years ago, by the global economic crisis, as an aggravating circumstance for women's entrepreneurship there are also significant gender inequalities which act as barriers when entering entrepreneurship and later, in management and business development. It is therefore not surprising essentially unfavorable perception of the business climate among entrepreneurs in the sample survey: 76,6% of women entrepreneurs believe that in Serbian are hard to start a business due to lack of financial capital. In addition to education disadvantages, one of the most difficult challenges that many women face when they start or expand business is the balancing of their business responsibilities with their household responsibilities.

Although the final goal may be for household responsibilities to be shared between men and women in the household, this sharing never happens in the short span of time. In many cases, women's business remains small and concentrated in less profitable ventures due to time constraints (Suja, 2012). So, the mission of women empowerment in women's assets and associations is that members of the group present positive examples of female entrepreneurship, and the goal of this is self-empowerment of women and starting their own businesses. In her oft-cited article on measuring women's empowerment, Kabeer (1999) suggests a key element of empowerment is the "ability to make choices.". But, there is one important distinction between increasing a woman's social opportunities or choices and ensuring that a woman really is able to make her own choices. What is clear is that women around the world are creative and hardworking, and they will find ways to gain access to the resources they need to care for their families. This confirmed the main hypothesis H da self-employment is the aim of women's empowerment. All this has fostered a kind of formula for women's empowerment which was the goal of the paper: self-employment as the ultimate goal of women's empowerment directly dependent on the *motives* for starting a business (22,8%), *business environment* (23,6%) and *the support of SHG's* (53,6%).

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# CHALLENGES ON FINANCING RURAL FARMS AND RURAL DEVELOPMENT IN ROMANIA AND SOME EUROPEAN COUNTRIES UNDER SUBSIDING PRESSURE

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## Abstract

*Rural policy is a basically element in supporting the development of the European rural communities from a multiple perspective. The evolution and transformations of the rural areas under the influence of the agricultural policy determines the development of a specific agricultural model, in which the financing policy is a modulating instrument for designing the new rural configurations. Starting from the assumption that rural communities have significant weight in contemporary economies, rural policy and rural development analysis is highlighted as an objective necessity. In the larger context of understanding the rural areas transformations, the main objective of the paper is to analyze the challenges of financing rural policies and rural farms in competitive economies from a Romanian perspective, as evidenced by the effect of funding and support policy on rural communities. Understanding the challenges on financing rural farms and rural development in competitive economies may represent a starting point in defining and developing specific policies to support rural communities in their way to increase comparative advantage.*

**Key words:** *farms, rural development, financial instruments, CAP, subsidies*

## Introduction

Rural economy, despite of numerous and changes, both as structure and orientation, represents one of the basically components of the contemporary free market economies. The massive transformation of the European agricultural model, under the effects of Common Agricultural

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Policy reforms and paradigm orientation, has generated new fluxes of resources, in and out, from rural communities (Cortignani et al., 2017; Anghel et al., 2017; Kowalczyk, 2016; Barnes et al., 2016; Andrei et al., 2015), creating new approaches in understanding rural economy and its role in generating the economic performance and competitiveness. In this context, during the recent years, agriculture has increased its role and importance as economic branch, not only for rural communities, but also, as strategic component of the national economy. As (Matei et al., 2010) argues, agriculture develops dimensions and correlations with and under the climate change influences, accelerating new paradigms` development.

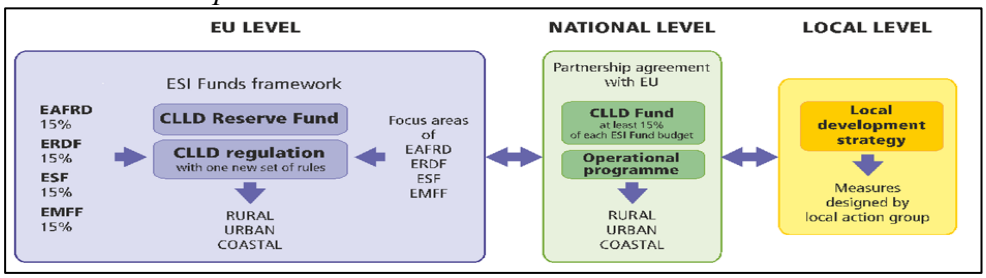
Establishing and substantiating a functional financing mechanism for rural communities which consistently supporting the rural economy as a whole is decisive in the context of an increased diversification of the role, importance, location and effects of the modern rural economy. In this context, the implementation of a general framework for harnessing the potential of rural communities juxtaposed to the diversified potential of rural economies in the EU area implies a massive reform in funding mechanism by promoting new solutions, prioritizing financing needs and applying viable local resource allocation criteria. A proper rural development is tightly connected to the farm development and functionality in the rural communities. As was argued in literature (Smędzik-Ambroży and Majchrzak, 2017; Jane Dillon et al., 2016; Andrei et al., 2014), the development of the farms represents a proper indicator in valuing the rural potential. Analyzing the rural development and the rural economy development could not be realized without understanding the financing mechanism of the rural farms on its whole complexity.

Rural development is by definition a vital component, and also, an equally responsibility of rural communities, for which, it is necessary to define and build a diversified and sustainable financing model, which can be integrated at national level. The complex role that rural communities have in shaping and sustaining the local cohesion emphasizes the need to integrate the funding for the realization of their goals, which are increasingly and more diverse for the local rural communities which are often increasingly territorial and needs more financial resources. In this approach, promoting an integrated local development for rural communities may represent a working solution for contemporary rural economy. An integrated local-rural development involves a more profound mobilization of rural resources and stimulates the active participation of different stakeholders, offering the possibility of

identifying and capitalizing local potentials at a much higher level than in the classical approach. As argued in literature (Vance, 2017; Fink , 2017; Salemink et al., 2017; Bock, 2016; CES, 2017), for most of the rural communities there is a lack of examples of real and functional models that can be used as pilots in promoting the financing of sustainable rural development and income-increasing effects rural population. Capitalizing the potential of rural communities involves articulating, both the various policies addressed to rural communities, as well the actors involved at local level. Rural communities as beneficiaries of rural development policy under the CAP financing or under the various instruments to support local cohesion often fail to identify the appropriate funding needs and promote the most profitable developmental opportunities.

The need for tools and financing mechanism modernization of the rural communities presumes the necessity of diversifying the potentials to be exploited and for which the existing instruments have proved their limitations or, as the case may be, their incapacity. The rural development policy funding mechanism has not always managed to focus on the real needs of financing rural communities, and rural communities have failed to mobilize and implement feasible ideas with large addressability to the local groups. A multiphase approach of sustaining rural and local communities could be achieved as it is presented in (CSE, 2017) by using community-led local development (DLRC) for integrated local and rural development. In fig.1 is presented the integrated approach promoted at EU level on community-led local development (DLRC) for integrated local and rural development.

**Figure 1.** *Community-led local development (DLRC) for integrated local and rural development*




**Source:** *authors` captation from CES (2017)*

Developing a functional financing mechanism for rural communities implies both developing a working strategy in valuing rural farms` potential doubled by reconsidering the subsidizing mechanism through the Common

Agricultural Policy (CAP) futures. Rural development and the rural communities are partner vectors in achieving a well functional rural economy. Understanding the transformations of the rural communities under the new CAP paradigm may provide a further step in dimensioning the role of agricultural farms in rural economy. Also, the structure of financial dimension of the farm`s outcome is heavily depended of financial subsidies allotted through the agricultural policy mechanism.

Subsidizing agriculture is an effective tool for harnessing agricultural potential and promotes rural communities development, and farms and farmers are instruments in ensuring sustainable economic growth and improving the rural economy functionality. The level of direct financial support for funding the farm and supporting farmers` incomes contributes to the aegis of ensuring a level playing field between European farmers and it favoring the balanced development of national rural areas.

The European agricultural model has developed over time as means for capitalizing the agricultural potential the sustainable family farms developments, which have become income securing vectors for the rural population. The CAP provides financial support for developing and continuing the activities of family farms, cooperatives and agricultural societies that have become sustainable exploitation patterns in rural communities.

he system of subsidies and other direct payments to farmers designed under the pillar I of the CAP contributes significantly to shaping the rural areas and the agricultural production. Although, greening the CAP has also helped to improve and select financial support beneficiaries, and in this context, the reorientation towards sustainable agricultural production must be a viable direction for defining the European agricultural model.

As it is reviled in some European Commission documents (CES, 2017a) in the current structure of the functioning and implementation of the CAP, 30% of payments under pillar one are linked to greening and 70% of 15 statutory management requirements and five standards on the good agricultural and environmental conditions to be met in order to benefit from these payments. (CES, 2017a). This situation is a solid argument in understanding the role that direct financial support and financial support measures have in achieving the functionality of the rural economy. Taking into the consideration all the remarks previously exposed, the paper is structure on two main directions. First is concerned to the subsidized agriculture and the structure of the farm value creation and its

structure in some EU countries with a close similarities to the Romanian agricultural sector and the second is dedicated to the evolution of the agricultural and farmers` income and tot the labor development.

**Subsidized agriculture in some EU countries, in 2007 and 2015**

Agriculture, as the main economic branch in rural areas, has faced massive transformation of the rural economy under the pressure of new CAP paradigm. Agriculture, in modern economies provides more than food and feed for livestock is multifunctional and influence the rural life on numerous aspects. Farmers are often faced with a dramatic decrease of the rural economy and finds difficult conditions in valuing the agricultural land. The rural areas have lost population, especially young people, and a need for revitalization of rural space and farms is necessary in the conditions of adaptations to the new conditions of economic competitiveness. In this context, sustaining farmers and agricultural activities through subsides can be a viable economic and social solution, stimulating the generation of added value in the rural economy.

Agricultural subsidies had represented for a long period functional instruments in orienting the agricultural production in EU-28. Subsiding the agriculture has proved to be a determinant policy in stimulating both the agricultural production and the development of the rural areas and communities. As Green Jesuit notices in his essay "in spite of its immense expense, farmers throughout Europe are deeply unhappy with the CAP. It is significant that even though the average UK farm receives over half its income from CAP subsidies, farmers in England and Wales voted overwhelmingly in favor of BREXIT"(Jesuit, 2016).

Developing agriculture through CAP specific financial instruments must focus on ensuring an appropriate level of income for European farmers in order to enable both a decent living conditions and the sustainable development of their farms. At the same time, the diversification of rural activities, especially of non-agricultural ones, requires adequate financial support for the development of social, ecological agriculture and the deepening of its multifunctional character in rural space. Subsidizing agriculture must have the effect of creating a sustainable agriculture that promotes the smart development of rural communities. In table 1 is presented the agricultural subsidies in some EU countries[3], in 2007 and in 2015.

[3] For this study the authors had chosen besides Romania, its neighbors (Bulgaria and Hungary) and Poland as country with an agricultural sector structure almost similar to the Romanian one.

**Table 1.** *Agricultural subsidies in some EU countries, 2007 and 2015*

(Standard Output)

| Country / Year | Bulgaria | | Hungary | | Poland | | Romania | |
|---|---|---|---|---|---|---|---|---|
| | **2015** | **2007** | **2015** | **2007** | **2015** | **2007** | **2015** | **2007** |
| Total subsidies - excluding on investments | 10488 | 1727 | 15978 | 12963 | 5189 | 4028 | 1213 | 2119 |
| Total subsidies on crops | 670 | 21 | 513 | 2287 | 318 | 61 | 1 | 50 |
| Total subsidies on livestock | 935 | 55 | 1189 | 474 | 463 | 0 | 98 | 1068 |
| Total support for rural development | 2058 | 0 | 1165 | 1802 | 433 | 1019 | 27 | 0 |
| Subsidies on intermediate consumption | 211 | 264 | 1082 | 1190 | 257 | 82 | 60 | 227 |
| Decoupled payments | 5810 | 969 | 10694 | 5498 | 3583 | 1459 | 982 | 402 |
| Other subsidies | 803 | 384 | 1297 | 1283 | 134 | 1406 | 45 | 373 |

**Source:** *authors based on FADN, 2017*

As is presented in table above the evolution and importance of total subsidies, excluding on investments has dramatic decrees in case of Romania, despite the fact that for Bulgaria, Hungary and Poland register positive trends. If in 2007, total subsidies excluding on investments in Romania were 2119 in terms of Standard Output, eight years later, the value represented just 57.24% form the initial level. Compared to the analyzed countries Romania has beneficiate of a low rate of agricultural subsidies. In 2007 the Romanian agricultural subsidies represent just 16.34% from Hungarian level of subsidies and 52.60% from the Polish level of subsidies. At the end of analyzed period the subsidized level of the Romanian agriculture still register downfalls. In 2015, Romanian subsidies represent 20.33% from Polish subsidies level and 7.59% from the Hungarian level of subsidies. The evolution of total subsidies on crops and total subsidies on livestock is presented in table 2 and table 3.

If in 2007 both Romania and Bulgaria has received no support for rural development, in 2015 Bulgaria has managed to attract and use financial founds almost ten times higher than Romania. The other two countries, Hungary and Poland registered a drop of the values for this indicator. In case of the subsidies on intermediate consumption all the analyzed countries, except, Poland has registered minor reductions. The decrease of this subsidies typology may result as an imperative on improving farm production under the market competitiveness restrictions. Optimizing the intermediate consumption contributes on improving the farm economic efficiency and resources usage.

As for example (Rescia, Del Bosque-González, 2017) propose a relatively functional allocation mechanism of financial compensations for those

farmers who choose to restore lands as non-agricultural areas. At the same time, this financial support mechanism that promotes biodiversity in rural areas and rural communities can help improve farmers' income levels, making it no longer a factor limiting farm profitability. (Rescia, Del Bosque-González, 2017).

Decoupled payments represent another important aspect in supporting farms in rural economy. In this case Romania has the same trend of evolution with all the analyzed countries. This reality is dependent on the active measurements and intervention in beneficiating the CAP agricultural financing on greening the agriculture and other policy`s specific measures.

On CAP financing by subsidizing measures, significant amounts are allotted to support crop production as subsidies on crops and subsidies on livestock in order to value the fundamental dimensions of the agricultural production – crop production and livestock. In the table below (Table 2) is presented the level of subsidies on crops in some EU countries, in 2007 and in 2015.

**Table 2.** *Subsidies on crops in some EU countries, in 2007 and in 2015*

(Standard Output)

| Country | Bulgaria | | Hungary | | Poland | | Romania | |
|---|---|---|---|---|---|---|---|---|
| Year | 2015 | 2007 | 2015 | 2007 | 2015 | 2007 | 2015 | 2007 |
| Total subsidies on crops | 670 | 21 | 513 | 2287 | 318 | 61 | 1 | 50 |
| Other crops subsidies | 670 | 21 | 513 | 2287 | 318 | 61 | 1 | 50 |

**Source:** *authors based on FADN, 2017*

As regards the subsidies on crops in some EU countries, in 2007 and in 2015, it could be noticed a dramatically decrease for all the countries analyzed. The reorientation of the CAP for supporting directly the agricultural production to the new measures in greening the policy had a direct impact on farm production. In this context, the diminish level of subsidies on crops reflects the new CAP paradigm. The evolution of subsidies on crops in EU follows the main stream in the field. The farms` agricultural production was heavily subsidized in the European Union and as a direct effect it was generated a distortion of the agricultural production. A need for increasing the competitiveness of the EU agricultural sector was mandatory in order to survive the world agricultural commerce. As (Helming and Tabeau, 2017) remarked in their study, the redeployment of Pillar I financial allocations to coupled agricultural labor subsidies has generated an increase in employment rates in agriculture, especially in those rural areas where agriculture was the most predominant activity or labor intensive farming sectors (Helming and Tabeau, 2017).

Continuing the analysis regarding the subsidizes in Table 3 are presented the subsidies on livestock in some EU countries, in 2007 and 2015.

**Table 3.** *Subsidies on livestock in some EU countries, 2007 and 2015*

(Standard Output)

| Country / Year | Bulgaria | | Hungary | | Poland | | Romania | |
|---|---|---|---|---|---|---|---|---|
| | **2015** | **2007** | **2015** | **2007** | **2015** | **2007** | **2015** | **2007** |
| Total subsidies on livestock | 935 | 55 | 1189 | 474 | 463 | 0 | 98 | 1068 |
| Subsidies dairying | 188 | 35 | 707 | 0 | 0 | 0 | 41 | 45 |
| Subsidies other cattle | 301 | 0 | 270 | 121 | 452 | 0 | 18 | 0 |
| Subsidies sheep & goats | 445 | 19 | 213 | 97 | 12 | 0 | 35 | 23 |

**Source:** *authors based on FADN, 2017*

As it can be remarked from the data presented in the Table 3, the total subsidies on livestock has registered massive increasing during the eight years period of analysis, except Romania, where the data shows a dramatically drop of. The subsidies on livestock have stimulated the farms in valuing superiorly the inland agricultural potential. The rural areas are facing numerous changes regarding the structure of agricultural economy. In countries as Romania, the rural population has given up growing animals, or farms have been reduced in significance due to the effects of a disintegrated sectored policy. In this context we can explain the low level of total subsidies on livestock.

Analyzing by component categories of total subsidies on livestock, the situation is a gratifying one, because in the case of all the analyzed states there are significant increases. As subsidies dairying, it could be remarked an important increase, except Romania, where it drops form 45 standard output units in 2017 to 41 standard output units in 2015. Both subsidies other cattle and subsidies sheep and goats are follow the positive trends in the field. Financial support for cattle, sheep and goats are simulating rural animal breeders and farmers to develop sectorally these components of the rural agricultural economy. Subsidizing the animal growers to develop and extend the livestock represented a stimulus measure for diversifying the modality of increasing gross value added in the field. Romania and Bulgaria, but especially Romania has experienced a dramatic reduction of the livestock. The destruction of agricultural farms specializing in animal husbandry has led to a reduction in livestock, and the rural population has taken over the animal husbandry most of the time by necessity or subsistence.

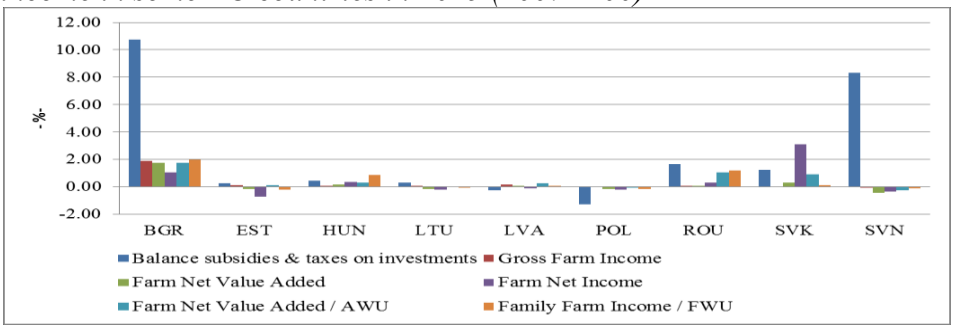
**The farm value structure and output in some EU countries**

Analysis of the farm value added creation is basically in understanding the level of rural economy competitiveness. Farms represent important tools and instruments in valuing the inland agricultural potential in context of optimal production combination in order to generate revenues. The value added creation imposes a mandatory knowledge of the level of all production factors available in rural areas and the availability of financial instruments in supporting farm development.

The numerous reforms of CAP had affected the financial support mechanism for the rural farms. In literature exists studies which argue the inefficiency of CAP mechanism and philosophy in promoting a well functional rural economics and agriculture on the lack of harmonization. As (Gorton et al., 2009) critically remarks in their article "the CAP was insufficiently reformed to accommodate CEE accession effectively and it represents a failure of the European Union to adjust adequately from an exclusively Western European institution into an appropriate pan-European organization."(Gorton et al., 2009).

The farm net value added and income juxtaposed to family farm income reflects the efficiency of farm in valuing rural economic potential. As for evidence, in fig. 2 is presented the structure of farm and family revenues - value added and income in some EU countries in 2015.

**Figure 2.** *The structure of farm and family revenues - value added and income in some EU countries in 2015 (2007=100)*




**Source:** *authors` computations based on FADN, 2017*

As it could be seen from fig.2 the structure of the four indicators - respectively farm net value added, farm gross and net income and the balance of subsidies and taxes on investments – is dramatically changed

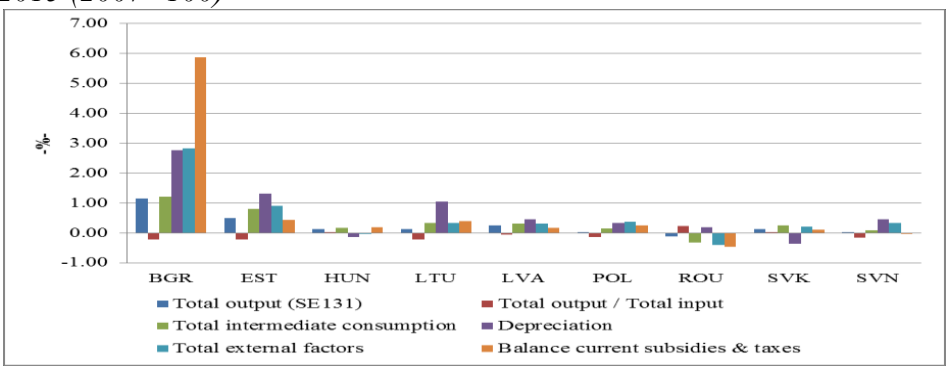
in case of all nine countries. The calculus was made taking into consideration as referential the year of 2007 in percentage.

The evolution of Gross Farm Income reviles positive evolution in case of majority of the analyzed countries, except there countries – Poland (-0.04%), Slovakia (-0.03%) and Slovenia (-0.08%). The highest increase of this indicator is in case of Bulgaria (1.88%). Romania has a small but positive value of Gross Farm Income of just 0.06%, lower with two percentages than Hungary (0.08%).

The trend of Farm Net Value Added had demonstrated the vulnerability of the rural farms to the rural economy changes. The shift of Cap financing through the first Pillar had impact on the farms` economic viability. The values demonstrate the dependency of the farms to the subsidies and other supporting financial mechanism.

Taking into consideration the efficiency indicators as - Farm Net Value Added / AWU and Family Farm Income / FWU – by adding the labor force used in farms as employed or family, it is obtain a wider imagine of economic farm viability. The value added created in rural economy by farms is heavily depended on labor force usage, as agriculture is labor intensive in former communist countries as those considered in this analysis. The evolution of these indicators is relevant in context of promoting sustainable policies in valuing rural potential by farm exploitations.
Another aspect in order to understand the farm economic viability is the output indicators. To complete the analysis in fig.3 is presented some of the farms` economic effort indicators.

**Figure 3.** *Some of the farms` output indicators in some EU countries in 2015 (2007=100)*




**Source:** *authors` computations based on FADN, 2017*

The most significant indicator form fig.3 is the ratio between total output / total input, because it manages to reflect the effectives of the production attracted resources usage and the final output. Valuing the agricultural potential implies highest levels of efficiency and efficacy of available rural resources.

In case of rural farms the share of intermediate consumption and depreciation are high and often affects the level of competitiveness of the farm. In this case, subsidies complete the shortage of agricultural efficiency and stimulate the farmer to continue production in the context of optimizing the use of available internal resources. The low level of economic efficiency in farms caused by agricultural production is due largely to the relatively low market value of agricultural products compared to the industrial ones and to the labor-intensive nature of agriculture. As is described in literature (Martinho, 2017; Vrolijk et al., 2010), the farm productivity and viability is strictly connected by the balance of employed production factors and their availability. Developing and maintaining comparable levels of production in farms involves maintaining working flows and materials under the efficiency criteria. The farms` productivity is a complex matter of understanding the rural economy realities and challenges, which often involves social aspects. In this context, form the social perspective, farms also engage numerous working force and streamline the rural employment which may contribute as (Martinho, 2017), states in order to found a balanced trade-off among the economic, social and environmental dimensions. (Martinho, 2017).

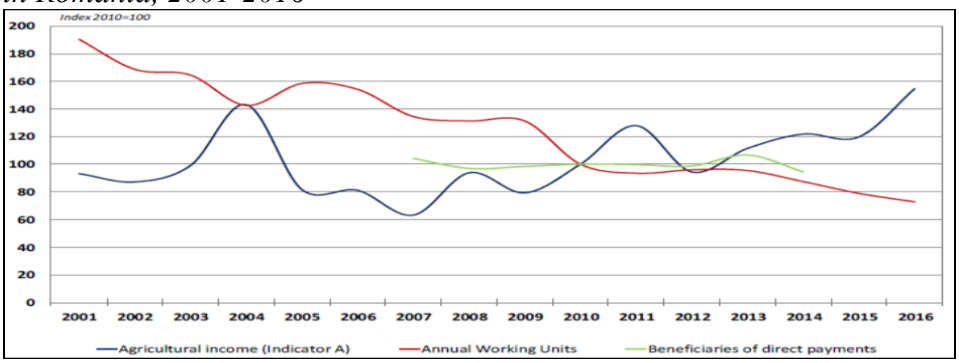
**Rural farms and rural economic aspects in Romanian agriculture**

In order to be more specific, the second part of the analysis is concerning to a national level, by taking into consideration aspects as: agricultural income, farmers` income and labor development and the structure of farms costs and revenues in case of Romania. The evolution of the agricultural sector in Romanian economy has faced numerous reforms and paradigm transformations during the last twenty-five years, and the most obvious effects are registered by the trends of farmers` income and labor development index computed in real terms during 2001-2016. The most obvious effect is perceived by evolution farmers` income and labor development. The trend of these components is presented in fig.4.

Analyzing the evolution of agricultural income, the annual work units employed in agriculture and the beneficiaries of direct payments during

2001-2016, it could be remarked three main streams. First stream is designed by the evolution of usage of labor in agriculture described by the decreasing tendency of the annual work units employed in agriculture during the all analyzed period, which confirm the fact that Romanian agriculture stated to become a less labor intensive that it was before, confirmed in the second stream by the saw blade evolution of the agricultural income, steadily increasingly after 2012. The third tendency is developed after the year of 2007 when Romania accessed the EU under the direct payments impact.

**Figure 4.** *Farmers` income and labor development index (in real terms), in Romania, 2001-2016*



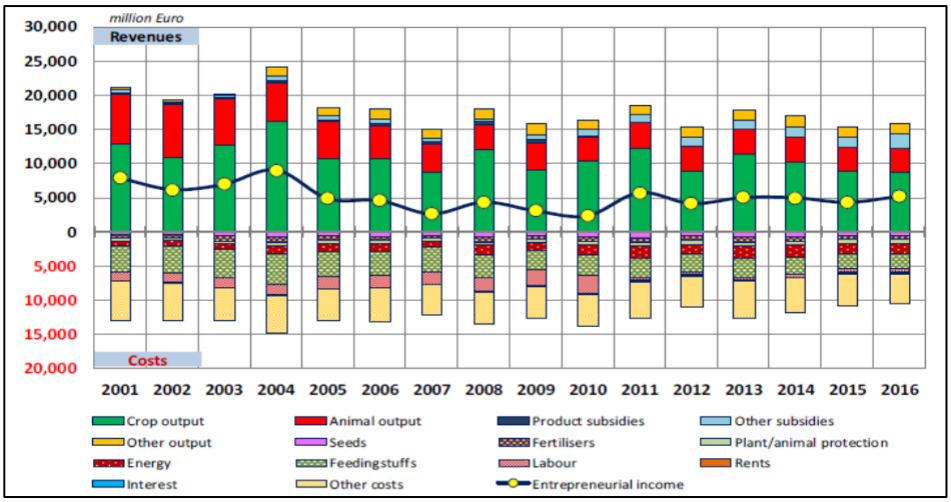

**Source:** *authors` captation from European Commission, 2017*

To detail these phenomena, in fig.5 is presented the structure contribution on agricultural income, in real terms, in Romania during 2001-2016.

As in fig.5 the most determinant components in forming agricultural income in Romania are the classical contributing structures as the crop output and the animal output slightly completed by rents and subsidies. The evolution of the agricultural entrepreneurial income is relatively steady during the accession period. Understanding the evolution of the agricultural income, in real terms, in Romania during the analyzed period, presupposes the deepening of the intimate resorts of determining the structure of the inland agrarian economy. The agricultural revenues as generally and agricultural income in particular is shaped by numerous endogenous factors. In case of Romanian agriculture the numerous reforms, undercapitalized farms, lack of investment capital and the agricultural land ownership were among determinant factors in affecting farm efficiency and the level of agricultural income. For imagining better

the determinants, in fig.6 and fig.7 are detailed the structure of costs and revenue in Romanian farms during the same analyzed period.

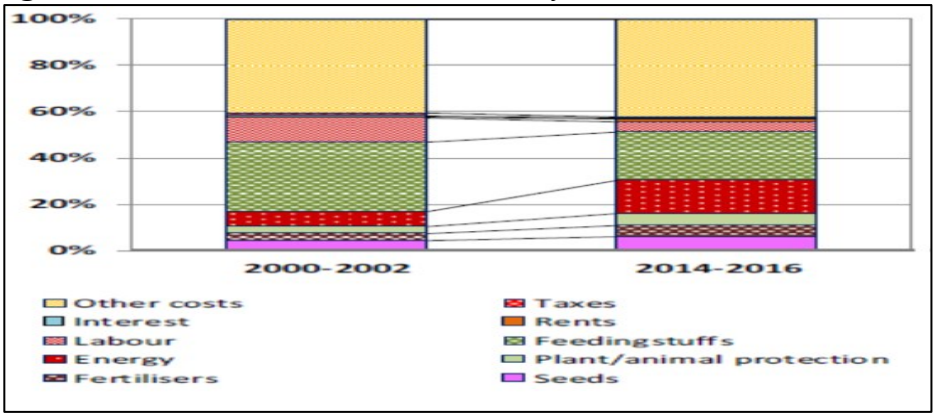
**Figure 5.** *Evolution of the agricultural income, in real terms, in Romania, 2001-2016*




**Source:** *authors` captation from European Commission, 2017*

As it could be remarked form fig.6, the evolution of costs` structure in Romanian farms during 2000-2002 and 2014-2016 reviles no significant changes, despite of reduction of feeding stuffs costs. This structure is juxtaposed to the farms revenue structure (fig.7) which explains in a great measure the paradigm of agricultural income and agricultural entrepreneurial revenue for framers.

**Figure 6.** *The costs` structure in Romanian farms, 2000-2016*




**Source:** *authors` captation from European Commission, 2017*

**Figure 7.** *The revenues` structure in Romanian farms, 2000-2016*


**Source:** *authors` captation from European Commission, 2017*

## Conclusions

The European agriculture and the Romanian agriculture also have experience dramatically change of paradigm. Analyzing the challenges on financing rural farms and rural development in Romania and some European countries represents an actual. The synergies developed by the redefinition of the mechanism of financing the exploitation of the agricultural potential through the CAP imply not only mainlining and stimulating the agricultural activities, but above all, the support of the agricultural producers and the diversification of the multifunctionality in the rural areas. Supporting the agricultural production through the direct payments mechanism and other complementary instruments addressed to farms in rural areas is defining in the development of rural areas and the rural economy in general.

The exploitation of agricultural potential, but also the diversification of agricultural activities in the rural area and the re-generation of farmers' families through the installation of young farmers in rural areas is a fundamental problem, in the context of the revitalization of rural space. Promoting local development under the responsibility of the community to contribute to a balanced and sustainable development of rural areas can be an effective tool for diversifying rural economic activities.

Understanding the challenges on financing rural farms and rural development in context of new Cap paradigm may represent a starting point in defining strategies for improving farms 'financing mechanism and reducing additional exploration costs. As it was argued in the manuscript content, in case of rural farms the share of intermediate consumption and depreciation are high and contributes in diminishing the farm competitiveness and reduces the entrepreneurial income for farmers.

The subsidizing mechanism for farms often improves the efficiency and stimulus the farmer to pursuit agricultural activity. The restructuration of subsiding mechanism had effects on farm production frontier movement.

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# EVALUATION OF POLISH RURAL DEVELOPMENT PROGRAM 2014-2020 IMPLEMENTATION

*Andrzej Kowalski*[1], *Adam Wasilewski*[2]

## Abstract

*The purpose of this evaluation is to assess effectiveness and efficiency of implementation of the RDP 2014-2020 in the period from its commencement to the end of 2016, to assess the net impact of the selected support instruments, as well as to assess synergy and indirect effects. Answers were provided to 11 evaluation questions, according to the scope of the concerned evaluation. The evaluation utilised participative and mixed model of evaluation through incorporating all significant stakeholders of the programme and application of various methods and data (the so-called triangulation), which led to verification and the fullest possible presentation of the obtained results. The RDP 2014-2020 activities will provide a potentially strong contribution to implementation of all assumed objectives. However some weaknesses have been identified during this evaluation, e.g. the need to change regional distribution of funds or enable the transfer of funds between RDP actions.*

**Keywords:** *rural development, implementation, agriculture*

## Introduction

Common Agricultural Policy (CAP) is one of the basic EU policies whose aim is to strengthen competitiveness and sustainable development of agriculture through: the market system, direct payments, as well as programs for rural areas. With an annual budget of around 59 billion euro, the common agricultural policy finances these objectives through the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). While maintaining

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the consistency of goals and tools at the level of all 28 EU member states, the CAP offers, however, some flexibility in their adaptation to the current needs of individual countries. In the years 2014-2020, the Polish agricultural sector and rural areas will be supported from the EU budget by a total amount of approx. EUR 32 billion for the implementation of the EU main priorities: employment, sustainable development, modernization, innovation and quality. The main instruments for the implementation of these priorities are direct payments (about EUR 23.4 billion) and the rural development program (about EUR 8.6 billion), which have been adapted to the specific needs of the country. RDP 2014-2020 for Poland was adopted by the European Commission on December 12, 2014. The legal bases for its operation are:

- Act of 20 February 2015 on supporting rural development with the participation of the European Agricultural Fund for Rural Development under the Rural Development Program for 2014-2020. (Journal of Laws, item 349, as amended);
- Act of 20 February 2015 on local development with the participation of the local community (Journal of Laws, item 378).

RDP 2014-2020 for Poland focuses on three main objectives, i.e. supporting competitiveness and productivity in the agri-food sector, ensuring sustainable management of natural resources and climate action, as well as achieving sustainable territorial development of rural economies through the development of local infrastructure, investments in the field of education, culture and public services, creation of new and maintenance of existing jobs.

In accordance with EU regulations, RDP 2014-2020 is subject to evaluation, which is carried out to improve the quality of design and implementation, as well as to analyze its effectiveness, efficiency and impact. The overriding objective of activities related to the evaluation of RDP 2014-2020 is to provide information necessary for the purposes of program management and to inform the general public about the results of its implementation. EC Regulation No. 808/2014 obliges the Member States to carry out evaluations and answers to evaluation questions in the extended annual reports on the implementation of RDP 2014-2020 in 2017, 2019 and in the ex-post evaluation. The territorial scope of the evaluation concerned the implementation of the Program throughout Poland, taking into account the spatial aspect, in the period from its launch until the end of 2016.

The purpose of the study was:

- assessment of the effectiveness of RDP 2014-2020 implementation, by at least assessing the level of achievement of common output and result indicators (including additional indicators), set out in Annex IV to the EC Regulation 808/2014;
- assessment of the net impact of selected RDP support instruments 2014-2020;
- assessment of synergies and additional effects of RDP 2014-2020.

## Theoretical background

The European Union, realizing the convergence objective, participates quite actively in the process of economic development of individual countries and regions. This participation is expressed in the application of a fairly wide range of instruments available for policy (Gancarczyk 2010, Bressers, and Klok 1988, Cubbage, Harou, and Sills 2007), oriented at supporting the development of economic activity. There are many classifications of these instruments in the literature on the subject, but in general it is possible to mention regulatory, economic and communication instruments (Bemelmans-Videc, Ray, and Vedung da1998). The subsidies included in the research are classified in the economic instruments according to the above classification. However, their impact on the economic situation is often obtained by different assessments of various economic trends and politicians. Subsidies, however, are the basic instrument used in operational development programs, practically in all European Union countries. During the implementation of these programs, both the production of public and private goods is subsidized. For this reason, the study attempts an empirical verification of efectiveness and efficiency (Ouattara 2012) of funds transferred from the European Union budget to rural areas in Poland under RDP.

Effectiveness is one of the criteria according to which the policy is assessed (Bird 1998). In general, it boils down to determining the degree of implementation of objectives set for a given policy (Król 2000, Pawłowski 2000). he assessment of the allocation of financial resources through policy is made not only by the criterion of effectiveness but also by efficiency. However, the active economic policy of the state is not a new phenomenon. The views on the necessity of state interference in economic processes proclaimed, simultaneously creating theoretical foundations, part of

economists. A good example is the representatives of the mercantilist school who in the 17th and 18th centuries claimed that the state should strongly engage in supporting the development of industry and trade (Landreth, and Colander 2005). However, the mercantilist concept of the role of the state was strongly criticized by Smith and the followers of the classical approach to the economy that he initiated (Landreth, and Colander 2005). Such a situation occurred up to the time of Keynes, who used certain threads of mercantilist theory to demonstrate the significant role of the state in economic development. Considering the effectiveness of policy implemented with the help of subsidies, attention should be paid to the inclusion of this issue by trends in economics and economic theory, whose main interest is the role of institutions in economic processes and the consequences of choosing specific solutions in the construction of the institutional system. Politics is treated in them as an element of the institutional environment. Currently, one of the main trends in the role of institutions is the New Institutional Economy.

The review of the literature shows that in the New Institutional Economics there is no precisely defined concept in efficiency, as it is in the case of efficiency in the sense of Pareto or Kaldor-Hicks (Stringham 2001). However, the theoreticians of this current refer to efficiency issues in their studies. For example, North (2005) states that "... companies, political parties, and even higher education institutions in the face of competitive organizations must strive to improve efficiency". In the author's opinion, subdued competition limits the organization's motivation to invest in new knowledge and consequently does not cause sudden institutional changes. In these considerations, the author concludes that the reason for improving efficiency is generally competition, and the means to improve it is to raise the level of knowledge. This raises the question of the implications for assessing the effectiveness of policies to support business development, especially with the help of direct subsidies. Assuming the existence of dependencies indicated by North, one can say that the assessment of policy effectiveness should take into account the competition of the environment in which the given organization operates, i.e. the enterprise. If competition is negligible then support for entrepreneurship development through subsidizing knowledge transfer can have negligible effects, as enterprises will not have the motivation to use it. The opposite effect will be in a highly competitive environment. In turn, direct transfers of funds to selected enterprises may result in the elimination of competing enterprises, and in the long term, reduce the propensity to invest in new knowledge, due to the lack of sufficient competition. Under certain conditions, however, such transfers

may have a beneficial effect. Such a situation will arise when in conditions of negligible competition they will contribute to the creation of new enterprises, which will motivate existing enterprises to improve their efficiency. The scale of this support and the conditions under which it is granted should, however, be determined in such a way as not to eliminate existing enterprises from the market. From North's considerations (2005) it also follows that under certain conditions subsidies may be a barrier to improving the innovativeness of the economy.

Neo-institutionalists claim that all forms of intervention, including direct financial support under the European Union's policy, slow down the process of efficient allocation of resources. However, they can be an important factor in economic growth, as it was in China. According to Murrell (2005), this is the role of the dual economy model. The use of various forms of intervention strengthens the efficiency "on the edge". In the context of the New Institutional Economy, this means temporary approval for a set of informal laws that give the possibility of sub-terminal production. However, it provides social protection for those units which, as a result of reforms, ie the transition to a purely market economy, would lose the most (Lau, Quian, and Roland 2000). As a result, this reallocation is slowing down, but thanks to this time is gaining the time to prepare mechanisms protecting market transactions or social protection of the weakest individuals. However, in the case of the Polish economy, as well as many other European Union countries, additional time to provide protection seems to be unnecessary.

The review of the literature generally shows that direct subsidizing of economic activity does not have a positive effect on the efficiency of resource allocation. It may slow down some unfavorable economic processes, providing time to adapt the human factor to the changes taking place. Nevertheless, the use of this instrument by a given level of public administration leads to a reduction in the pool of resources that can be used for the production of public goods. In the conditions of decentralized power, subsidies and subsidies at the higher level for lower administrative levels are one of the sources of financing the production of public goods (Bailey 1999). This source of income is particularly important when the scale of local taxes and fees is not sufficient to meet the needs of the local community in the field of public goods. However, direct subsidization of enterprises' activities may lead to an increase in budget revenues indirectly, i.e. causing an increase in revenues from local taxes. These subsidies should contribute to increasing income from personal and legal

persons or real estate tax. Due to the later reallocation, however, this may be a short-term increase. However, taking into account the solutions in Poland regarding sources of obtaining income by territorial self-governments, municipalities, poviats and voivodships will become indirect beneficiaries of this instrument. As a consequence, it may hinder the growth of tax rates or fees for using public goods left to local governments. This in turn is particularly important if local governments base their budget management on the maximization of income concept (Holcombe 2013). The condition, however, is the significant positive impact of subsidies on the level of local taxes.

## Methodology of evaluation

The research results presented in the study were prepared on the basis of the evaluation report entitled "Evaluation of the results of the implementation of the Rural Development Program for 2014-2020 in the years 2014-2016". This report has been prepared by the consortium of the Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland and the Institute of Soil Sciences – National Research Institute, Pulawy, Poland for the Polish Ministry of Agriculture and Rural Development (RDP Evaluation 2017).

The main element of the RDP 2014-2020 evaluation was the assessment of compliance of the solutions adopted by Poland with the documents defining its general framework:

- Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013 establishing common rules on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund covered by the Common Strategic Framework and laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No. 1083/2006 (OJ L 347 of 20.12.2013, p. 320 with later amendments) d.) - hereinafter referred to as Regulation 1303/2013;

- Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural

development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No 1698/2005 ( Official Journal of the European Union L 347 of 20/12/2013 p. 487, as amended) - hereinafter referred to as Regulation 1305/2013.

- Commission Implementing Regulation (EU) No 808/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development ( EAFRD) (Journal of Laws No. L 227, 31.7.2014 p. 18, as amended) - hereinafter referred to as Regulation 808/2014.

In accordance with the requirements of the European Commission and the Ministry of Agriculture and Rural Development of Poland, the aim of the study was to answer 11 evaluation questions:

1. To what extent have RDP interventions contributed to improving the economic performance, restructuring and modernization of supported farms in particular through increasing their market participation and agricultural diversification (2A)?
2. To what extent have RDP interventions supported the entry of adequately skilled farmers into the agricultural sector and in particular, generational renewal (2B)?
3. To what extent have RDP interventions contributed to improving the competitiveness of supported primary producers by better integrating them into the agri-food chain through quality schemes, adding value to the agricultural products, promoting local markets and short supply circuits, producer groups and inter-branch organization (3A)?
4. To what extent have RDP interventions supported the restoration, preservation and enhancement of biodiversity including in Natura 2000 areas, areas facing natural or other specific constraints and HNV farming, and the state of European landscape (4A)?
5. To what extent have RDP interventions supported the improvement of water management, including fertilizer and pesticide management (4B)?

6. To what extent have RDP interventions supported the prevention of soil erosion and improvement of soil management (4C)?
7. To what extent have RDP interventions supported carbon conservation and sequestration in agriculture and forestry (5E)?
8. To what extent have RDP interventions supported local development in rural areas (6B)?
9. To what extent have the synergies among priorities and focus areas enhanced the effectiveness of the RDP?
10. To what extent has technical assistance contributed to achieving the objectives laid down in Art. 59(1) of Regulation (EU) No 1303/2013 and Art. 51(2) of Regulation (EU) No 1305/2013?
11. To what extent has the national rural network contributed to achieving the objectives laid down in Art. 54(2) of Regulation (EU) No 1305/2013?

Evaluation questions were related to the implementation of RDP 2014-2020 in the years 2014-2016. For this reason, the assessment of the intervention logic, effectiveness, efficiency and the impact of measures implemented under the RDP has been carried out in relation to the following priorities and specific objectives:

- Priority 2: Farm viability, competitiveness and sustainable forest management
    - 2A - Farm performance;
    - 2B - Generational renewal;
- Priority 3: Food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management
    - 3A - Improving competitiveness of agricultural producers;
- Priority 4: Restoring, preserving and enhancing ecosystems in agriculture and forestry
    - 4A - Biodiversity;
    - 4B - Water management;
    - 4C - Soil erosion and management;

- Priority 5: Resource efficiency and shift to low carbon and climate resilience economy in agriculture, food and forestry sectors
    - 5E - Carbon conservation and sequestration;
- Priority 6: Social inclusion, poverty reduction and economic development in rural areas
    - 6B - LEADER;
- Technical Assistance;
- National Rural Development Network.

The evaluation of the intervention logic was generally carried out according to one scheme for all specific objectives, in which the following features were analyzed:

- scale of financial resources for specific objective,
- regional distribution of financial resources,
- access criteria and the rate of differentiation,
- adequacy of support to the action,
- selection of beneficiaries,
- range of eligible costs, eligibility conditions,
- potential direct and indirect effects,
- relevance of the risk identification related to the implementation of actions.

The assessment of direct and indirect effects of RDP implementation 2014-2020 was carried out in the form of the evaluation questions presented above. The basis for the assessment were the criteria listed in the study "Common Evaluation Questions for Rural Development Programs 2014-2020". Answers to evaluation questions were provided based on the analysis of indicators resulting from the adopted assessment criteria, namely:

- product indicators,
- result indicators,
- context indicators,
- additional indicators of the product, result and context.

In the assessment of the intervention logic and RDP effects, the principle of triangulation of information and data sources was followed. For this reason, the empirical material was information obtained from:

- program documents,
- legal acts,
- Financial Statements,
- ARMA monitoring data,
- Polish FADN data,
- National Public Statistics (CSO) data related to changes in the context,
- EUROSTAT data,
- professional literature,
- in-depth interviews with ARMA staff,
- in-depth interviews with the staff of Ministry of Agriculture and Rural Development,
- in-depth interviews with Regional Government Office,
- in-depth interviews with Local Action Groups,
- 2 panels of experts with representatives of the scientific community, whose research is oriented on the social, economic and environmental impact of the implementation of the RDP 2014-2020.

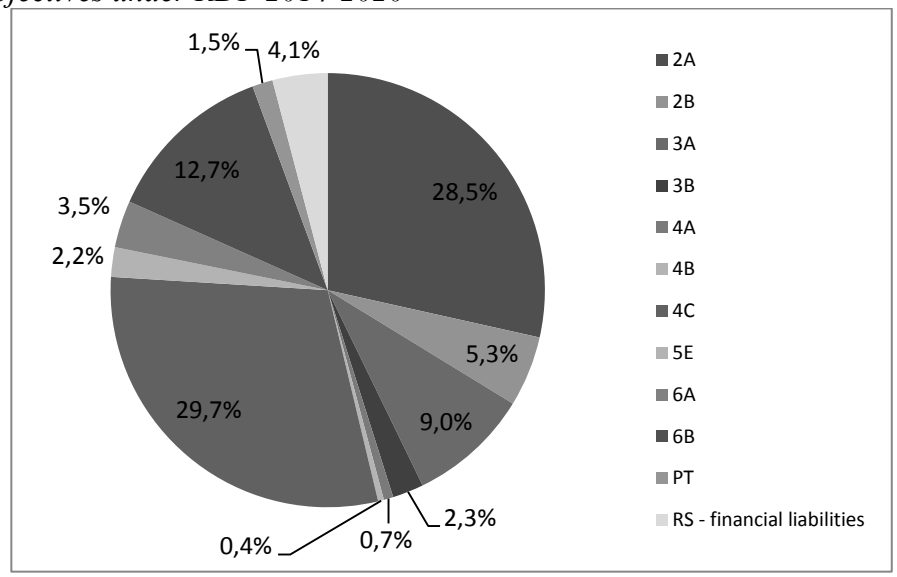
**Results of evaluation**

The research shows that EUR 8.6 billion from EAFRD funds was allocated for RDP activities in the period 2014-2020. The largest amount of funds will be transferred to the beneficiaries implementing activities related to the implementation of Priority 4, related to the protection of the natural environment and beneficiaries implementing the operation under the specific objective 2A, oriented at improving the performance of agricultural holdings (Figure 1). In other words, more than 50% of financial resources will be allocated on the implementation of operations under specific objectives 4C and 2A.

The Polish Rural Development Program was at the end of 2016 only at the initial stage of implementation. In the case of some activities, call for proposals has not yet been announced. Such a situation took place in the case of all activities oriented on the implementation of Priority 1, related to the transfer of knowledge. During the evaluation, their evaluation was omitted. The most advanced was the implementation of activities related to carbon sequestration and protection of the natural environment, ie affecting the implementation of Priority 5 and Priority 4 (Figure 2). In the first case, over 64% of the funds were contracted, and approximately 9% were spent, while the second contracted to nearly 30%, and more than 18% was spent.

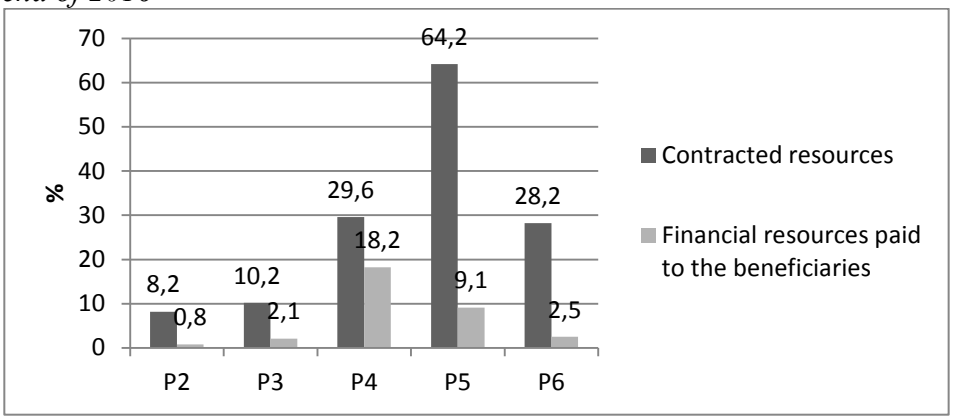
The relatively high degree of advancement in the implementation of these activities resulted, however, from the liabilities created in the previous budget period. In turn, the least-advanced was the implementation of investment activities under Priority 2 and Priority 3. In this case, less than 2% of funds were spent. Due to the low level of advancement of the implementation of the RDP 2014-2020, there were difficulties in assessing the results of the RDP, and in particular the assessment of their impact on rural development.

**Figure 1.** *Planned distribution of EAFRD funds between the specific objectives under RDP 2014-2020*




**Source:** *Data of the Polish Ministry of Agriculture and Rural Development.*

**Figure 2.** *Financial resources contracted and paid out under RDP by the end of 2016*




**Source:** *Monitoring data of the Agency for Restructuring and Modernization of Agriculture.*

The RDP 2014-2020 activities will provide a potentially strong contribution to implementation of the assumed objective 2A, i.e. improvement in economic results, restructuring and modernisation of supported farms, in particular by an increase in their market share and agricultural production diversity. This conclusion may be drawn primarily from assessment of the intervention logic (direct impact on achievement of the objective was reported for 8 measures/sub-measures/operations). Objectives of those measures are consistent with the specific objective 2A. Its implementation is also positively affected by the amount of budget. Funds in this respect are significant and amount to ca. 28.5% of all funds of the RDP 2014-2020. The greatest share in implementation of the objective 2A have the expenses intended for "Modernisation of agricultural farms" (more than 64%) and "Small farms restructuring..." (more than 26%). Assessment of impact on achievement of the indicated key objective is impossible due to a low representative character of this beneficiary group, (by the end of 2016, only 20 projects concerning modernisation of agricultural farms were completed). Regional distribution of funds regarding creation and development of non-agricultural activities (sub-measure 6.4.). In case of submeasure 6.5. "Payments to farmers eligible for the scheme of small farmers who have permanently transferred their holdings to another farmer" it is recommended to set a fixed amount of aid at the level offered in 2016 rather than gradual reduction in subsequent years.

The RDP 2014-2020 contributes to implementation of the objective 2B, i.e., entry of farmers with appropriate skills to the agriculture sector, especially to generational renewal. The adopted intervention logic is suitable for implementation of the assumed objective and facilitates undertaking agricultural activities by young people holding appropriate qualifications, although simultaneously, statistical data indicate that farmers in Poland are among the youngest in Europe. By the end of 2016, no operations from sub-action 6.1 were brought to completion, however, evaluation of the adopted eligibilty criteria and "business plans" indicates that improvement in agricultural area structure of farms and improvement in system of fertilizing, soil management and increase in the share of farmers in the EU and national quality systems is to be expected. The commonness of declaration of farmers for implementation of the cross-cutting objectives of innovation also needs to be emphasised. There may appear a problem with full absorption of funds, if the interest of beneficiaries in the operation entitled "Setting-up of young farmers" maintains at a similar level in the subsequent calls for applications. It is reasonable to introduce corrections concerning the access criteria and to supplement the scope of the monitoring data with the age of farmers transferring the farm.

The RDP 2014-2020 interventions contribute to implementation of objective 3A, i.e. improvement in competitiveness of agricultural producers covered by the support by means of improvement in their integration with the agrifood chain through quality systems, adding value to agricultural products, promotion on the local markets and short supply chains, setting up of producer groups and inter-branch organisations. Implementation of the objective 3A is facilitated by supporting: vocational training, information and promotional activities, new participants of quality systems, processing and marketing of agricultural products, investments in market places, setting up of producer groups and organisations, cooperation within the EIP groups. Division of funds between support instruments being implemented under the objective 3A is appropriate, taking into consideration diverse development needs in the agri-food sector, and at the same time it does not always correspond to needs of the beneficiaries. The aforementioned support instruments also contribute to achievement of other RDP 2014-2020 objectives. Due to a still initial phase of the Programme implementation, it is not possible to determine (on the basis of numeric data) how the implemented measures affect the competitiveness and integration of producers with the market. Competitiveness increasing potential of particular operations is highly

varied. Since most of the support instruments under Objective 3A have not yet been launched during the period under study, a more detailed response to the evaluation question will be possible only during the next evaluation, i.e. in 2019 year. The monitoring data for the assessment indicators collected by IA require supplementation.

The RDP 2014-2020 interventions contribute to implementation of the objective 4A, i.e. support for restoring, preserving and increasing biodiversity, including in the Natura 2000 areas, areas facing natural constrains or other specific constrains, as well as high nature value farming and the state of European landscapes. The adopted intervention scheme is complex and multifaceted. No risks associated with execution were identified for the majority of measures related to the specific objective 4A. Substantial regional disproportions in the level of implementation of different activities raise concerns related to effectiveness in achieving the objective. High allocation of the funds and implementation degree progress for the Agri-environmental programme, the Agri-environmental and climate programme, LFA and the Organic farming enable complete realisation of the adopted assumptions. Due to implementation of the Agri-environmental programme, the Agri-environmental and climate programme and the Organic farming, the farms characterised by a higher production intensity level (the main beneficiaries of the packages) have reduced the level of negative pressure on the environment. The factors restricting achievement of the objective include lack of commencement of the operation entitled "Investments in farms located on the Natura 2000 areas" as well as the measures entitled "Knowledge transfer …" and "Advisory services...".

The RDP 2014-2020 interventions support improvement in the condition of water management, including management of the use of fertilizers and pesticides, i.e. implementation of objective 4B. Intervention scheme, based on implementation of the following measures: transfer of knowledge and information activity, investment in fixed assets, quality systems for agricultural products and foodstuffs, agri-environmental and climatic, organic farming and the LFA payments, is logical and consistent. In 2016 the land related measures covered 1,831,606 ha, which means exceeding the interim indicative target (1,752,800 ha in 2018). Extensification of production on the naturally valuable areas and protection of water resources is especially facilitated by the Sustainable Agriculture Package and Protection of soils and water Package. In connection with draught areas periodically occurring in Poland, and, at the same time, expanding the area

of the irrigated areas, it is necessary to strengthen the possibility for the RDP 2014-2020 to affect the problem of rational use of water in agriculture, e.g. through: knowledge transfer, sustainable irrigation methods or investments facilitating improvement in the soil structure. Higher share of leguminous plants desired from the point of view of rationalisation of fertiliser management and lower expenses for purchase of mineral fertilizers was observed within the structure of cultivations of the farms implementing the aforementioned packages. There are large regional disproportions in the implementation of objective 4B.

The RDP 2014-2020 interventions contribute to the implementation objective 4C, i.e. they support prevention of soil erosion and facilitate improvement in the soil management. The adopted intervention scheme is characterized by complexity and multi-directionality of the approach to achieve the assumed objective, which is expressed, among others, in multiplicity of measures, directly and indirectly affecting its achievement. However, the area covered by the Agri-environmental programme and the Agri-environmental and climate programme in the 2015-2016 varied and was regionally diverse as well as it not always was optimal from the point of view of actual protection needs with regard to prevention of erosion and improvement in soil management. Usually the support was used by farmers from large farms (where it is easier to obtain the effect of scale) in the western and northern Polish voivodships. Beneficiaries were mostly interested in the afforestation programme, while Package 2 - protection on the erosion endangered areas, especially on the areas with the largest hazard of water erosion (Małopolskie and Podkarpackie voivodships) attracted little attention. The countrywide share of the area covered by protection against erosion, as compared to the areas endangered by it, is relatively small (in 2016 - only 1.1%). Implementation of the measure increasing the content of humus in the soil is not satisfactory. Countrywide, in 2015 the package covered only 1.8% of land, while in 2016 the acreage decreased to 1.4%. As compared to 2015, in 2016, a reduction was also observed in the area of land covered by the organic farming package. For this reason, there is a need for better adjustment of the RDP instruments to areas with the greatest risk of soil degradation and water contamination with nitrogen of agricultural origin. In order to raise awareness concerning practical need to undertake measures protecting agricultural areas, it is necessary to intensify the implementation of such measures as "Knowledge transfer…" and "Advisory services...", as well as to regionally differentiate financial support adequately to the hazard zones.

Achievement of objective 5E, namely protection of coal and carbon dioxide absorption in agriculture and forestry, is directly associated with implementation of the programmes concerning: afforestation, agriculture-environment and climate and ecology. The adopted intervention scheme is logical and coherent, and the listed interventions are capable of leading to absorption of CO2 and reduction of greenhouse gas emissions. The amount of funds allocated for implementation of afforestation is higher than in the previous programmes, which enables increase in their area and, as a result, better implementation of objective 5E. Distribution of funds by regions is generally greater in voivodships with larger afforestation needs and with higher share of soils particularly susceptible to losses of organic carbon, as a result its contribution to implementation of the aforementioned Objective is greater. So far, afforestation under the RDP 2014-2020 amounted to approximately 86.9% of the target land area, while the result indicator amounted to 0.3% (at the target value – 0.35%). Annually, CO2 sequestration from the atmosphere achieved as a result of afforestation projects implemented so far under the RDP 2014-2020 amounted to approximately 0.2% of Polish greenhouse gas emissions in 2014. Simultaneously, it amounted to 2.4 % of CO2 absorption from the domestic LULUCF sector and 2.3% of CO2 absorption from a forestry land subsector, being a part of the domestic LULUCF sector. There is also a large area of agricultural areas contributing to protection of coal by preventing mineralisation of organic substance (1 610 471.23ha , which amounts to approx. 11.3% of the used agricultural areas entered into the ARMA registers and approximately 8.6% of potential agricultural areas in Poland).

The RDP 2014-2020 interventions supported implementation of the objective 6B, i.e. local development on rural areas through measures concerning support of basic services and regeneration of rural areas as well as under the LEADER initiative. The adopted intervention scheme is logically consistent and complex. Also, distribution of funds, including the regional and the eligibility criteria is adequate to the identified needs and enables achieving objective 6B. Risk identification and its elimination methods are also effective. The interventions under the RDP 2014-2020 support local development in rural areas, however, the scale and the assessment of this support will be possible no sooner than in 2019. For the LEADER approach, further work is recommended to harmonize the procedures for assessing the correctness of the selection process in the implementation of local development strategies by the Provincial

Authorities, to avoid differences in the interpretation of regulations in individual offices.

Assessment of effectiveness of the programme in the context of possible synergy effects between the specific objectives and priorities is possible only on the basis of the ex-ante assessment of the RDP 2014-2020 and after taking into account the conclusions from the expert panel and the literature studies. In the theoretical perspective, relations between different RDP 2014-2020 measures can be synergistic or neutral or conflictual. The RDP strategy is consistent, based on objectives formulated at the EU level, while in the detailed perspective, on the results of the SWOT analysis and the needs of food economy and rural areas in Poland as well as points of contact with regional and national operational programmes. Implementation of particular measures contributes to achieving their intended objectives, but the degree of impact depends on the amount of financial resources and the scope of the measures implementation. Generally the assessed RDP 2014-2020 is dominated by neutral or synergistic relations. The high proportion of synergies relates to operations involving knowledge transfer and educational activities, as exemplified by horizontal instruments whose impact spectrum covers the whole of the specific and cross-cutting objectives and all the priorities of the EU rural development policy, such as "EIP Group Collaboration" and "LEADER" toolkit, operations supporting the development of small tourist infrastructure and the preservation of cultural heritage.

The objective of technical assistance is to strengthen the RDP 2014-2020 implementation system, the NRN functioning support and information and promotional actions implementation. Until the end of the 2016, it was impossible to submit applications for granting support. On the basis of the analysis of implementation of the RDP 2014-2020 as at the end of 2016, it can be concluded that technical assistance will foster achieving the assumed objectives. Entities entitled for support will use the pre-emptive financing, which enables realisation of current tasks, and, in the future, they will be able to obtain refund of the incurred costs. However, budget of the action is insufficient and it is necessary to re-allocate funds. The institutional potential and preparation for the RDP handling is good in both MA and IA. It is recommended to increase the number of trainings for employees.

Since, in 2014-2016, no applications were submitted for refund of costs with regard to support concerning the NRN financing, at the present stage, it is impossible to perform assessment of expenditure of funds. The

potential beneficiaries performing current operations meeting the criteria of eligible costs of Technical Assistance, will still be able to apply for refund at a later date. Intervention logic and the eligibility criteria for the NRN tasks implementation correspond to the identified needs. Network actions implemented using pre-financing are consistent and complex and their analysis indicates proper implementation of the NRN tasks. Institutional potential and preparation of staff implementing the NRN actions should be assessed positively.

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# AGRICULTURAL CHAMBER – KEY FOR AGRICULTURAL DEVELOPMENT AND FOOD SECURITY IN SOUTH EAST REGION

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## Abstract

*In this paper, we will analyze a series of interesting aspects regarding the organization of agricultural chambers, as key for agricultural development and food security in South East Region. The positive economic consequences of implementation and development of agricultural chambers system could be a good example for those states in the region that did not apply to this solution, in order to develop their agricultural potential and food security. Without a clear and rapid implementation of agriculture policies dedicated to farm and farmers, in the context of climate changes adaptability in our region, will irreversible and immediately affect the price volatility of agricultural commodities and with economic consequences to the agricultural potential. It is obvious, that national agricultural policies must be aligned with the reality of the region because the agricultural potential and food security it is not only a national or regional problem, it is a global problem which must concern us because it has profound global implications.*

**Key words:** *agricultural chambers, agricultural development, food security, agricultural potential, price volatility.*

## Introduction

Agriculture, as the main component of food security, has the potential to play the lead role in our region especialy for the sustainable development, describing a multifunctional character and great impacts: economic (as a provider of foodstuffs, fibers, bio-fuels, and timber, and a source of income for farmers), social (as a source of employment, quality of life and health) and environmental (as a friendly ally for soil, water,

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biodiversity, landscape and climate). This is why, a weak food security can quickly produce internally seizures and severe social tensions, can harm the physical and mental health of the population, can create economic and political instability, and may evolve into political, economic and diplomatic tensions that will damage the national security. Food issue has two basic components: food policy and nutritional policy.

Therefore, food policy is developed on two levels: one is referring to supply and the quality of products, and the others target directly the consumer and its capacity to consumption. These statements point out one or more from the next goals:

- Establishing food prices against international price fluctuations;
- Ensuring a certain nutritional level of the malnourished population;
- Controlling the food prices;
- Limiting the inflationary pressure through the control of the food prices.

Therefore, food policies represent the ensemble of legislative, normative, administrative and financial governmental measures, which are considering already defined objectives. The nutritional policy settles a balance between the physiological needs of food consumption and the contribution of the nutrients for their satisfaction.

The role of the food production, disponibility and consumption, has deep consequences over the human activity and the future welfare. As food security is placed in complex social, economic, cultural and political contexts, it is difficult, if not impossible, to disconnect the role of food security from the agricultural sector and food production, rural agricultural reform and economic development.

Food security is closely related to sustainable development, because a proper nutrition and quality food products constitute the basis of the population welfare and of the productivity growth.

Healthy foods contribute, according to the international standards of food safety, at boosting the exports, hence, at the income growth. It is important to be aware of the necessity of quality and nutritious food products, because food safety increases the health of the consumers and is a major component of the future food security. Based on this assumption,

emerges the obligation of government to integrate into national policies goals to meet food security and ensure sustainable development. In this context, we consider that, in our region, the Agricultural Chambers can be considered as "key role" to develop the agricultural production, farm management and high technologies in rural areas, elements for ensuring the stability of food security in Europe.

The food production and consumption is essential to any society, and has economic, social impact and, in many cases, on the environment. Although health protection must always take priority, these issues must be considered in the development of food policy. In addition, the state and the environment, particularly ecosystems, may affect different stages of the food chain.

Thus, environmental policy plays an important role in ensuring safe food for consumers while agro-food sector occupies a key position in the European economy, the annual output of food and beverages having a value of € 600 billion.

## Organization of Agricultural Chambers in European Union

One of the key elements agricultural development and food security in our region are the agricultural chambers. In this regards, based on our analyses we present a short presentation of this entities, as key promotor for a real and sustainable agriculture development.

## Organization of agriculture chambers in Lithuania

### 1. History

The first Agricultural Chamber from Lithuania was opened by law in 1926 and functioned at national level until 1940. After Lithuania regained its independence, Agricultural Chamber was formally restored in 1991 and in 1997 was approved the Agricultural Chambers Law which permitted it to function[4].

[4] https://zum.lrv.lt/en/

## 2. Organization

| NATIONAL LEVEL<br><br>AGRICULTURAL CHAMBER | REGIONAL LEVEL |
|---|---|
| **Congress** (General Assembly)<br>**Council** (gathers between the Congress meetings)<br>**Presidium**<br>**President**<br>**Vice-President**<br>**Evaluation Committee**<br><br>**Managing Director**<br>**Managing Body** (organized on activity directions) | **Managing Body**<br>- Administrative directions from the center have reprezentations at regional level<br><br>**MB members**<br>90 organizations, NGOs, divided into sectors: agricultural production, animal husbandry, professional, cultural, regional associations. |

## 3. Funding Sources

Financing is done through monthly contributions paid by members.

## 4. Atributions

- Participates in elaborating laws in agricultural and rural development sector.
- Provides support for the members of Agricultural Chamber for implementing projects, consulting,training, educational programs,etc.
- Statistical activities, sectorial analyzes and forecasts.
- Performs market research, surveys and draws up articles and papers in the field.

### Organization of agricultural chambers in Poland

## 1. History

Agricultural Chambers were first created in 1896 in western region of Poland, those were reprezented the farmers and worked together with the central and local authorities to promote agriculture. Between 1918 and 1939, Agricultural Chambers operated throughout Poland, and then were abolished until 1995[5].

[5] http://www.minrol.gov.pl/eng/Start

## 2. Organization

| NATIONAL LEVEL | REGIONAL LEVEL<br>16 Camere Agricole compuse din: |
|---|---|
| **NATIONAL COUNCIL OF AGRICULTURAL CHAMBERS - 32 members-**<br><br>**Composed of the Presidents of the sixteen Regional Councils of Administration and one delegate for each one elected from the 16s of General Assembly** | Administration Council<br>Evaluation Committee<br>Councils of Cantons (314 cantons divided among 16 Agriculture Chambers)<br>General Assembly (1 or 2 representatives for each of the 2479 communes)<br><br>* each owner of agricultural land bigger than one hectare is a member of an Agricultural Chamber and have the right to vote or to be elected in the General Assembly or the Council of Cantons. |

## 3. Funding Sources

Agricultural Chambers are funded by the state at 2% of the land rent, in this amount every Agricultural Chamber sends 6% to the National Council plus attracted funding from alternative sources for various implemented projects.

## 4. Atributions

- AC are obligatorily consulting for each legislative project in the agricultural sector and rural development.
- AC offers farmers a range of advisory and consultancy services, management of economic issues, development for grant of application files, testing of new species and breed, etc.
- AC represents Polish farmers COPA-COGECA along with other trade unions and employers in agriculture.
- AC created a council of professional organizations on product network with general vocation and operating at regional and national level.

## Organization of agricultural chambers in Austria

### 1. History

The first efforts to represent the interests of farmers in Austria date back to the second half of the eighteenth century, however, the first autonomous organizations similar with Agricultural Chambers was formally established after the First World War. Central idea of agricultural camera system was the establishment of a regional body directly elected to represent the entire agricultural and forestry sector. In 1923 regional agricultural committees had set up a representative organization at the federal level that was replaced by a system similar to that in Germany in the period 1938 to 1953, when it was recognized Austrian Chamber of Agriculture by law[6].

### 2. Organization

| NATIONAL LEVEL<br>AUSTRIAN AGRICULTURE CHAMBER | REGIONAL LEVEL<br>9 REGIONAL AGRICULTURE CHAMBERS |
|---|---|
| **President (**elected from the 9 presidents of Regional Agriculture Chambers**)**<br>**Presidency (**composed of president and vice-presidents**)**<br>**Council of Directors** (composed of the presidents of Regional Agricultural Chambers and two representatives of the Austrian Raiffeisen Association)<br>**General Assembly** (same composition as the Council of Directors),<br>**Committees and Advisory Bodies** (temporarily held) | **President**<br>**Vice-president**<br>**General Assembly** (19-36 members elected by vote on political party lists + representatives of the agricultural cooperative)<br>**County Agricultural Chambers**<br>**Local Committees**<br>**Members**<br>- Owners of agricultural land or forests<br>- Corporate or cooperative in the field<br>- People dependent on agriculture or forestry activities and their families, employed full-time and part-time in activities in the field |

### 3. Funding Sources

Financing is done through monthly contributions paid by members.

[6] http://www.eu2006.at/en/Austria/political_system/social_partners/landwirtschaftskammer.html

## 4. Atributions

- Represents the member's interests in all areas and authorities including the level and type of taxes collected.
- Provides advice and guidance in legal, technical, social and economic issues
- It has delegated representatives on committees and consultative bodies participating in national administrative decisions
- Assumes responsability for forms of support and the collection of fees delegated by the national government ( Agricultural Chambers provide management and implementation of the Common Agricultural Policy in Austria)
- Makes legislative proposals, it is madatory consulted for all legislative proposals in the field
- Austrian Chamber of Agricultural Chamber ensures coordination between Regional Agricultural Chambers.

## Organization of agricultural chambers in Ukraine (non EU country)

## 1. History

National Agricultual Chamber of Ukraine was created by Citizen Consortium Law in June 2004.

## 2. Organization

| **NATIONAL LEVEL**<br>**NATIONAL AGRICULTURAL CHAMBER OF UKRAINE**<br>**Composed of:** | **REGIONAL LEVEL** |
|---|---|
| **President of the Chamber**<br>**Vice-president of the Chamber**<br>**Presidium of the Chamber**<br>**Executiv Committee of the Chamber**<br>**Presidents of the Working Committees**<br>**Chamber Management (**ensure implementation of activities**)**<br>**General Assembly (** composed of **''independent members''** individuals and judicial persons of the entire supply chain of agri-food product including funding and research and **''collective members''** representing unions, NGOs, institutions, etc.) | 22 local branches organized at the provincial level which have the right to open by themselves branches at district level, named, ''primary organizations''<br><br>* local branches are basically "representative" of the National Agricultural Chamber , their number is not fixed |

### 3. Funding Sources

Financing is done through monthly contributions paid by members and enrollment fees in Agriculture Chambers, along with other sources allocated to projects.

### 4. Atributions

- Participates in elaborating the agriculture policy and organizes lobby activities at regional and national level, strengthens the capacity of the civil society participation.
- Protects the interests of the Agriculture Chambers members.
- Propose changes in laws that will support effecient agricultural sector.
- Assists in the creation of a judicial system of legal protection for members of the Agriculture Chambers.
- Signs partnerships with similar bodies in other countries and implement joint international projects.

## Organization of Agricultural Chamber from Romania[7]

Review of the common agricultural policy at European level requires simplification and modernization of EU policies and procedures in terms of "Healthcheck" results, which is currently underway. In this context, Romania aims to identify and promote win-win solutions for romanian agriculture, allowing achievement of European Union integration.

At european level, promoting romanian interests suppose **organization and institutionalization of the reprezentation framework and promotion of socio-economic interests of farmers**, which develop activities in the following fields: agriculture and food production, rural development, fishing and aquaculture, forestry, land improvements, specialized scientific research, plant protection, farm optimization and soil conservation.

Common Agricultural Policy are developed in order to provide an real support for farmers on medium and long-term perspective and sufficient resources to reduce the gaps towards other Member States and to solve structural problems facing Romanian agriculture (attrition of large

[7] www.madr.ro

parcels, weak equipment and moral and technical outdated for most small and medium farms, etc.) **can not be done without the necessary legal framework for the establishment of an institutional device representing workers in agriculture and related fields.**

Therefore, it is necessary to promote the European common position, both from the responsible authorities and the beneficiaries. Dialogue promotes responsible and sustainable and competitive agriculture by harnessing the potential of local agriculture and strengthen the partnership between public authorities and beneficiaries with legitimate representation throughout the country.

In recent years, the reality of agriculture reveals that there are a number of social needs which consist of both **the rural population need to be represented** in relations with third parties, people with the same goals, democratically elected on the basis of regulations ensuring territorial and demographic representativeness and the need for access to information, advice in agriculture and quality services in the training field. Improved quality of life in rural areas is intrinsically linked to the rate of absorption of European funds that Romania has access and to revitalize communities.

In agriculture, **decentralization strategy** involves the establishment of a national network of autonomous structures that promote the general public interest in action at local and regional integration in developing specific sectoral policies. The administrative decentralization through the establishment of Agricultural Chambers is a process to get closer to farmers, a form by which to achieve such advice to local farmers.

Currently, institutional construction of agricultural administration does not give farmers the opportunity to actively participate in decisions on strategies and programs for agricultural development. Agricultural Consulting (ANCA) is the only institution that supports a certain extent farmers in their efforts to positively influence the development of the rural economy. However, **being a public institution, agricultural consulting network has limited powers and resources imposed by the civil service and budgetary constraints**. Compared with the situation in other EU Member States, to meet the needs of beneficiaries, staff is more undersized in agricultural consulting and the network development prospects are reduced due to budget discipline and limit spending. Therefore, ANCA is subject of decentralization strategy of agricultural

administration and will ensure, in the initial phase of institution building, financial, material and human resources of Agricultural Chambers.

Associative forms, regardless of their status, are not yet sufficiently functional or working only in the interests of small groups of farmers, not sufficiently well organized to develop and implement projects for the benefit of a broader category of farmers and the local community. **A major problem faced by most of the associative forms, regardless of the level of representation (local or national) is funding**, their members are not interested to support their own associations.This fact discourages and weakens confidence in the possibility of carrying out projects of public interest.The authorities have not the necessary means to encourage the establishment and operation of farmers associations and organizations In this context, the discrepancy between the overall economic interests and the organization framework becomes more obvious.

## The emergence of Agricultural Chambers in Romania - Expected changes in consulting

Agricultural Chambers foundation stake is to create a legal framework for the representation of all persons engaged in agricultural activities in the sense of involving farmers in decisions that affect them through those willing to promote the public interest on the basis of territorial representation.

Being conceived as an organization of rural population, emanating from those directly involved in specific activities to agriculture and related sectors, the ones who know the reality of those communities, role, functions and how to set up the Agricultural Chambers should be promoted among all dialog partners of ministry of agriculture and rural development (MARD).

Thus, through Agricultural Chambers, MARD create the institutional framework for dialogue and consultation with representation from across the country, through which farmers can become responsible for the sustainable development of agriculture, increased quality of life and active participation in the development and implementation of agricultural policies at local, national and European level.

In a first step, creating Counting Agricultural Chambers will result in the creation of new jobs, both at county and community level.However,

Agricultural Chambers will ensure the transfer of modern technologies in applied research in production, becoming a promoter of new technologies. Agricultural Chambers institutional structure are establish in each county of one Agricultural Chamber from holding elections at the administrative territorial unit. At the national level will be established, all the criteria of representativeness, National Agricultural Chamber of Romania. Agricultural Chambers are autonomous structures, their network ensuring at national level, training needs, information and public services for the entire population engaged in agriculture and related specific activities.

Establishment of Agricultural Chambers was asked repeatedly even by the beneficiaries of agricultural policies, the positive association of farmers in organizations of public interest being reported as well by the representatives of other EU Member States.

**Macroeconomic impact of Agricultural Chambers in national economy**

The main goal in creating these public organizations is to promote socio-economic interests of the rural population, engaged in agriculture and related specific activities. Along with public institutions efforts to transform the agricultural sector in a competitive sector, Agricultural Chambers can be held accountable and involved in the promotion of Romanian agriculture on domestic and foreign markets.

**The impact on business**

County Agricultural Chambers and National Agricultural Chamber of Romania will develop proposals for fiscal regulations on agricultural activities and regulations on pricing methodology, ways of marketing agricultural products and/or processed. County Agricultural Chambers will provide accounting support to farm at their request, will advise and will provide technical assistance to those who are represented in completing applications for payment and paperwork on European funds, financial support and other national or European aid. Also, through the County Agricultural Chambers, farmers and representatives of agricultural holdings will be supported in the management of farms, the marketing and organization of production and the establishment and consolidation of associative forms, of the product branches and local market organization, aiming measures to avoid imbalances in the market.
Together with local and county authorities, County Agricultural Chambers will promote the organization of local markets for direct

marketing of agricultural products by manufacturers. Also, Agricultural Chambers may establish commercial companies under the law and under the Statute, but they can not carry out its electoral competitor activity.

Technological facilities in various branches of agriculture is not yet at required standards, Agricultural Chambers can stimulate investment in technology ,can support research and innovation, can ensure the transfer of modern technologies in applied research in production.

Romania's integration into the European Union ensures, in addition to access to financial resources necessary for the development of agriculture and related areas, access to expertise, partnerships, information and experience exchanges. In this context, County Agricultural Chambers, National Agricultural Chamber of Romania will establish contacts with its counterparts in the European area for experience exchange and uniformity at community level procedures and quality standards, promoting products and services in Romania and abroad.

**Social Impact**

The considered target groups are the people who conduct activities in the fields of agriculture and food production, rural development, fishery and aquaculture, forestry, land restoration, scientific research, holdings optimization and soil conservation. County Agricultural Chambers will make proposals for legislation underlying normative acts, regarding training of farmers and agri-tourism activities. Thus, they will prepare annual plans for the farmers training in their fields of interest, based on requests and forecasts of rural development and will organize training courses for farmers through operational or technical service in collaboration with training providers. Working with educational institutions for agriculture and forestry annual and multiannual plans will lead to harmonization school profile and specialized education structure of labor demand in the market, increasing jobs and agriculture competitiveness and related fields. On the other hand, rural tourism development will provide the increase of jobs and sustainable integration of unemployed and inactive people in the labour market.

County Agricultural Chambers and the National Agriculture Chamber of main EU countries including Romania represent and promote specific interests, professional and local, as well as general interest of farmers/population from rural environment and will friendly solve the

conflicts that may occur, serving as intermediary and establish the discussion framework for all beneficiaries. These institutions of public utility will represent a guarantee to respect the law and to protect the beneficiaries interests, ensuring their cohesion.

## Impact over the environment

County Agricultural Chambers and National Agricultural Chambers offer consultative notice on issues related to territorial planning and countryside management, promote good agricultural practices and animal welfare norms. Thus, they will colusly worked with farmers in order to draw proposals of legislation underlying normative acts, on good agricultural practices, plant protection treatments and improved varieties and animal breeds.
In the same time, will be ensured the presentation and dissemination among farmers of European and national norms on the activity of agricultural and food production, environment protection, control over plants pests and animal diseases, animal welfare and other norms and rules related to work on farms.Through Agricultural Chambers, will be created an institutional framework neccesary to promote the opinions regarding rational use and conservation of productive poential of agricultural lands and forests, hydrological resources, biodiversity conserrvation and environment protection.

## Conclusions and proposals

Nowadays, in agri-food system on the market of knowledge transfer and technology and innovation as well, to ensure a proper information, between producers and consumers are vectors which access new technologies (consulting agencies, agricultural extension, mass media, education). The process of knowledge transfer and innovation in agri-food sector, has as main beneficiaries individuals and judicial people engaged in agriculture, farmers both from industrial and traditional sector on European Region.

Shortcomings of this sector are related to weak colaboration and cooperation between actors that participate in knowledge transfer, and the means of information dissemination among all beneficiaries.

European model related to technology and innovation transfer is different from the romanian one, regarding the fundamental role of the research

centers between producers and information consumers both from rural and urban areas. These centers and centers of rural development in particular represent '' true informational cores where inputs are given by the research results, the information shared by rural actors, legislative information of political interest, funding oportunities,etc. and the outputs are answers of farmers and rural entrepreneurs needs''. [8]

Universities, public research and development institutions and the other research entities of public law from EU play a well defined role on the knowledge market. Transforming universities and public research and development institutions in actors on international knowledge market and increasing their capacity of colaboration with companies became a target for romanian universities.

In Romania, the activity of agricultural consulting is a factor of major importance for the development, diversification and specialization of agricultural production, and to stimulate the transformation of subsistence housekols into modern commercial farms. This is why, the consulting activity should be focus more and more towards market with the purpose to give farmers quality advice in issues related to management and organization in agri-food activities.

Beside it stimulates the producers initiative to join and to cooperate in agriculture, agricultural advisory work is a vector of technology transfer and thus a vector of knowledge in the agri-food system, essential to the whole countryside, which is particulary addressed to holdings wishing to develop and can not define and solve the problems they face.

The large number of subsistence or semi-subsistence holdings (3.931.350), respectively the small number of unities with legal personality (17.699) are major problems of agri-food system from Romania, representing a great obstacle in its development and modernization. Small consumers, represented by subsistence holdings because of lack of information and financial disponibilities, don't have too many possibilities to access innovative technologies, which can not lead to their earlier transformation in viable commercial farms. In this regard, we can advice the public research institutions to be more involved in managing the information/technology transfer, because they ensure socio-economic advantages and atract funds for research process.

[8] Idem 4 ,

Another proposal would strengthen cooperative structures to collaborate with research centers in order to optimize the dissemination of information, experience and best practices, and cooperation to promote innovation, to support those who want to create innovative enterprises and to support innovative projects.

I believe that, **agriculture**, food safety and security is for Romania, a fundamental research field with great potential and modernization of this sector through the introduction and implementation of innovative technologies clearly will increase its efficiency.

Given the presented events and the potential of Romanian agriculture we can say that to be economic competitive on the market, companies in the food industry should promote technological progress and that of national food products in order to meet European requirements.

In this paper results as well that **consultancy** = knowledge transfer is absolutely necessary, both in the urban and rural level, whereas innovative use of technology is leading to improved working conditions of the beneficiaries (farmers/companies) but through increased profitability of the undertaken activities.

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# POTENTIALS OF FOREIGN TRADE OF MEAT AND MEAT PRODUCTS OF SERBIA ON THE INTERNATIONAL MARKET*

*Bojan Matkovski, Stanislav Zekić***

## Abstract

*A transitional process has had inevitable effects on decline of livestock production in Serbia, and the process of liberalization has impacted several changes of foreign trade of meat and meat products. The aim of this paper is an analysis of competitiveness of meat and meat products on the international market, as well as on the market of countries which are the main foreign trade partners of Serbia: EU and CEFTA. Accordingly, different indicators which measure a level of Revealed Comparative Advantage of meat and meat products have been used, and a level of interconnection of these indicators is shown through the correlation analysis. The results show negative tendencies regarding the level of comparative advantage of meat and meat products of Serbia, especially on the EU market, which is a consequence of the market's dealing with new opportunities that require the adoption of new standards for export of these products.*

**Kew words:** *meat and meat products, comparative advantage, Serbia*

## Introduction

The production of meat in the world is constantly growing up as a result of the population growth, income growth and changes in consumer preferences, and the FAO estimates indicate that demand for meat will have been doubled by 2050, primarily as a consequence of the increase in demand for meat in the countries in development (FAO, 2014).

* This paper represents a part of the research on the project of the Ministry of Education and Science, Republic of Serbia, No. 46006, entitled: *Sustainable Agriculture and Rural Development in terms of the Republic of Serbia strategic goals implementation within Danube region.*

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In Serbia, as well as in most of the countries of Central and Eastern Europe, the transitional period have caused many problems for the livestock sector, which found the adaptation after transit from centrally planned to trade system of economy much harder than the sector of plant production. Namely, the consequence of centrally planned system, and of centralization and concentration of capital in the agriculture of Serbia, is a dual production structure. The dual production structure implies large companies which combine plant and livestock production to a greater or lesser extent, but also a large number of individual agricultural households with half-natural production.

As a result of the process of globalization, changes in the agricultural sector, as well as in the foreign trade with agri-food products, are inevitable. With the aim of integration on the international market and preparations for the EU membership, Serbia has signed numerous agreements regarding free trade: the Stabilization and Association Agreement, the CEFTA Agreement (Bosnia and Herzegovina, Macedonia, Montenegro, Albania, Moldavia, UNMIK in the name of Kosovo), agreements for free trade with the EFTA countries, Russia, Belorussia, Turkey, the USA. An impact of the signed agreements on the range of foreign trade with agri-food products is inevitable, and according to Matkovski, Lovre and Zekić (2017), liberalization of trade has had positive effects on intensification of foreign trade, as well as on the growth of comparative advantage of the agri-food sector on the international market.

When it comes to foreign trade with meat and meat products, Serbia has decided to protect primary production of meat by high customs, which protected its production, but also led to the lower levels of competitiveness. The range of foreign trade with meat is low due to the high customs which unable a significant part of import and uncompetitive production does not meet security standards for export to a larger degree (SEEDEV, 2017).

The main aim of the paper is an overview of the level of competitiveness of meat and meat products of Serbia on the international market, as well as on the main exporting markets: the EU and CEFTA countries, using relevant methodology for measuring the level of comparative advantage. The paper is divided into five chapters. After the introduction, an overview of predominant views in literature, and materials and methods of research are provided. The levels of production and competitiveness of

meat and meat products are presented within the results of the research, and in this chapter an analysis of the main factors which influence the competitiveness of this trade segment is also included. After this chapter, the summary of the results and closing remarks are given.

## Literature review

Using the index of Revealed Comparative Advantage (RCA), and several modifications of this index, numerous authors have analyzed the level of comparative advantage for different sectors, sections and products in their papers. When it comes to the analysis of comparative advantage of meat and meat products in Serbia, many authors have dealt with this segment within the analysis of comparative advantage of agri-food sector. Matkovski, Lovre and Zekić (2017) have analyzed the foreign trade liberalization and export of agri-food products of Serbia and concluded that meat and meat products have had advantage on the international market, as well as on the market of CEFTA countries, but in last years negative tendencies have been present, too. By contrary, in the paper written by Vlahović and Veličković (2016) who have analyzed export, regional structure, and comparative advantage of some segments of agri-food sector, it has been concluded that meat and meat products have had a satisfactory level of comparative advantage, and it is emphasized that, in order to improve the competitiveness, producers should improve the quality of products and marketing activities. Božić and Nikolić (2013) have analyzed the significance and comparative advantage of agricultural sector in the foreign trade, and using the traditional Balassa index of Revealed Comparative Advantage it has been concluded that meat and meat products do not have comparative advantage on the international market. According to these authors, the situation is somehow better on the market of CEFTA countries than on the EU market. In the paper written by Birovljev, Matkovski and Ćetković (2015) the competitiveness of agri-food products on the CEFTA market has been analyzed and it has been concluded that meat and meat products have had comparative advantage on the market of all countries in the region, except Croatia. Matkovski et al. (2017) have analyzed the competitiveness of meat and meat products of Serbia, as well as the level of integration of Serbian market and main foreign trade partners when it comes to this sector, and it has been concluded that in last several years, there has been a decline in the level of comparative advantage on the market of main foreign trade partners, excluding Russia where the growth has been present. As a consequence of decline of comparative advantage

these authors emphasize the inability to cope with new market opportunities which demand the adoption of new standards.

## Material and methods

Within the paper the competitiveness of meat and meat products sector of Serbia on the international market has been analyzed, also emphasizing the levels of competitiveness within the markets for these products: EU, the CEFTA countries and Russia. The level of competitiveness has been measured by the comparative advantage indices traditionally used in literature. Balassa (1965) has established the original index of comparative advantage (RCA – Revealed Comparative Advantage):

$$\mathrm{RCA} = \frac{\frac{X_{ij}}{X_{it}}}{\frac{X_{nj}}{X_{nt}}}$$

in which X presents export, i a country, j stands for a product, t presents a group of products, n is for a group of countries to which these products are exported.

The existence of Revealed Comparative Advantage implies that the value of the RCA is higher than 1, and the higher the value of this index the comparative advantage is considered to be more conspicuous. Numerous modifications of this index are present in literature, and Vollrath (1991) has formulated a new specification of Revealed Comparative Advantage in the form of the Relative Trade Advantage (RTA) which is calculated as a difference between the Relative Advantage of Export (RXA) and the Relative Advantage of Import (RMA):

$$\mathrm{RTA} = \mathrm{RXA} - \mathrm{RMA}$$

in which:

$$\mathrm{RXA} = \mathrm{RCA}$$

and

$$\mathrm{RMA} = \frac{\frac{M_{ij}}{M_{it}}}{\frac{M_{nj}}{M_{nt}}}$$

in which M stands for exports, i presents a country, j presents a product, t presents a group of products and n is for a group of countries to which these products are exported.

Vollrath has, as two others indicators which could be used to measure comparative advantage, formulated two other measures of comparative advantage: a logarithmic value of RXA (ln RXA), as well as a revealed competitiveness (RC).

$$\mathrm{RC} = \ln\mathrm{RXA} - \ln\mathrm{RMA}$$

When the value RC for a product is larger than 0, it is implied that that product has comparative advantage. According to Vollrath, the RC is more suitable indicator due to the fact that this index includes the balance of supply and demand, so it depicts comparative advantage of the product in the particular country much better. In literature, modified indices are more preferred than the RCA index suggested by Ballasa since they cover import and export, thus avoiding double calculation of products and countries which may cause shortcomings. These modified indices are often used in literature in numerous empirical analyses of competitiveness of specific sectors or products (e.g. Ferto and Hubbard, 2002; Ignjatijević, Matijašević and Milojević, 2014; Zekić et al., 2016).

Based on the example of Balance et al. (1987), particular statistical tests for determination of the level in which certain RCA indices are consistent in their identification of comparative advantage have been taken, so these tests should determine how certain indicators are related when it comes to identification of comparative advantage.

Using all these indicators, comparative advantages of meat and meat products of Serbia are presented in the paper through different modifications of the RCA index, and the data used has been taken from the Statistical Office of Republic of Serbia (SORS), as well as from the data basis UN Comtrade. The time period taken into consideration in the paper is 2007-2016, and both changes in comparative advantage of meat and meat products of Serbia on the international market and on the markets of CEFTA and EU countries have been analyzed.

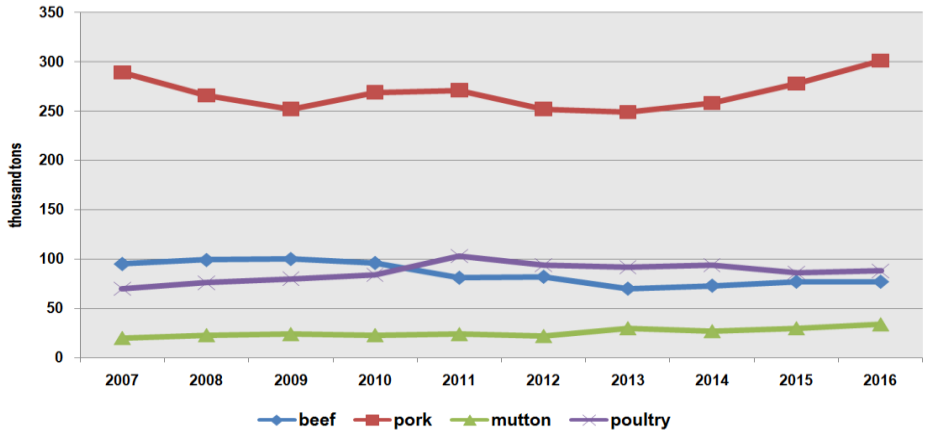
## Results and discussion

### The characteristics of the meat supply chain in Serbia

In the last ten years the share of livestock production amounts about one third of the total agricultural production in Serbia, and within the livestock production prevails the livestock farming (71%) in comparison to the manufactures of livestock products (29%). According to the number of livestock units, the largest share has pig farming (36.7%) and cattle farming (34.7%), poultry raising amounts 18.1%, sheep and goats farming 9.7%, while the share of horses and other animals amounts less than 1%. When it comes to the value of production, the products of cattle farming (milk and meat) are the most represented – 40.9%, followed by pig farming – 36.4%, while the products of poultry raising have share of 15%, and of sheep farming and goat farming about 6% (SORS, 2014).

If meat production is taken into consideration, in Serbia pork is produced the most. From 2007 to 2016, pork was, with the share of 58% in the total meat production, by far most commonly produced meat, and it was followed by poultry, beef, and mutton with the shares of: 19%, 18% and 5%, respectively (Chart 1).

**Chart 1.** *Trends in the production of meat in Serbia*




**Source:** *SORS, 2017*

The largest significance in the structure of livestock production, although in the last years with the tendency of decline in production, has had pig farming, and according to the data of Census of Agriculture 2012, about 355,000 of agricultural households have been engaged in this production.

Relatively large significance in the structure of livestock farming has had cattle farming, both from the perspective of reproduction in livestock production, and from the perspective of revitalization of traditional systems of production in mountainous areas. According to the Census of Agriculture 2012 about 177,000 of agricultural households has been engaged in the cattle farming. Poultry is the only branch of livestock production which records continuous growth, and according to the Census of Agriculture 2012, about 414,000 of agricultural households has been engaged in this production.

From the point of view of meat consumption in Serbia, pork is the most significant with the average annual consumption of 27.5 kg per inhabitant. It is followed by poultry with 11 kg, beef with 8.2 kg and mutton and goat meet with 2.5 kg per inhabitant annually (FAOSTAT, 2017). In comparison to the EU countries, in which there is an annual consumption of pork of about 40 kg (European Commission, 2014), Serbia does not have a large consumption, although it should be taken into consideration that a significant number of livestock in Serbia is slaughtered for the own needs which means that the real consumption is surely larger.

According to the data of MAFW (2014a), in 2010 there was 1,197 meat slaughter and processing plants in Serbia, which implies that this country has good capacities and that the level of their utilization is under the designed one. When it comes to the meat slaughtering, cutting and processing plants, there are 277 slaughterhouses for ungulates and 415 plants for mixed use (slaughter, cutting and processing). Currently available capacities of slaughterhouses are larger than demand on the domestic market.

As far as distribution is concerned, unlike other countries of Central and Eastern Europe in which the process of internationalization of retail sector has started in 1990s by entering of the large chain stores of the Western European countries, in Serbia, that process has started later. The appearance of the large international supermarket chains has imposed challenges for agricultural producers, a sector of processing and a retail sector (FAO, EBRD, 2007). Namely, the structure of Serbian retail has significantly changed since 2000. The share of modern trade formats, like hypermarkets and supermarkets has noticeably increased, and the number of smaller retail objects has dropped. However, despite the closure of the large number of small retail objects, smaller retail formats are still dominant. Also, by taking into consideration an indicator of trade

fragmentation, measured by the number of inhabitants per store, it can be concluded that Serbia still has a relatively undeveloped trade system.

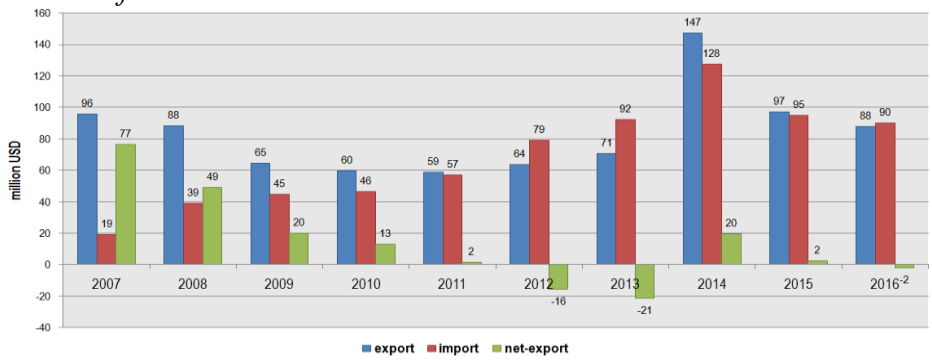
Unlike other food products, in whose case the role of supermarkets in the last decade has been highly significant for distribution, when it comes to the meat and meat products distribution in Serbia, specialty stores still have the most important role, more specifically – butcher shops. Additionally, a certain number of large producers have their own network of retail shops in which they trade with meat and meat products. However, in future, a growing importance of supermarkets as meat distributors is expected (FAO, EBRD, 2017).

## Foreign trade with meat and meat products in Serbia

In the analyzed period 2007-2016, the share of meat and meat products in the total export of agri-food products amounted 3.4%, while these products participated in the total import of agri-food products with about 4.9% (SORS, 2017). The export had a tendency of growth of 2.9% annually, and the largest value of export was realized in 2014 primarily due to the growth in export to Russia which is the result of the Russian sanctions to EU.

In the analyzed period, import has been increasing faster than export, by average annual rate of 18.4%, and the largest value of import has been realized in 2014. A positive foreign trade balance is characteristic for the larger part of the analyzed period, except 2012 and 2013 when a negative foreign trade of meat and meat products balance has been present (Chart 2).

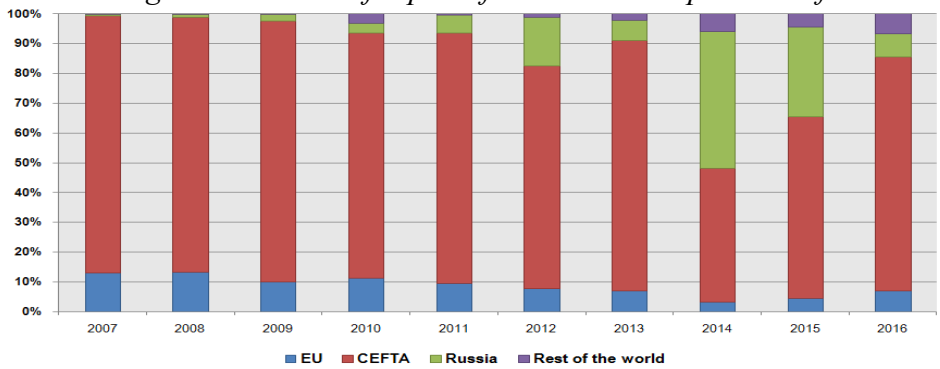
**Chart 2.** *Trends in the export, import and net-export of meat and meat products of Serbia*




**Source:** *SORS, 2017*

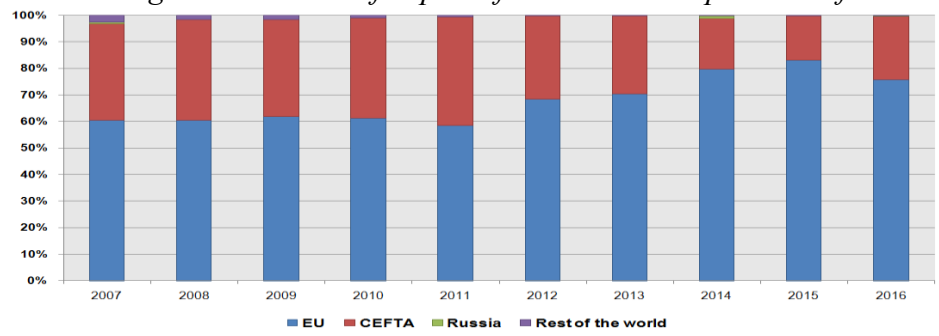
The most important market for meat and meat products export from Serbia is the CEFTA market to which about 77% of the total export of these products has been sent in the analyzed period. A significant growth in the export of meat and meat products has been noticeable on the Russian market as a consequence of the duty-free import for large number of Serbian agri-food products since 2011. The sanctions of Russia for import of products from EU had an impact on the increase of export to Russia, which led to the high value of export in 2014 and 2015 (Djurić and Puškarić, 2015). However, despite the closure of the Russian market for EU meat, there are still large producers on this market, with more competitive prices than Serbia, and an additional problem for export of meat from Serbia to this market is a logistics for export of larger quantities (SEDDEV, 2017). Export to the EU countries is on the extremely low level, primarily due to the failure to meet the standards for export to this market, and only 0.5% of slaughterhouses have a license for export to the EU market (MAFW, 2016).

**Chart 3.** *Regional structure of export of meat and meat products of Serbia*




**Source:** *SORS, 2017*

**Chart 4.** *Regional structure of import of meat and meat products of Serbia*



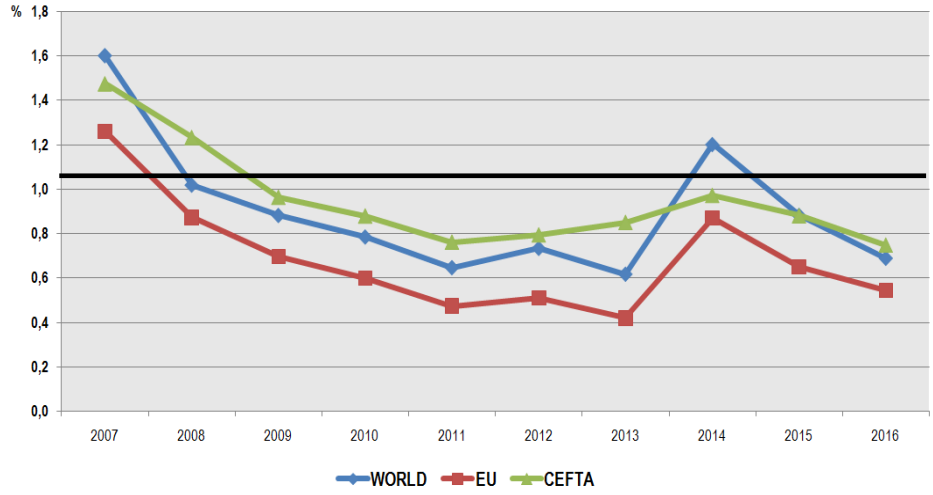

**Source:** *SORS, 2017*

The value of import of meat and meat products has significantly increased from 2007 to 2014, and in 2014 it has been, nominally, 6 times larger than in 2007, while in the last two years it has had a falling tendency (Chart 4). The largest part of meat and meat products import has been realized from the EU countries, from which it has been imported about 67% of the total import of meat and meat products in the analyzed period, whereas the import from the CEFTA countries equals about one third of the total import of these products.

## Comparative advantage in export of meat and meat products from Serbia

In order to determine the level of comparative advantage of meat and meat products on the international market, as well as on the EU and CEFTA markets, firstly, a traditional index of comparative advantage defined by Balassa has been measured (Chart 5). The RCA index is smaller than 1 for the most of the analyzed years, which means that meat and meat products do not have comparative advantage. As far as the difference between the analyzed markets is concerned, the lowest level of comparative advantage has been present on the EU market, to which Serbia has been exporting very small amounts of meat and meat products. Situation with comparative advantage on the international market has slightly increased in 2014, as a consequence of export to Russia.

**Chart 5.** *Index of Revealed Comparative Advantage of meat and meat products of Serbia*




**Source:** *The authors' calculations on the basis of UN Comtrade, 2017*

By using modified RCA indices (Table 1), it can be concluded that Serbia does not achieve, or in particular years achieves satisfactory comparative advantage. The best situation is on the CEFTA market, while it is noticeably more unfavorable on the EU market. In addition, if different indices of comparative advantage are compared, situation is better in the case of RTA and RC, since they also take into consideration import of meat and meat products in Serbia, so according to these indices meat and meat products have satisfactory level of comparative advantage.

**Table 1.** *Indices of Revealed Comparative Advantage of meat and meat products of Serbia*

| | WORLD | | | | EU | | | | CEFTA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RXA | RTA | ln RXA | RC | RXA | RTA | ln RXA | RC | RXA | RTA | ln RXA | RC |
| RCA if: | >1 | >0 | >0 | >0 | >1 | >0 | >0 | >0 | >1 | >0 | >0 | >0 |
| 2007 | 1,60 | 1,39 | 0,47 | 2,05 | 1,26 | 1,10 | 0,23 | 2,05 | 1,48 | 1,27 | 0,39 | 1,98 |
| 2008 | 1,02 | 0,71 | 0,02 | 1,19 | 0,87 | 0,63 | -0,14 | 1,28 | 1,23 | 0,99 | 0,21 | 1,63 |
| 2009 | 0,88 | 0,53 | -0,12 | 0,92 | 0,70 | 0,44 | -0,36 | 0,98 | 0,96 | 0,74 | -0,04 | 1,48 |
| 2010 | 0,79 | 0,42 | -0,24 | 0,77 | 0,60 | 0,33 | -0,51 | 0,80 | 0,88 | 0,66 | -0,13 | 1,41 |
| 2011 | 0,65 | 0,24 | -0,43 | 0,45 | 0,47 | 0,17 | -0,75 | 0,45 | 0,76 | 0,51 | -0,27 | 1,10 |
| 2012 | 0,73 | 0,13 | -0,31 | 0,20 | 0,51 | 0,08 | -0,67 | 0,18 | 0,79 | 0,47 | -0,23 | 0,90 |
| 2013 | 0,62 | -0,01 | -0,48 | -0,02 | 0,42 | -0,02 | -0,87 | -0,06 | 0,85 | 0,52 | -0,16 | 0,94 |
| 2014 | 1,20 | 0,44 | 0,18 | 0,46 | 0,87 | 0,31 | -0,14 | 0,43 | 0,97 | 0,57 | -0,03 | 0,88 |
| 2015 | 0,88 | 0,15 | -0,12 | 0,18 | 0,65 | 0,09 | -0,43 | 0,14 | 0,88 | 0,46 | -0,13 | 0,75 |
| 2016 | 0,69 | 0,09 | -0,37 | 0,15 | 0,54 | 0,06 | -0,61 | 0,12 | 0,75 | 0,49 | -0,29 | 1,06 |
| Mean | 0,94 | 0,48 | -0,11 | 0,75 | 0,71 | 0,38 | -0,40 | 0,77 | 0,99 | 0,72 | -0,03 | 1,29 |

**Source:** *The authors' calculations on the basis of UN Comtrade, 2017*

Ballance et al. (1987) suggested simple statistical tests for analysis of correlation of different indices of comparative advantage which should determine at which level different indices of comparative advantage are related, i.e. these tests can determine empirical consistence of different indices of comparative advantage.

**Table 2.** *The correlation index of the comparative advantage of meat and meat products of Serbia*

| | $r_p$ | | | | $r_s$ | | | |
|---|---|---|---|---|---|---|---|---|
| | RXA | RTA | ln RXA | RC | RXA | RTA | ln RXA | RC |
| RXA | 1,000000 | 0,901050 | 0,989276 | 0,818452 | 1,000000 | 0,818182 | 1,000000 | 0,733333 |
| RTA | 0,901050 | 1,000000 | 0,878397 | 0,985703 | 0,818182 | 1,000000 | 0,818182 | 0,975758 |
| ln RXA | 0,989276 | 0,878397 | 1,000000 | 0,798535 | 1,000000 | 0,818182 | 1,000000 | 0,733333 |
| RC | 0,818452 | 0,985703 | 0,798535 | 1,000000 | 0,733333 | 0,975758 | 0,733333 | 1,000000 |

$r_p$ - *Pearson correlation index*; $r_s$ - *Spearman correlation index*

**Source:** *The authors' calculations on the basis of UN Comtrade, 2017*

By using *Pearson* and *Spearman* correlation index (Table 2) a correlation coefficient between four different indices which can measure comparative advantage has been calculated. If correlation coefficient is above 70% it can be said that two different indices have consistent results. By using both correlation indices, it has been shown that all four indices are significantly correlated, so results for meat and meat products, according to all indicators, are highly consistent.

***Potentials and limitations of meat and meat products sector in Serbia***

In the value structure of agricultural production in Serbia livestock production presents one third, which, taking into consideration available resources of Serbia, can be regarded as very low. Livestock production in Serbia mostly takes place on small family agricultural households, and in last several years concentration of production on larger family households and households of legal entities in certain parts of livestock production such as, for instance, poultry raising and pig farming, has been present to some extent. An extremely large number of individual agricultural producers, who, to great extent, produce only for their own needs, present an obstacle for production intensification, since small agricultural producers apply low intensity production systems which are based on locally adapted races (MAFW, 2014b).

There are numerous additional problems and limitations both in the process of production and in the foreign trade with meat and meat products. Namely, for many years production of meat was not in the system of incentive of agriculture, which additionally negatively influenced development of production and loss of particular markets. Also, there are some problems when it comes to the breed structure of livestock production which is not on a satisfactory level in Serbia, and livestock farming sector is to the greater extent conditioned by import of races and hybrids from countries with more developed livestock farming systems.

In order to advance meat and meat products export to the EU market it is necessary to (SEEDEV, 2017):

- advance the way of adoption of EU regulations related to veterinary policy and food safety;
- improve the system of registration and approval of production capacities;

- mobilize unnecessary material and institutional resources for solving issues of animal welfare important for international trade with alive animals, meat and some primary products of animal origin (discontinuation of vaccination against swine fever; monitoring Salmonella; atypical fowl plague);
- develop and establish an integral system of collecting, removal and usage of animal by-products;
- further improve a national monitoring of residues and develop other programs for monitoring of particular animal diseases and perennial and annual plans of food safety control and animal foods and
- establish a comprehensive plan of official controls of hygiene, food safety and animal foods based on risk assessment, and develop mechanisms and structures for cooperation and coordination of all authorities in the food chain.

Certainly, an establishment of appropriate associations which could offer a versatile support for improvement of competitive positions on the international market would trigger an improvement of competitiveness among meat producers and processors. Namely, associations of producers could impact building of protection capacities (i.e. of geographical origin), marketing, but also faster adaptation when it comes to establishment of appropriate exporting standards.

## Conclusion

A foreign trade with meat and meat products is on a low level, primarily due to high customs which unable significant import and incompetent production does not fulfill safety standards for export. The most significant market for meat and meat products export from Serbia are the CEFTA countries, and in last years larger quantities have been exported to Russia, but, because of the inappropriate logistics, further significant growth in meat export to this market is not expected. Export to the EU countries is on a low level, so it is necessary to undertake numerous measures in order to impact growth of competitiveness on this market, in terms of the EU regulations adoption in the area of veterinary policy and food safety. When it comes to import, meat and meat products are to the greater extent imported right from the EU countries. Results of the analysis of several RCA indices used in this paper showed that meat and meat products have a very low level of RCA, and by correlation analysis their consistence has been tested. Also, results show negative tendencies

which are probably results of additional liberalization which opened the market. In that sense, creators of agricultural policy should make additional efforts in future period in order to influence strengthening of competitiveness both on the domestic and international markets, primarily on the EU market through development of safety standards and meat and meat products quality. In future papers, the authors are going to make a comparative analysis of competitiveness of meat and meat products of the regional countries, which will further help in establishment of reasons for low levels of competitiveness of this sector in Serbia.

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# STRATEGIC SIGNIFICANCE OF WHOLESALE MARKETS IN AGRICULTURAL PRODUCTS SALE[1]

*Boris Kuzman[2], Nedeljko Prdić[3]*

## Abstract

*Sustainable agriculture is a strategic approach and development program of agrarian economyleading to the increasedagricultural products trade. Regional and world market development more commonly bring the change of current economic strategy for agriculture development and increase the companies' competitiveness. The paper's aim is to point to the elements of competitiveness advantages of wholesale markets which can reflect on the increase in agricultural products trade, and to highlight the need for constructing these facilities in Serbia. The main hypothesis is based on knowing the wholesale markets' place, role and significance for domestic agriculture development with the purpose to increase agricultural products' sale. Modern economy conditions, changeable market conditions and competition point to the economic efficacy of wholesale markets as distribution channelsfor agricultural products.This paper points out the basic directions of sustainable agriculture development as a recommendation for improving agricultural products' sale through wholesale markets.*

**Key words:** *sustainable agriculture, competitiveness, wholesale market, agricultural products*

## Introduction

Due to trade development in agroindustrial sector, market institutions specialized for movement of goods has a special role. Trade and

[1] Paper is part of project III 46006 - Sustainable agriculture and rural development in function of achieving strategic goals of Republic of Serbia within Danube region, funded by Ministry of Education, Science and Technical Development of Republic of Serbia. Project period 2011-2015.

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sustainable agriculture in this century are characterized by bigger role and significance of these institutions (fairs, wholesale markets, markets), which gained bigger role and importance with the development of new information technologies, technological development, IT "revolution", unsparing competition, "knowledge" affirmation as a very important resource, and as such they are only a part of the new market circumstances.

In developed market countries, wholesale markets survive and develop within changed market circumstances, as the essential connection between production and consumption in agricultural products' sale. New economic circumstances give wholesale markets a primary role in supplying big cities and regions, with above all, fruit and vegetables, but also with other products. From the market aspect, wholesale markets also have competitive advantage, in the respect of diverse products offer and demand. Also, the quality and price enable these markets the role of the mediator, where fresh products from familiar traders are sold to familiar buyers, with low prices (market acceptable), at the familiar buying location.

"Wholesale market is a special market institution dealing with wholesale trade by arranging, maintaining and renting out specialized space for display and sale of fruit, vegetables and other agricultural and food products and other consumer goods, as well as providing related services, particularly storing of goods, its finalization, processing, packing and other services connected with handling and transport." (Law on Trade-Republic of Serbia)

This text analyses political, economic and commercial aspects of wholesale market management for the purpose of making efficient decision, with the main aim to develop sustainable domestic agriculture and to improve strategic positions of the country on domestic and regional market. Text is made to help managers and authorities whose job is food wholesale in order to improve the work of current domestic wholesale markets or to plan construction of the new ones. Characteristics and the role of wholesale markets at the beginning of this century are changing a lot. These changes require answers to the question of what is the optimal way of managing wholesale markets and the way they are organized, from the aspect of efficacy of utilization of open and closed spaces, cooling systems, storage, warehouses, and also the infrastructural spaces they are built on. Infrastructural space includes vicinity of highways,

railways, piers, with large parking spaces, all with the aim to have efficient external traffic and internal transport. The main objective of the paper refers to decision-makers for building a warehouse as a strategic market institution in order to promote trade, to develop sustainable domestic agriculture, to raise business results of goods' sellers, buyers' satisfaction and efficient model of business efficacy of a modern wholesale market.

## Wholesale markets in Serbia- current market position working method

The main aim of the paper is focused on the research on the role, significance and the effect of wholesale markets as specialized market institutions in the function of sustainable agriculture's development for the purpose of increasing the trade with agricultural products. Also, the aim of the paper is to indicate the significance of wholesale markets in market developed countries and in our country and to perceive strategies, tactics and directions of development of these market institutions in Serbia. Theoretical framework of this research is based on the literature from the field of management, marketing, trade and other scientific disciplines like sociology, psychology, etc. Theoretical attitudes in the paper areverified in author's own empirical research conducted on "Kvantaškapijaca" in Novi Sad (part of JKPTržnica Novi Sad) using the purposive sampling method. The research's results provided a more trustworthy basis for theoretical analyses and objectification of the role, significance and the effect of wholesale markets as a channel for distribution of agricultural products.

Our company's development plan includes, in accordance with the urban city plan, searching for the best solution for moving this market place to the suitable location which will suit the generally accepted standards with its surface, access road and infrastructure. (www.nstrznica.co.rs)

Research on the business success of goods' sellers (companies) on "Kvantaškapijaca" was carried out by the method of questioning on the 60 sellers sample. When it comes to the success verified in annual business balance the state of the sellers from the survey shows the following:

- 51% of the sellers covered the expenses, but did not make profit
- 39% of the sellers were successful in business and made profit
- 10% of the sellers had business which resulted in loss

The most important business control instruments of the companies in the survey, based on the questionnaire are the following(ranked 1-5; 1- the most significant):

- Sales volume 1.9
- Profit 2.6
- Market involment 2.7
- Liquidity
- Marketing costs ( sales promotion) 2.0

As far as the respondents' attitudes on trade conditions on "Kvantaškapijaca" are concerned 30% of them have positive attitude and 70% have negative attitude on the sales conditions.

When they were asked if the new modern market facility like wholesale market should be built, 85% gave the positive answer, while 15% regard it as unnecessary. The respondents were questioned about the potential location for constructing the wholesale market and the answers were the following:

- At the outskirts of the city, near traffic routes (the highway) 60%
- At or near the "Najlonpijaca" 30%
- At the current location 10%

It was not possible to get more precise and more specific answer about the suitable location for future wholesale market since the decision on construction and location has not been adopted yet. Based on the answers in the survey, it can be concluded that the goods sellers are familiar with the most significant factors that can affect their business efficacy.

The survey on the customers' attitudes about buying conditions on "Kvantaškapijaca",carried out on the sample of 200 respondents, showed the following results:

- Very bad conditions 80%
- Acceptable conditions 20%

The answers on the question whether they would purchase at the new wholesale market:

- Yes, I would 90%
- I don't know, I'm not sure 10%

Research results of purchase motives at the new wholesale market according to the significance are the following:

- Products' freshness 37%
- Products' quality 27%
- Price 25%
- Diversification of offer 9%
- Habits 2%

After the conducted research on the customers' attitudes about constructing the wholesale market, it is necessary to carry out detailed research on the attitudes of customers who have visited "Kvantaskapijaca" as well as the marketplace of the sellers from the survey. Also, the research can be conducted among potential customers who have not visited the marketplace in order to determine the wholesale market's influence on the awareness about the products' existence and the potential customers' interest for the product. The research should determine the level of awareness about the construction of wholesale market and the interest for the products. It can be concluded that the customers' attitudes are very important for the functioning of the wholesale market, but that is not the subject of this paper's research.

A need for researching the significance of wholesale markets in the aspect of selling the products stems from the fact whether the sellers achieved their goals by selling at the wholesale market as well as from the competition of wholesale markets as the channel for distribution with other relevant centers for agricultural products trade.

The vision of Wholesale market Belgrade ("Veletrznice Beograd") is to enable development of local self-government in the Republic of Serbia and to enable maximal competitiveness. Besides that, the aim is to provide the easier connection between producers and sellers. The mission is to create the best conditions for all users, through the offer and demand for fresh food on the platform with modern infrastructure. Another aim is to ensure business stability, by growth and development of companies, through constant rising of the competitiveness of traders working in the system. This kind of development policy would ensure easier placement for the traders, which will lead to better prices with defined food quality and safety policies. (Wholesale market Belgrade)

There are over 500 hundred traders at Belgrade wholesale market. The wholesale market includes 866 marketplaces (on the area of 7ha) on the plateau and 6300$m^2$business and storage place (20 premises, 3 wharves, 73 tents and 52 warehouses). (veletržnica.co.rs, 2017)

Advantages of a wholesale market:

- it enables food procurement for public institutions at stock market prices without inviting tenders which saves money and time significantly.
- it introduces tax discipline into food trade,
- it prevents unloyal competition,
- it provides better conditions for market placement of domestic producers' products,
- it encourages cooperation development and and associations
- it enables finalizing and introduction of marketing standards.
- it creates additional value for fresh food products (calibration and packing). (Vlahovic, 2013)

Apart from market and public function, wholesale markets in our country have a special role in a sociological sense. They are market and public institutions that enable, besides their main function of offering and demanding products, meeting and communication of a large number of people at the familiar shopping place. Their social role grows due to the position and place they are situated in and those are big urban environments, which besides their market function, have the function to enable encounters of a big number of people at the public place. Communication intensity depends on their age and other social roles where people identify and integrate themselves in the urban environment with all its flaws, virtues and significances.

In market developed countries, wholesale markets are one of the most important market institutions for agricultural products movement. In the last years of the last century, especially in this century, significant changes occurred regarding increasing the significance of wholesale markets. As far as our country is concerned, wholesale markets are on a very low development level due to the fact that there is only a wholesale market in Belgrade ("Veletrznica Beograd).In other cities this kind of trade is preformed through "Kvantaskapijaca", which actually represent retail, not wholesale. Based on communication knowledge on the functioning of this kind of markets in our country, it can be said that this type of "wholesale trade" is unsustainable and that modern trade facilities have to be constructed as the main pre-condition for domestic agriculture development, development of trade in agroindustry and raising domestic products' competitiveness on the regional and other markets.

A wholesale market lowers total expenses of brokering for the following market subjects primarily:

- producers, importers, exporters, wholesalers, by making them "free" from renting and investing into too big storage capacities, expensive cold storages and conditioned warehouses through offering smaller storage units, with the main service of a great quality with a number of potential following services at acceptable prices.
- wholesalers (for the further products' movement), big domestic and foreign retailers, retail in neighboring country, caterers, institutional buyers and other subjects, by putting a large assortment of goods at lower prices at their disposal at any moment along with making them free from investing and renting already spent capacities.
- final consumers, by providing them with goods of better quality at lower prices than it is the case now.

It is important to point out that the decision on the wholesale markets' construction is on the higher level of authorities which have to adopt the strategy and movement direction regarding the decision on construction of these market institutions. Based on the conducted research, it can be concluded that these institutions are pre-condition for domestic agriculture development and they are of vital importance for trade and domestic agriculture development.

**Political-legal and institutional aspects of constructing the wholesale market**

The main assumption and responsibility for trade development in agro-industry and improvement of agricultural production are held by the government and its institutions. They have to provide the necessary infrastructure and financial and legislative framework for functioning of the public sector and creating conditions for development of the private sector.

The role and significance of wholesale markets grows worldwide with market development. They become central trade spots for agroindustrial products wholesale with modern sophisticated selling methods (Prdić, 2016).

Measures for efficient functioning of agro-industrial market and agicultural produce primarily refer to the following:

- Creating market conditions for providing a diverse offer of agricultural products.
- Providing real market mechanisms in order to create conditions that enable market competitiveness
- Providing standards and criteria for market business
- Providing criteria and standards for quality and quality degrees
- Creating legal and by-law conditions for ensuring people's safety and health and for the control of vegetable and animal products.

The role of the government should be specially mentioned since it creates, in political aspect, economic and other conditions for trade, transport and goods transport, decentralization in the aspect of urban development of cities, infrastructural equipment. It can also offer a solution for the direction in which the agriculture products market will develop. The role of the wholesale market as the main trade broker should be emphasized too. The government's role in developed trade economies is to set the necessary infrastructure and financial and legal framework for functioning of the public sector. Another role is to provide legislative framework for the private sector, which can develop in the aspect of trade within adopted laws.

In order to establish legally defined roles, there is a need to define the role of every wholesale market clearly. This strategy has to be accepted by the national, regional, city and municipal authorities as well as by producers, wholesalers and buyers at every wholesale market, service providers in banking sector, in transport sector and also by the management of a wholesale market.

## The role of wholesale market for development of agriculture

Wholesale markets as specialized marked institutions in goods movement are the most efficient place for trade of agricultural products, primarily fruit and vegetables, but also other products depending on the place and role of a wholesale market on the market. They actually represent the market environment where it is possible to achieve the most acceptable price for products via concentration of offer and demand with open competition and transparency. Their significance as market institutions enables the offer of appropriate products, sellers and buyers at one place with the aim to provide real (low) prices at every moment.

Modern wholesale markets which are equipped with modern facilities have all conditions for trade through stock market and because of that they represent the most efficient strategic space for trade in agro-industry and agriculture.

Nowadays, when the awareness about nutrition and about the importance of arable land grows, it is necessary to give specific attention to the problem of financial deficiency within agrarian production. (Vojnovic et al. 2017)

It is known that agricultural products' market as a part of a whole market takes special place due to specificity of agricultural production and that makes market conditions also special. Street markets as special market institutions have a significant role in the domestic agriculture development, especially for the development of small family agricultural holdings as a part of the whole agricultural products' market. (Prdic, 2014)

This concentration of offer and demand represented through wholesalers and buyers, especially through retail trade chains, distributive centers, public institutions and companies, is very important for developing countries. It is actually the most important for developing countries which need to establish modern market approach in agriculture after agricultural combines, state warehouses and distributive centers are no longer exists.

Due to the development of trade, urban infrastructure and competitive market, wholesale market's location and development strategies are directed to the places of main roads at outskirts of cities for the sake of more efficient transport, preventing traffic congestions issues, pollution, and noise and also for the purpose of creating conditions for competitive advantage over other distributive centers (Kuzman et al., 2017).

Wholesale markets worldwide have the role and the task of a very important commercial and logistic mediator on the fruit and vegetable market. Importance of mediation of every wholesale market stems from the structure of sales and storage capacities offer on every wholesale market and its positions in the channels of relevant goods groups' marketing. Therefore, every wholesale market in the world creates its own gravity cores, which are their clients who see the existence of a wholesale market as beneficial for themselves. (Lovreta, 2008)

The World Union of Wholesale Markets (WUWM) has a specific role and it is significant for the development of wholesale markets. It was founded in 1958 for the following purposes:

- to enable international promotion of wholesale markets
- to raise the efficacy and effectiveness of wholesale markets' functioning
- to make the role of wholesale markets bigger within the whole food sector.

Rapidly growing worldwide, wholesale markets will keep playing the vital role in channeling the wide food spectrum to urban consumers, despite the fact that new techniques are being adopted, like for instance supplying supermarkets with products directly by farmers. Investments into infrastructure of wholesale markets are undoubtedly going to rise during oncoming years. However, wholesale markets will not represent financial burden to local and national authorities. If they are managed properly and professionally, wholesale markets can make powerful stimuli to modernization of food market as a whole. (INFOAM,2014)

Considering the fact that previous research dealt with comparative advantages of some countries or group of countries in regard to their position in world trade, the author introduces a new approach which follows comparative advantages between two countries, as well as competitors on the same market (Kuzman et al., 2016).

Total volume on products market is 26 million tons per year, which is approximately 40% of fruit and vegetables supply in Europe (24 million tons per year), 10% of fish and fish products supply in Europe (1 million tons per year) and 2% of meat and meat products supply in Europe (1 million tons per year). (WUWM, 2016)

System of trade information gives daily, updated information about the state in various agriculture sectors in Serbia and it can provide relevant information about market potentials and competition. In the online survey,1361 site visitors answered the question if STIPS (System of trade information in Serbian agriculture) helps them in making decisions in their business and the answers are the following: (Employer) Yes, it helps me a lot 45%, It helps me 34%, It doesn't help 21% (STIPS)

By analyzing the set goals and the role that world wholesale markets union assigns to agriculture development, it can be concluded that their

primary aim is the necessity of the modern wholesale market construction, primarily in developing countries and transition countries, but also in a large number of developed countries in present and future.

## Main elements for efficient management of wholesale market

The most important elements for efficient management refer to the legislations, suitable capital structure, efficiency in decision making, establishing domestic and foreign associations of wholesale markets and retail markets, creating trust in a wholesale market among buyers. Another important element is the influence of political structures on management and finances; besides political, it also includes the influence of other groups, institutions and individuals interested in development of a wholesale market as the most efficient instrument of agricultural products wholesale.

Competitive advantage– over competition has been won by the offer of a higher value for a buyer or with lower prices or by giving more benefits that justify higher prices (Kotler et al. 2007).

The most important elements for efficient management of wholesale markets are:

1. appropriate capital control
2. necessary powers and authorizations
3. efficient agreement with market users
4. accordance with market rules, contracts and agreements
5. economic sustainability
6. efficient relations with wholesale market users, service providers government agencies and other markets
7. operational and management efficacy
8. efficient structure of decision making
9. trained and disciplined staff
10. trust in wholesale market- integrity of wholesaler
11. politics and finances

Leading principles in marketing management of wholesale markets are based on the following criteria:

1. Financial sustainability on the market means trust and trust in its use as well as accepting fees, taxes and rules made by a wholesaler, agricultural producers, retailers and other buyers and users

2. Operational efficacy which includes:
    - financial handling with delivery, loading and unloading of products
    - discipline on the market, in inland traffic, storing and exposing the products which can be achieved with valid contracts on rental and with widely accepted and implemented market rules and regulations.
    - traffic control and parking
    - personal safety
    - safety of products
    - cleanliness and hygiene
    - Efficient service providing, like services of loading and unloading, movement of products, telephone, fax, e-mail services, internal communication, storage and cold storage.

3. Pleasant and safe trade and working environment in which private trade can be profitable. Such environment should have toilet, food drink and other services like bank, accountants, entrance for suppliers (for example packing of material, seeds, and fertilizers for agricultural producers), parking, food and accommodation for transporters.

4. A wholesale market should be in accordance with general market and social needs by providing the following:
    - regular supply with fruit, vegetables and other food products of specified quality and quantity
    - transparency of prices through free competition among traders
    - obeyed standards and prices
    - package that corresponds market or possibly consumers' needs

5. Wholesale market management should have correct relation with market users including wholesalers, other market operators, agricultural producers, sellers and buyers and other service providers.

Modern business conditions impose clear and precise criteria regarding agreed obligations about rental, with clearly defined laws and obligations, whose main aim is to secure discipline in market operations for the sake of eliminating misunderstandings and legal disputes. Many world

wholesale markets use experience of others as rules and principles of International retail and wholesale markets association and World organization for food within the United Nations.

Proactive company tends to have strategic initiative to control place and time of an action on the market. In order to achieve the competitive advantage on the market, it is essential to allocate main sources to strategic directions of company's development. (Milosavljevic, 2010)

So, the efficacy of wholesale market as a competitive company to other aspects of trade can be viewed as an efficient wholesale market construction model in all bigger cities which would replace current "kvantaškapijaca" and make this form of trade successful. (Prdic, 2016)

**Recommendations and directions for development of wholesale markets those are significant for agriculture development**

Development of domestic wholesale markets in future as a strategic instrument of trade has to be based on already adopted existence mission in accordance with proclaimed values. Wholesale markets' vision and strategically determined values have to be in accordance with strategic vision of domestic agriculture, based on the sustainable competitive advantage strategy. Besides the strategy based on the competitive advantage and the strategy of regional leader, business strategy of domestic wholesale markets development is also development strategy based on the application of e-business and internet. IT technology, especially internet development, makes it possible to make a huge strategic step in that direction, because operative and easily-accessible data bases can be created, which enables a constant education of employees and management and it helps them to acquire special knowledge about wholesale market managing.

The availability of all relevant information on global market is very important for future success of domestic wholesale markets.

Strategic significance of wholesale market for agriculture development has to be a part of a real trade strategy and it has to be a long-term strategic goal for agriculture development. In the future, domestic wholesale markets need to "enter" complex research on their own identity to determine values on which they function and to see how leading world

wholesale markets operate and to discover a possibility for new development and affirmation.

Achieving agrarian competitiveness requires that macroeconomic management change basic elements of agriculture strategies in the direction of creating agricultural systems, whose growth is guided by knowledge and innovations, and in the direction of agriculture products' chain development (Mihajlovic et al., 2016).

Benchmarking against best identified practices, if suitably adopted and adapted, can generate a company considerable profit of performance within a very short time (Maire et al., 2005).

The Target costs are defined as the difference between the anticipated price and required return. In practice, target profit often is driven by medium term corporate profit plans, which reflect the returns demanded by the financial markets (Woods et al., 2012).

Recommendations for wholesale markets development and management in future are to adopt the concept in which knowledge based management b is one of important competitive advantages. Managers of future modern wholesale markets have to be responsible, open for communication and able to adopt new knowledge and world experiences in wholesale market management. Also, it is important that they can actively apply all acquired knowledge and experience.

**SWOT analysis of market potentials of wholesale markets External aspect of SWOT analysis**

Opportunities

- Efficient and effective distribution channels of agricultural products
- Specialized market institutions at which the interests of producers, buyers, sellers and wholesale market are accomplished in the most efficient way.
- They enable development of domestic agriculture and create chances for a state help to development of agriculture holdings, due to marketplace efficacy in the aspect of good price and products' quality.
- Buyers' interests for wholesale markets and market development
- Adapting to new market circumstances and consumers' needs

- Constructing of new modern trade center creates conditions for sale increasing
- Strategy of competitive advantage of wholesale markets in respect to competitive companies
- Development strategy of a wholesale market as city- public and infrastructural center
- Creating market position of " so called brend street market"
- Constant research of consumers' needs, attitude and perceptions
- Marketing-- communication strategy with sellers, buyers and interested public.

Threats

- Selling of goods out of market and trade transactions
- A large number of distributive centers that trade with agricultural products
- Not adapting and implementing the strategy of development of a wholesale market as a primary distributive chain in agricultural products sale
- Changing the market environment and consumers' needs and attitudes
- Inadequate service quality
- Regulated system of legislation , legal and ownership relations

**Internal aspects of SWOT analysis**

Strengths

- Adopting national strategy for wholesale market construction in all bigger city trade centers
- Helping domestic agriculture and directing the product sale on the wholesale market
- Strategic approach to the significance of a wholesale market and managing wholesale markets are based on competence and knowledge
- Quality of the offer at traditional market institution
- Direct trade, interest seller, buyer
- Selling traditional domestic products
- Researching consumers' attitudes
- Improving the service quality
- Adapting to market changes, on domestic, regional markets and the market of developed countries

Weaknesses

- Not adapting the strategy of development of a wholesale market.
- Undefined market relation in the aspect of obeying legal, market-financial and tax solution
- Lack of a clear vision and strategy of relations of wholesale markets and retail markets of agriculture products
- Stronger competition and a lack of development strategies
- Infrastructural equipment, market position of wholesale markets
- Influence of political factors
- Inadequate marketing-communication strategy

## Conclusion

Strategic significance of wholesale markets for agriculture development represents a clear vision and a thought-out way to the future, which represents certain strategic development and increasing incomes of domestic products sellers in today's economic conditions. By constructing the wholesale market, our country, which is mostly agriculturalshould create necessary conditions for more dominant position on the regional market that would enable bigger sale and better perspective for further development.

Based on the theoretical and practical research for the needs of this paper, it has been confirmed that it is necessary to adopt the strategy for the construction of the wholesale market for the purpose of increasing the trade and sale of agricultural products. It should be especially emphasized that the construction of these facilities is urgent, based on the world experiences on the agriculture and trade development. Also, domestic sellers see a wholesale market as an organized, well-equipped and unique site for meeting of sellers and buyers, where the company's (seller's) success and satisfied buyer is seen as the final result.

Conducted research enabled achieving the main aim of the paper, so this paper points out the significance of strategic approach to wholesale markets in market developed countries and in our countries. The paper also indicates the possibility of application of this facility on domestic market and determines assumptions and directions for the implementation of the concept of wholesale market development on domestic market. Regarding the main aim of the paper, strategic significance of wholesale markets for agriculture development and increasing business results on the one side, and empirical research of companies (sellers) on domestic

market on the other side. It is necessary to anticipate and identify all obstacles and remove doubts about strategic significance of wholesale markets for agriculture development as well as improving interests of companies (sellers) and buyers.

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# STATE AID AS A FOREIGN INVESTMENT FACTOR IN THE AGRICULTURAL SECTOR OF THE REPUBLIC OF SRPSKA

*Boro Krstić*[1], *Milica Panić*[2]

## Abstract

*The development of national economies largely depends on the state of direct foreign investments, and their impact is certainly visible in the agricultural sector as well. As the Republic of Srpska and BiH have entered the transition period after the war, the fast economic recovery required the establishment of intensive business cooperation with partners from around the world, and foreign investments were a factor of contention in furthering development in these areas. Foreign investment contributes to the improvement of the existing investment environment as fresh capital motivates new investors. The paper analyzes important characteristics and features of state aid. The aim of the paper is to provide a legal aspect of the role and importance of state aid as a measure to stimulate foreign investment in the agricultural sector of the Republic of Srpska. The analysis of various forms of incentives allows determining the degree and scope of state aid for stimulating foreign investment in the agricultural sector of the Republic of Srpska over the past years, and points to existing constraints and future perspectives.*

**Key words:** *state aid, foreign investment, incentives*

## Introduction

The level of investment in capital is one of the main criteria determining the level of development of a country, and it is in the best interest of each country to attract as many investments both domestic and foreign. This is especially true at the time of the current economic and financial crisis. Foreign investments bring a whole range of positive effects, such as new

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jobs opening, applying new, modern technologies, market development, strengthening competition on the market, higher tax revenues for the state budget, and the like (Krstić, 2017). Foreign investment is in practice encouraged by various measures by the state, state authorities, territorial autonomy units and local self-government units, various economic entities or entities under the control of the state. The mentioned measures aim to promote the arrival of foreign investors, i.e. to influence foreign investors to stay in the given country, or to expand their investments.

Such actions by the states should not be surprising, given the still current economic and financial crisis around the world, as well as high unemployment rate. It is understood that various forms of incentives can be given to domestic businesses, so a balance must be created between the two groups of investors.

In Republic of Srpska and Bosnia and Herzegovina there are various forms of incentives for foreign investors, but it is necessary to clarify what is implied by the concept of state aid. In that sense, it is best to consult the current regulations of the European Union, given the highly developed legal-theoretical basis, as well as the rich practice of its institutions.

## The concept of state aid

The State Aid Provisions are contained in Articles 107 - 109 of the Treaty on the Functioning of the EU (hereinafter: TFEU). The problem may be the fact that neither in the treaties on which the EU is based, nor in the other act the precise definition of state aid is given. This may be somewhat understandable if one considers the weight and complexity of this issue, the different motives and ways of allocating aid, the wealth of the forms under which state aid is granted and the like (Domazet, 2012: 25).

Problems with the definition of state aid have also been increased due to the narrow interpretation of Article 107 (1) of the TFEU by the European Court of Justice (now the Court of Justice of the EU[3]). A typical example confirming this is the case is *PreussenElektra* (PreussenElektra, 1998). In this case, German legislation obliged companies that distribute electricity to buy electricity from renewable sources at prices higher than the market.

[3] For easier reference, the term "Court" will be used as a common mark for the European Court of Justice and the Court of Justice of the EU.

The law also establishes the obligation of producers of energy from conventional sources to partially compensate distributors for additional costs incurred. The problem was whether the resources of PreussenElektra, producers of electricity from conventional sources, intended to subsidize energy producers from renewable sources, should be treated as state resources? The Court interpreted the Article 87 (1) of the EC Treaty (now Article 107 (1) of the TFEU), so that only the advantages given directly or indirectly through state resources would be designated as aid.

In the Court's view, this does not imply that all advantages (benefits) given by the State, whether they are financed through state resources or not, constitute State aid. According to the Court's position, the aforementioned article highlights the advantages given directly by the state, as well as through the public or private bodies established or designated by the state. It was therefore concluded that this case does not imply state aid, since there was no direct or indirect transfer of state resources here. Such a view was not questioned by the fact that the obligations in question were established by law (Domazet, 2012: 26).

The problem with the precise definition of the concept of state aid is also seen in the fact that state aid is in practice very often equated with state subsidies, grants or premiums. A typical example is the *Agreement on Subsidies and Compensatory Measures*[4] as part of the World Trade Organization's Founding Acts, in which the term "subsidies" is used as a synonym for State aid. In this *Agreement*, a definition of subsidies may be found, in the case of the World Trade Organization and the *General Agreement on Tariffs and Trade*[5].

Thus, subsidies include financial contributions from a government or any public authority in the territory of a Member State that provides benefits to the recipient[6]. Financial contributions include: 1) direct transfers of funds, including potential transfers, such as guarantees on loans; 2) the government's renunciation of income that would otherwise accrue to it; 3) providing or acquiring goods or providing services, except for general

[4] *Agreement on Subsidies and Countervailing Measures*. *It can be found on the Internet site:* http://www.wto.org.
[5] *General Agreement on Tarrifs and Trade-GATT. It can be found on the Internet site:* http://www.wto.org.
[6] Atricle 1.1. (a) *Agreement on Subsidies and Compensatory Measures*.

infrastructure; 4) different payments by the government to certain funds, as well as entrusting private entities with one or more of the functions mentioned in the above points[7]. The concept of state aid can also be found in International Accounting Standard 20 (hereinafter: Standard)[8].

Under state aid, the Standard implies measures undertaken by the state with the intention of providing an economic benefit specific to the entity or set of entities that meet certain criteria. State aid for the purpose of this document does not include only indirectly derived benefits through actions that affect general business conditions, such as providing infrastructure in developing areas or imposing on competitors the restrictions on business[9]. In this *Standard*, the term "state benefits" is also used, representing the state's assistance in the form of transferring resources to the entity based on the fulfillment of certain conditions in the past or in the future, relating to its business activities.

They exclude those forms of state aid that can not be measured to a reasonable extent, as well as transactions with a country that cannot be distinguished from the entity's usual business transactions[10]. Therefore, state aid here is not equalized with subsidies, as is the case with the Subsidy agreement and compensatory measures (Domazet, 2012: 27-28).

A similar problem is not present only in various acts, but it is also visible in the field of legal theory, where there is also a great inconsistency in the use of the notion of state aid[11].

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[7] Ibid, Article 1(1)(a)(1)(iv).

[8] The mentioned standard can be found on Internet site: http://www.mfin.gov.rs.

[9] A comment by the Ministry of Finance of the Republic of Serbia about this: http://www.mfin.gov.rs.

[10] ibid

[11] Thus, the term "state subsidy" as a synonym for state aid can be found in: R. Mrdaković Cvetković, D. Mihajlović, „Izmene regulative u oblasti subvencija (sistem državne pomoći) u privredi Srbije i upravljanje preduzećima“, *Politička revija* 2/2009, str. 155 – 164; G. Gasmi, „Principi Evropske unije o državnoj pomoći u kontekstu procesa stabilizacije i asocijacije-putokaz za harmonizaciju u Srbiji“, *Finansije*, 1 – 6/2007, str. 65 – 96. In this paper, the author decided to use the term "state subsidy", taking into account the Agreement on Subsidies and Compensatory Measures, signed by both the EU and the Member States individually. However, at the same time, he stresses that the term "state subsidies" has a narrower meaning than the notion of "state aid" (page 71). On the other hand, in the journal *Pravo i privreda*, he uses the term "state aid" (G. Gasmi, „*Državna* pomoć u Evropskoj uniji-putokaz za harmonizaciju u Srbiji“, *Pravo i privreda*, br. 5 – 8/2007, str. 480 – 481). See more about this: Krstić. B., (2016),

However, subsidies, grants and premiums are only one of the numerous forms under which state aid is available. Therefore, it can be concluded that they belong to the "umbrella" concept of state aid.

This is evidenced by the fact that the concept of state aid that is much wider than the concept of subsidies is accepted in EU law. In this sense, the term "state aid" is the correct and most commonly used in jurisprudence[12].

Without holding this issue too much on EU law regarding state aid, it should be emphasized that the Bosnia and Herzegovina legislation gives the definition of state aid.

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[12] See: T. Rajčević, „Kontrola državne pomoći", *Pravni život* 12/2006, str. 1047 – 1055; S. Varga, „Pravno regulisanje postupka kontrole državne pomoći u Evropskoj uniji", *Pravni život*, 12/2006, str. 695 – 705; N. Šćepanović, „Državna pomoć preduzećima kao oblik narušavanja konkurencije u pravu Evropske unije", *Pravo i privreda* 5 – 8/1996, str. 415 – 422; B. Stojanović, „Državna pomoć, regionalni razvoj i zaštita konkurencije", *Ekonomika preduzeća*, 3 – 4/2008, str. 95 – 105; A. Ćirić, *Međunarodno trgovinsko pravo*, 2010, str. 206 – 209; E. Rizvanović, *Mjere državne pomoći unutar Evropske unije kao oblik intervencije države na tržištu*, 2008; I. Spasić, „Komunitarno pravo konkurencije", *Strani pravni život* 1 – 2/2007, str. 81 – 82; R. Vukadinović, „Državna pomoć u pravu EU", *Pravo i privreda* br. 5 – 8/2005, str. 799 – 815. In one of his earlier papers, the author used the term "state subsidy" - to see it: R. Vukadinović, „Pojam i značaj državnih subvencija u pravu Evropske unije", *Pravni život*, 12/1998, str. 641 – 652; G. Ilić, „Državna pomoć u pravu konkurencije Evropske unije", *Pravo i privreda* br. 5 – 8/1997, str. 880 – 893. When it comes to foreign authors, the term "state aid" can be found in: P. Nicolaides, M. Kekelekis, M. Kleis, *State Aid Policy in the European Community,* 2008; R. Whish, *Competition Law*, 2009, str. 244 – 245; B. Wendland, „State aid and Public Funding for Universities and other Research Organisations", *Competition Policy Newsletter*, 2/2010, str. 54 – 63; Ž. Didžiokaite, M. Gort, „Restructuring in the banking sector during the financial crisis: the Northern Rock Case", *Competition Policy Newsletter*, 1/2010, str. 74 – 77; A. Jones, B. Sufrin, *EC Competition Law*, 2008; D. Spector, *State Adis: Economic Analysis and Practice in the European Union*, 2007; R. Nitsche, P. Heidhues, „Study on methods to analyse the impact of State aid on competition", *European Economy, Economic papers*, br. 244, 2006; D. Collie, „State Aid in the European Union: The Prohibition of Subsidies in Integrated Markets", *International Journal of Industrial Organisation*, vol. 18, 2000, str. 867 – 884; A. Metaxas, „Recovery obligation and the limits of national procedural autonomy", *European State Aid Law Quarterly*, 2/2007, str. 407 – 415, and like. See more about this: Krstić. B., (2016), *Pravni režim stranih ulaganja u Republici Srpskoj - stanje i perspektive,* doctoral disertation, Faculty of Law, Slobomir P Univerzitet, Bijeljina, Republika Srpska, BiH. The author in this paper opted for the notion of state aid, because he considers that subsidies, grants and premiums are forms of state aid and fall under its notion, and therefore cannot be considered synonyms.

Thus, in accordance with the Law on State Aid System in Bosnia and Herzegovina, state aid in terms of this Law is any actual or potential public expenditure or a reduced realization of public revenue, an existing, planned or potential, which can be assigned or planned directly or indirectly by the provider of state aid, in any form, thereby impairing or threatening to distort competition on the market, favoring certain economic entities, production or trade of certain products, or providing certain services, if it affects the fulfillment of international obligations of Bosnia and Herzegovina in this field (Law on State Aid System in Bosnia and Herzegovina, Article 3, 2012). As can be seen, the concept of state aid under the Bosnia and Herzegovina legislation is fairly wide-ranging, so that many forms already exist in its scope, or will appear in practice in the future. Such an approach by the legislator is entirely justified, given the various forms of state aid that have emerged in practice, especially in EU law.

## State aid for foreign investments in the Republic of Srpska

The Law on State Aid System in Bosnia and Herzegovina defines the concept of state aid. It can be assigned for many purposes and in practically all sectors of the economy. State aid for foreign investments will be discussed in more detail, from the point of view of its practical application.

However, a few remarks should be made immediately. Despite the well defined concept of state aid, by the legislator, recipient of the state aid will, in every possible way, try to conceal the granting of state aid (that is, they will try to avoid its notification to the competent authority). The reason for this is the fact that the recipient of state aid is brought into, in a competitive position, a more favorable position in the market in relation to other economic entities from the same sector that did not receive the aid. Therefore, what is one of the grounds for sanctioning the illegal allocation of state aid is its selective allocation.

From the above, it is not necessary to reach the conclusion that the granting of state aid is in any case prohibited. In general, it is forbidden, but there are certain exceptions to this general rule. Too rigid approach in the formal legal regulation of state aid allocation (which would imply its absolute ban) would produce a counter-effect, i.e. state aid would not be allowed in justified cases. On the other hand, there is a basis for the attitude of the legislator that state aid is *a priori* inadmissible, since by the act of doing business, recipients of the aid would be practically rewarded

for poor business results, and completely demotivated and healthy business entities would be unreasonably punished. All the same goes for foreign investment. Nevertheless, state aid here should be viewed from a somewhat different angle in relation to direct financial grants to domestic businesses, as state aid is most often viewed. State aid for foreign investors has a more incentive character and serves to attract foreign investment, or increase their existing volume.

State aid in the Republic of Srpska has been allocated in different ways and in different forms. Government of the Republic of Srpska, line ministries, municipalities and cities appear as state aid providers. The amount of aid varies from case to case, and it's mostly about grants, or direct financial incentives, as well as subsidies for employment and other purposes.

Some examples of state aid in the Republic of Srpska which are important for foreign investments are evident in Table 1[13]. In the Republic of Srpska, the Law on state aid control for economic entities (hereinafter: LSAC) is applied to the area of state aid for foreign investments. In accordance with the Law, assistance to economic entities represents any actual or potential public expenditure or a reduction in public revenues that constitute privileges for the state aid beneficiary (LSAC, Article 1, 2009). As in the EU, in the legislation of the Republic of Srpska there is the general prohibition of granting state aid. In this regard, any form of state aid that is distorting or likely to impair the market competition by granting privileges in the market is prohibited, except in the cases prescribed by this Act (LSAC, Article 4, 2009).

Certain exceptions are set out in the above general prohibition of the granting of state aid, but it must still be notified (LSAC, Article 5, 2009):

a) for the promotion of certain economic activities or certain economic areas where such assistance does not adversely affect market conditions and competition,
b) for removing serious disturbances in the economy or improving the realization of significant projects for the Republic,
c) to promote the economic development of areas with extremely low living standards or high unemployment.

[13] Tabela 1 – *List of state aid programs in the Republic of Srpska in 2013; List of state aid programs in the Republic of Srpska in 2013.*

**Table 1.** *Incentives in the Republic of Srpska*

| Type of measure | State aid category |
|---|---|
| Incentives in agriculture (subsidies, Municipality of Rudo) | State aid in the field of agriculture and forestry |
| Incentive for employment of workers in the textile industry (Municipality of Pale) | Horizontal state aid for employment |
| Incentive for new employment (Municipality of Pale) | Horizontal state aid for employment |
| Incentive for Small and Medium Enterprises (Municipality of Kotor Varoš) | Horizontal state aid for small and medium-sized enterprises |
| Incentives to Agriculture (Municipality of Laktaši) - subsidies, incentives | State aid in the field of agriculture and fisheries |
| Incentives to Agriculture (Municipality of Laktaši) - interest subsidies for loans | State aid in the field of agriculture and fisheries |
| Production incentives (Municipality of Laktaši) - interest subsidies for loans | Horizontal state aid for small and medium-sized enterprises |
| Incentives to Agriculture (Municipality of Laktaši) - subsidies, incentives | State aid in the field of agriculture and fisheries |
| Funds for stimulating employment for employers (Prijedor City) - an incentive | Horizontal state aid for employment |
| Employment incentives (Municipality of Kostajnica) | Horizontal state aid for employment |
| Employment incentives (Municipality of Novi Grad) | Horizontal state aid for employment |
| Subsidy (Municipality of Šekovići) | State aid in the field of agriculture and fisheries |
| Employment incentives (Municipality of Berkovići) - subsidy | Horizontal state aid for employment |
| Incentive Employment Loans (Trebinje City) - loans under more favorable conditions | Horizontal state aid for employment |
| Incentive in Agriculture (Municipality of Srbac) - incentives | State aid in the field of agriculture and fisheries |
| Help (Municipality of Istočni Stari Grad) - grant | Horizontal state aid for small and medium-sized enterprises |
| Employment incentives (Municipality of Kozarska Dubica) - subsidies, incentives | Horizontal state aid for employment |
| Employment incentives (Municipality of Foča) - incentives | Horizontal state aid for employment |
| Employment incentives (Municipality of Rogatica) - incentives | Horizontal state aid for employment |
| Employment subsidies (Municipality of Milići) - subsidies, incentives | Horizontal state aid for employment |
| Employment subsidies (Municipality of Zvornik) - subsidies and incentives | Horizontal state aid for employment |
| Subsidy for agriculture (Municipality of Bileća) - subsidy | State aid in the field of agriculture and fisheries |
| Subsidies (Municipality of Bileća) - subsidy | Horizontal state aid for the rehabilitation and restructuring of an enterprise in difficulty |

**Source:** *Government of the Republic of Srpska, Ministry of Finance*

The law also stipulates that "any change in previously granted state aid must be previously reported to the Commission, and the application will contain information on:

a) the legal basis for granting state aid,

b) the body proposing the granting of state aid,

c) the amount, type, form, intensity and aid category, as well as the expected duration,

d) the economic impacts of state aid in the past in the case of a notification about the change of existing state aid,

e) the user or users,

f) criteria and procedure for awarding in the case of its award under the state aid scheme and

g) other information at the Commission's request (LSAC, Article 6, 2009).

The law also lists certain categories of state aid, although this list is not comprehensive. Thus, there is room for a more extensive interpretation of the Law and the imposition of a new category of state aid under its provisions, which could appear in practice in the future.

Therefore, the needs for reporting and reporting state aid within the meaning of this Law are classified into one or more categories (LSAC, Article 7, 2009):

a) State aid for exports,

b) State aid for small or medium-sized enterprises,

c) State aid for the purposes of environmental protection and energy savings,

d) State aid in the form of direct or indirect subsidies for cash benefits,

e) State aid for the rehabilitation or restructuring of economic entities,

f) State aid for new investments and for job openings,

g) State aid for research, development and innovation,

h) State aid for employment,

i) State aid for training,

j) State aid for the promotion of culture and the protection of cultural and historical heritage,

k) State aid for ongoing maintenance of production and

l) State aid to economic entities in specific sectors.

Control of compatibility of declared or allocated state aid in accordance with the provisions of this law is performed by a commission appointed by the Government (LSAC, Article 9, 2009). The Commission consists of six members nominated by the Ministry of Finance, the Ministry of Industry, Energy and Mining, the Ministry of Economic Relations and Regional Cooperation, the Ministry of Trade and Tourism, the Ministry of Administration and Local Self-Government, and a member of the experts on the proposal of the Ministry of Finance. The Commission is competent to decide on (LSAC, Article 9, 2009):

a) the compliance of the state aid proposal submitted by the state aid provider with the provisions of this law (hereinafter: the previous control) and

b) the compliance of the granted state aid with the provisions of this law.

The Commission is obliged to (LSAC, Article 10, 2009):

a) submit an annual state aid report to the Government for consideration, which is then sent to the National Assembly of Republic of Srpska for approval and

b) cooperate with the competent bodies for controlling the financial operations of the organs of the Republic's administration.

In the previous control, the Commission examines all applications for the granting of new state aid and applications for significant modification of existing state aid, and determines whether the applications and individual state aids are in compliance with this Law. The Commission shall determine the deadline for the applicant to remedy the deficiencies in case the application does not comply with the provisions of this Law. The Commission shall make a decision on non-compliance if the applicant fails to correct the deficiencies within the time limit. The Commission shall make a decision on compliance or additional harmonization in accordance with paragraph 1 of this Article, within 60 days from the date of receipt of the complete application (LSAC, Article 12, 2009).

The granting of state aid to the applicant is allowed after receiving the decision under Article 12. If state aid is granted without a decision under Article 12 paragraph 4 of this Law or with a decision on non-compliance, the Commission will submit to the Government a report on such state aid granted with a proposal for:

a) determination of the illegality of the allocation of a whole or part of state aid,

b) the current suspension of state aid and

c) the return of unlawfully granted state aid, including the payment of statutory default interest, starting from the day of using the aid until the day of the repayment of the amount recovered, in order to eliminate the effects of distortion of competition caused by such unlawful or unlawfully granted aid (LSAC, Articles 13-14, 2009).

The control of the use of state aid and the achieved results (hereinafter: ex post control) is performed by the state aid providers, the Ministry of Finance and the competent inspection bodies, who report to the Commission about their findings. Ex-post control is based on information from the Commission or information from other sources. If, during ex post control, irregularities are detected, the Commission shall determine the deadline for the provider to remedy the irregularities identified. If the aid provider fails to remedy the identified irregularities within the deadline, the Commission shall submit a report to the Government with a proposal of measures in accordance with Article 12 of this Law (LSAC, Articles 15-16, 2009).

Supervision over the implementation of this law is carried out by the Ministry of Finance and the competent ministry. State aid repaid in accordance with this Law represents the income of state aid providers, and interest on repatriated state aid is the revenues of the Republic's budget (LSAC, Articles 17-18, 2009). According to the Law on the provision and direction of funds for the promotion and development of agriculture and rural areas (hereinafter: LPDFPDRA), funds for the development of agriculture and rural development are provided from the budget of the Republic of Srpska in the amount of at least 6% of the domestic revenues of the budget and other sources (the Law on Security and directing funds for the promotion and development of agriculture and rural areas, 2002). These funds are used for interventions in agriculture and investments in agriculture (LPDFPDRA, article 3, 2002). Regarding

the means used for interventions in agriculture, according to this Law, they consider the following:

- premiums for the production of basic agricultural products and breeding of stock in livestock breeding,
- reimbursements for the purchase of varietal seed and planting material in plant production, as well as reproductive material in livestock, fishery and beekeeping,
- funds for financing the measures for the improvement of agriculture, established by the Medium-Term Agricultural Strategy of Republic of Srpska and the measures of the agricultural policy of the Republic of Srpska,
- participation in the financing of the necessary measures of animal health protection,
- participation in the financing of professional agricultural services which are in function of raising the technological level of production on the farms' holdings.

As an incentive for investing in agriculture, the following was introduced:

- interest rate rebate on loans granted to agricultural holdings by banks - creditors
- rebate on loans for financing the purchase of fixed assets for production in agricultural holdings (procurement of basic herds, machinery, other equipment and other fixed assets),
- interest rate rebate for working capital loans,
- interest rebate on loans for financing the construction, reconstruction and modernization of production and reproductive capacities in agriculture, fisheries and beekeeping,
- interest rebate on loans for financing builds systems for irrigation and drainage of land for the needs of primary agricultural production,
- loan interest rebate for financing the agro melioration of meadows and pastures,
- interest loan rebate for financing the equipping of purchase stations for agricultural products.

The Ministry of Agriculture, Forestry and Water Management of the Republic of Srpska is determined by the Agricultural Service of the Republic of Srpska and it gives the assessment of socio-economic justification for the allocation of investments for encouraging the development of agriculture and villages at the proposal of the bank of the lender (LPDFPDRA, Article 4, 2002) for the. According to the Rulebook on the conditions and method of achieving financial incentives for the development of agriculture and villages (hereinafter: the Rulebook), the right to incentives is given to individuals and legal entities residing in the Republic of Srpska, and who are engaged in agricultural activity on the territory of the Republic and who are registered in Register of agricultural holdings, as well as other entities registered in the Register of users of incentive funds (Rulebook, Article 2. 2017). It is clear from the above provision that all incentives in the agricultural sector are available both to domestic and foreign physical and legal entities, which is a strong basis for the inflow of foreign investments into the agricultural sector.

According to the Decree on Purpose, criteria and conditions for granting state aid in the Republic of Srpska (hereinafter: the Regulation), the basic prerequisite for granting state aid is that the state aid program is in line with the Interim Agreement on Trade and Trade Issues between the European Community and Bosnia and Herzegovina and the Stabilization and Association Agreement between the European Community and Bosnia and Herzegovina (Regulation, Article 4, 2013).

According to the above regulations, in order to avoid possible abuse, any form of state aid should be in accordance with Articles 81, 82, 86 and 87 of the Treaty on European Union (TEU, Article 71). Also, the other two conditions for the granting of state aid relate to the condition that state aid funds are not planned, and that state aid cannot be granted to an economic entity that has been ordered to recover state aid (Regulation, Article 4, 2013). The condition regarding the planning of state aid allocation funds is in some ways are very debatable, because if one considers that such funds are planned in the budget, this can call into question the character of state aid.

However, having in mind the definition of state aid, the State Aid System Law defines state aid as any actual or potential public expenditure or a reduced realization of public revenue that may be granted or planned by the State aid provider in any form, as well as the provisions of the Treaty on the functioning of the European Union which permits aid to facilitate

the development of certain economic activities or certain economic areas, where such assistance does not affect trading conditions to a degree that is contrary to the common interest (UFEU, Article 107); this can be safely taken that incentives that are regulated by the Rulebook on the conditions and method of achieving financial incentives for the development of agriculture and villages represent state aid to the agricultural sector in the Republic of Srpska.

## Conclusion

Based on the analysis of the regulations governing state aid in the Republic of Srpska and Bosnia and Herzegovina, it is evident that umbrella regulations at the level of Bosnia and Herzegovina, that is, the Law on the state aid system in Bosnia and Herzegovina is in line with the regulations that regulate this matter in the European Union. Therefore, the Law already has in its definition the width and flexibility that ensure that a large number of benefits (categories) by the state, addressed to individuals and economic entities, can be sub-specified under the state aid scheme.

On the other hand, when it comes to regulations that regulate this matter in the territory of Republic of Srpska, whether those are legal or sub-legal acts, it is evident that the budget of Republic of Srpska, that is, the Government of the Republic of Srpska and the Ministry of Agriculture, Forestry and Water Management count on expenditures in the purpose of incentives for the development of agriculture. These funds, in the form of state aid, are directed to support current production, long-term development, as well as the systemic and other support measures.

Assuming that the regulations in the Republic of Srpska and Bosnia and Herzegovina do not introduce significant restrictions for foreign individuals and economic entities in relation to domestic, especially in the agricultural sector, there is a wide range of state aid and local government units, so it can be concluded that state aid is of great importance for stimulating foreign investments in the agriculture sector in the Republic of Srpska. Possible remarks, which can be further discussed, are the amounts of funds that are placed in the form of state aid in relation to the existing 6% of the national revenues of the budget and other sources, which are currently allocated for these purposes.

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# STRATEGIC PLANNING AS SUPPORT TO DEVELOPING AGRICULTURE OF THE CITY OF NOVI SAD[1]

*Branko Mihailović[2], Vesna Popović[3]*

## Abstract

*The paper examines the factors of the development of agriculture in the city of Novi Sad, and accordingly defines the development priorities. The aim at the research is to analyze the real possibilities for improving the situation in this field through the SWOT analysis. The analysis focuses on: demographic characteristics and trends in rural settlements, trends in the development of agriculture in the city of Novi Sad, agro-technical equipment, storage and finishing capacities, as well as development priorities in the agriculture of the city. The results of the research show that the improvement on the competitiveness of the agricultural sector in the city of Novi Sad requires the implementation of adequate strategic measures and projects in the field of improvement to human potential , higher level of processing of agricultural products and better agricultural equipment of agricultural producers. New rural development policies are focused precisely on defining effective mechanisms to ensure coordination of the development of agriculture and other activities in rural areas, in accordance with the principles of sustainable development, with the aim of improving the living standard and quality of life of the population.*

**Key words:** *strategic planning, agriculture, agro-technical equipment, storage and finishing capacities, development priorities.*

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[1] Paper is a part of research within the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia. Project period: 2011-2017.

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## Introduction

Today, the development of agriculture more than ever relies on the results of scientific research and their practical application. Research in the field of agriculture is carried out by a wide network of state institutes, institutes and universities and is mainly aimed at improving production. Perspectives emerging from the EU enlargement process for our country and the importance of capital investments in sustainable development implied the need for an analysis of the economic effectiveness of investments in agriculture (Subic et al, 2012, p. 781-791). Namely, economic research, farm level, market to study, or economic policy analysis and assessment is poorly developed, and the profitability of agriculture and food industry should be improved by supporting appropriate research and applying the results obtained (Mihailovic et al, 2009, pp. 413- 421 ) .

Agriculture is the basis of economic activities (Popovic, Grujic, 2015, pp. 513-525). Commence changes in the field of agriculture, although under the influence of many factors that have depreciation effect on them, they have assumed the character of irreversible processes. The reform of the agricultural sector can hardly be restored to the starting position, but rather about its hectic pace and instruments of agrarian policy, which often need to establish a balance between diametrically opposed targets. Under such conditions, the agrarian of Serbia has an exceptional place and role in the overall economic development of the country, especially in the process of harmonizing economic mechanisms for the realization of certain social goals, in the implementation of reforms and transition, and above all on mitigating the impact on the global economic and financial crisis, which seriously threatens the recovery and the development of the economy.

Serbia has great potential for the agricultural sector, which is not fully exploited (Simonović et al, 2012, pp. 535-544). With adequate strategic planning, agriculture can make a significant contribution to the economic development of the country. Due to its connection and influence on other sectors, it is extremely important to the development of Serbia, since it employs, directly or indirectly, a large number of people, participates in a significant part in foreign trade, provides food safety to the citizens, and contributes to rural development and ecological balance. The achievement of agrarian competitiveness requires macroeconomic management to change the basic elements of agricultural development strategies, first of

all, towards the creation of sustainable agricultural systems, whose growth is driven by knowledge and innovation, as well as in the direction of market development and agricultural product chains and agricultural clusters. Namely, an important cluster contribution is reflected off the creation of a sustainable competitive advantage of cluster members, as well as regions in which the cluster operates.

## Methodology and data sources

In order to realize the research task, all available sources of information will be used: 1) Official local statistics, i.e. the data onto the Republic Bureau of Statistics; 2) National and municipal strategies and development documents from a specific area; 3) Research of the authors of the thematic field; 4) Research carried out by the Institute of Agricultural Economics and its associates in the previous period.

In the realization of the research task, which refers to the assessment of agricultural potentials and defining development priorities to the city of Novi Sad, the analysis of secondary data (primarily the Agricultural Census from 2012) will be used, spatial analysis of relevant variables as well as focus based on stakeholder groups interested in the agriculture and food industry of the city of Novi Sad.

Also, a valuable support for the diagnosis of the condition in this area will be SWOT analysis, based on which the development priorities and strategic directions of action will be formulated. A combination of these methods of research can provide a more reliable answer to the key issues that arise from the framework of the agricultural analysis and development priorities of the city of Novi Sad.

## Results and Discussion

The network of the town of Novi Sad in the scope of the plan includes Novi Sad with Petrovaradin and Sremska Kamenica, then settlements of pronounced urban characteristics of Futog, Veternik and Kać and settlements: Begeč, Budisava, Bukovac, Čenej, Kisač, Kovilj, Rumenka, Ledinci, Stari Ledinci and Stepanovicevo (Official Gazette of the City of Novi Sad, No. 11/2012). According to the Spatial Plan of Novi Sad, Novi Sad, in addition to the Belgrade agglomeration, represents the city center of the highest degree of urbanization in the Republic of Serbia. It is located on the Danube, an important European river, almost in the central

part of Vojvodina, on important road, rail and water corridors (X, VII). Apart from being the administrative center of the City of Novi Sad, the center of the South Bačka District and the capital of the AP Vojvodina, and according to the Spatial plan of the Republic of Serbia and the center of the functional urban area (FUP) of international significance and one of the key factors in the development of a wider gravitational area. Recognition and spatial definition of functional urban areas (FUPs) and its centers in the area of AP Vojvodina is of great importance for the establishment of a more balanced development of the Province, but also for the affirmation of functionally urban areas as a carrier and driver of development in this area (Regional Spatial Plan of the Autonomous Vojvodina by 2020, December, 2011).

Indicators of agricultural development. According to the data onto the Program for support for implementation of agricultural policy and rural development policy in the territory of the City of Novi Sad for 2017, the relevant indicators of agricultural development are as follows:

1. Agricultural production of the area of the City in 2016 took place on the available surface of arable agricultural land of 50,000 ha, on which about 80% of the area are produced cereals, about 6.2% of vegetables, about 3.1% of fruit, while under other crops it is about 10.7% of the area.
2. The structure of total fruit production dominates the cultivation of some important fruit crops with perennial plantations of apples, pears, plums and apricots, which totals an area of 877 ha. Also, very favorable climatic conditions, especially on the slopes of Fruška Gora, exist on growing and cultivating vines.
3. According to the latest data, in 2016 the number of cattle was 5,754; number of pigs 87,753; number of sheep and goats 7,069; number of horses 405; number of poultry 635,938 and number of bee hives 14,052. Livestock breeding is in decline, there are several large livestock farms (Focus Group, City Administration for the Economy of the City of Novi Sad, 2017);
4. Agricultural planting production in the area of the City can be viewed through the achieved average yields in 2016 in the City area. Thus the total realized yield of the most important seed crops in 2016 is: for wheat 48,477 tons; for barley 2,496 tons; for corn 181,324 tons; for soybeans 48,623.2 tons; for sunflower 1,766.4 tons; for sugar beet 82,180. tons and for rapeseed 2,279.2 tons.
5. In vegetable production, the highest yield in tons was achieved in the production of potatoes (total 39,735 tons) and cabbage (total

48,490 tons). Futoški cabbage as a product is branded with a certificate, and 60% of the production is exported to the countries of the region.

6. In fruit growing, plants are especially distinguished: apple, pear, plum, apricot, and in winegrowing vines. The achieved total yield in 2016 is especially significant in the production of apples, 26,120 tons, plum production, 840 tons, and peaches 1,360 tons.
7. With regard to average yields on the territory of the City in 2016, they are among the two most important crop-grown crops: wheat 6.5 ton / ha and corn 11.0 ton / ha. In the two most important vegetable crops in the City area in 2016, the average yields are: for potatoes 45.0 tons / ha and for cabbage 65.0 tons / ha.
8. Based on the above, it can be seen that there are general conditions for agricultural production, as well as organic agricultural production, which is carried out in the area of the City on the surface of 55.88 ha.

*Demographic characteristics and trends in rural settlements*. According to the Census of Population, Households and Flats in 1981, 1991, 2002 and 2011, the number of inhabitants in Novi Sad has a tendency to grow. According to the latest Census of Population, Households and Dwellings from 2011, in Novi Sad there was an increase in the number of inhabitants by 14.1% (or 42,331 persons), compared to 2002 (AP Vojvodina Development Program 2014-2020, p. 33). On the other hand, the number of inhabitants in rural and peri-urban settlements (so-called "other" settlements) recorded a slight decrease (-0.9%) only in the period 2002-2011 (Table 1). If migration movements are observed in the districts of AP Vojvodina, it is noted that the migration balance is negative in all districts, except in South Bačka, where a positive migration balance of 1,407 persons was recorded (Demographic Statistics in the Republic of Serbia, 2011). This result is largely the result of the highly sensitive migration balance of the city of Novi Sad, which amounts to 1,900 persons. At the same time, the characteristic of the Novi Sad and Vojvodina areas area significant change in the demographic structures of rural areas, which as a result has the "relocation of population reproduction" from rural to urban areas (Program for support of agricultural policy and rural development policy in the territory of the city of Novi Sad for 2017 year, p. 2).

**Table 1.** *Number of inhabitants in settlements in the city of Novi Sad in the period 1981-2011.*

| Settlements | Number of inhabitants | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1981** | **1991** | **2002** | **2011** | **1991/ 1981** | **2002/ 1991** | **2011/ 2002** |
| *City Novi Sad* | 250,138 | 265,464 | 299,294 | 341,625 | 6.1 | 12.7 | 14.1 |
| Novi Sad | 227,920 | 241,262 | 268,067 | 307,760 | 5.9 | 11.1 | 14.8 |
| - City | 178,437 | 189,234 | 210,238 | 250,439 | 6.0 | 11.0 | 19.1 |
| -Other settlements | 49,483 | 52,028 | 57,829 | 57,321 | 5.1 | 11.1 | -0.9 |
| Begec | 2,717 | 2,827 | 3,335 | 3,325 | 4.0 | 18.0 | -0.3 |
| Budisava | 3,502 | 3,685 | 3,825 | 3,656 | 5.2 | 3.8 | -4.4 |
| Vetrenik | 15,803 | 16,711 | 18,375 | 17,454 | 5.7 | 10.0 | -5.0 |
| Kac | 8,551 | 9,755 | 11,166 | 11,740 | 14.8 | 14.5 | 5.1 |
| Kisac | 6,220 | 5,850 | 5,471 | 5,091 | -5.9 | -6.5 | -6.9 |
| Kovilj | 5,279 | 5,242 | 5,599 | 5,414 | -0.7 | 6.8 | -3.3 |
| Novi Sad | 163,773 | 173,186 | 191,656 | 231,798 | 5.7 | 10.6 | 20.9 |
| Rumenka | 3,629 | 4,361 | 5,729 | 6,495 | 20.1 | 31.4 | 13.4 |
| Stepanovicevo | 2,096 | 2,020 | 2,214 | 2,021 | -3.6 | 9.6 | -8.7 |
| Futog | 14,664 | 16,048 | 18,582 | 18,641 | 9.4 | 15.8 | 0.3 |
| Cenej | 1,686 | 1,577 | 2,115 | 2,125 | -6.5 | 34.1 | 1.7 |
| Petrovaradin | 22,218 | 24,202 | 31,227 | 33,865 | 8.9 | 29.0 | 8.4 |
| - City | 17,870 | 19,240 | 25,178 | 27,083 | 7.7 | 30.9 | 7.6 |
| -Other settlements | 4,348 | 4,962 | 6,049 | 6,782 | 14.1 | 21.9 | 12.1 |
| Bukovac | 2,641 | 3,040 | 3,585 | 3,936 | 15.1 | 17.9 | 9.8 |
| Ledinci | 1,137 | 1,280 | 1,641 | 1,912 | 12.6 | 28.2 | 16.5 |
| Petrovaradin | 10,338 | 11,285 | 13,973 | 14,810 | 9.2 | 23.8 | 5.9 |
| Sremska Kamenica | 7,532 | 7,955 | 11,205 | 12,273 | 5.6 | 40.9 | 9.5 |
| Stari Ledinci | 570 | 642 | 823 | 934 | 12.6 | 28.2 | 13.5 |

**Source:** *Census of Population, Households and Flats in Serbia for Relevant Years, Serbian Statistical Office.*

The educational structure of the population at the city of Novi Sad is more favorable compared to the level of the Republic of Serbia. Comparison of the urban settlement and other settlements in the city of Novi Sad reveals a more unfavorable educational structure of the population in rural and per urban settlements (Table 2). According to the educational structure of the population of the city older than 15 years, based on the "2011 census",

it can be said that in the city area about 53% of the population with secondary education, about 20% is a part of the population with higher education, about 7% part of the population with higher education, about 14% is a part of the population with elementary education, about 1.5% is a part of the population without school education, and 4.5% is a part of the population with incomplete basic education (Program for support of agricultural policy and rural policy development in the territory city of Novi Sad for 2017, page 2).

**Table 2.** *Educational structure of the population / [1] in R. Serbia and the city of Novi Sad, 2011. (%)*

| | No school and incomplete elementary education | Primary education | High school | Higher and higher education |
|---|---|---|---|---|
| Republic Serbia | 13.7 | 20.8 | 48.9 | 16.2 |
| -City Settlements | 7.0 | 16.8 | 53.4 | 23.2 |
| -Other Settlements | 23.4 | 27.7 | 42.4 | 6.1 |
| *City Novi Sad* | 6.0 | 13.6 | 53.1 | 27.0 |
| - City Settlements | 4.7 | 11.8 | 52.5 | 30.7 |
| - Other Settlements | 11.5 | 21.7 | 55.9 | 10.7 |
| Novi Sad | 5.9 | 13.4 | 52.7 | 27.7 |
| - City Settlements | 4.6 | 11.5 | 52.0 | 31.6 |
| - Other Settlements | 11.6 | 21.8 | 55.8 | 10.6 |
| Petrovaradin | 6.5 | 15.5 | 57.2 | 20.6 |
| - City Settlements | 5.6 | 14.2 | 57.2 | 22.8 |
| - Other Settlements | 10.4 | 20.7 | 57.1 | 11.7 |

**Source:** *Census of Population, Households and Dwellings in Serbia 2011, RZS.*

*/[1]Population aged 15 and over.*

The age structure of the population of Novi Sad (Table 3) is more favorable compared to the level of the Republic of Serbia and at the level of the urban settlement and at the level of other settlements. Only in the urban settlement of Novi Sad the share of the population older than 65 years is slightly higher than the republican average of 15.6%. However, according to the population projections, the old population in the planned area will increase by about 50% in the period from 2010 to 2027 and will constitute about one fifth of the total population, and in the planning period the city of Novi Sad will face increasing problems of care for the elderly (Spatial Plan of the City of Novi Sad, Official Gazette of the City of Novi Sad, No. 11, 2012, p. 203).

**Table 3.** *Structure of the population in the Republic of Serbia and the city of Novi Sad by age.*

| | Population under 15 years old (%) | Population older than 65 years (%) | Aging index /[1] | Average age (year) |
|---|---|---|---|---|
| Republic Serbia | 14.3 | 17.4 | 124.6 | 42.2 |
| - City Settlements | 14.5 | 15.6 | 114.1 | 41.3 |
| -Other Settlements | 13.9 | 20.1 | 140.4 | 43.6 |
| *City Novi Sad* | 15.0 | 14.3 | 102.4 | 40.0 |
| - City Settlements | 14.9 | 15.9 | 104.0 | 40.0 |
| - Other Settlements | 15.9 | 13.4 | 92.5 | 39.9 |
| Novi Sad | 15.1 | 14.0 | 100.5 | 39.8 |
| - City Settlements | 14.9 | 14.2 | 102.8 | 39.8 |
| - Other Settlements | 16.0 | 13.2 | 91.2 | 39.8 |
| Petrovaradin | 14.4 | 15.0 | 113.1 | 41.2 |
| - City Settlements | 14.3 | 15.3 | 115.6 | 41.3 |
| - Other Settlements | 14.9 | 14.0 | 103.7 | 40.7 |

**Source:** *Census of Population, Households and Dwellings in Serbia 2011, RZS.*

*/ [1] The ratio of the number of old (60 and more years) and young (0-19 years) population.*

Although there is a slight increase in the number of inhabitants, it is noticeable that the biological quality in the population will be weaker due to the increased participation of the old population. Consequently, the problems of depopulation and aging of the population will be mitigated by the measures of population policy, which will be determined and implemented by the state, and the city of Novi Sad will, within its competencies and possibilities, take measures that stimulate birth and birth rate in order to alleviate the negative tendencies of the demographic Development (Official Gazette of the City of Novi Sad, No. 11/2012, p. 203).

Agro technical equipment: machinery and equipment. The agriculture of Serbia in recent decades portrays the differentiation and stratification of the rural population, which is the main bearer of agricultural production. There are producers that have greater economic power, which enables them to follow modern technological achievements, both in terms of using new equipment and implementing new technologies. In the second group, they are poorer, without sufficient resources for a serious change, and such a large majority of Serbia (Radivojević, 2014). Problems that farmers in Novi Sad have in the field of agricultural mechanization are similar to those problems that farmers have in the whole territory of

Serbia, and the most important are the following: 1) the structure and exploitation life of existing mechanization in some sectors of agricultural production is unfavorable; 2) unfavorable bank loans for the purchase of new machinery; 3) undeveloped so-called machine rings. According to the 2012 Agricultural Census data (Book 1) in Novi Sad, 532 one-axle tractors were recorded; 3,781 two-axle tractors and 348 combine (Table 4).

**Table 4.** *Spatial Distribution of Agricultural Machinery in Novi Sad, 2012*

| | **One-axle tractors** | **Two axle tractors** | **Universal combine harvesters** | **Forage harvesters** | **Other combines** |
|---|---|---|---|---|---|
| City Novi Sad | 532 | 3,781 | 300 | 29 | 19 |
| Novi Sad | 358 | 3,536 | 289 | 28 | 19 |
| Begec | 13 | 221 | P | P | P |
| Budisava | 18 | 161 | 21 | P | P |
| Veternik | 26 | 97 | 7 | P | P |
| Kac | 25 | 421 | 33 | 7 | P |
| Kisac | 37 | 719 | 72 | P | 11 |
| Kovilj | 36 | 556 | 45 | 4 | P |
| Novi Sad | 61 | 172 | 13 | P | P |
| Rumenka | 32 | 214 | 18 | P | P |
| Stepanovicevo | 6 | 205 | 14 | P | P |
| Futog | 42 | 438 | 8 | 5 | P |
| Cenej | 62 | 332 | 56 | P | P |
| Petrovaradin | 174 | 245 | 11 | P | P |
| Bukovac | 36 | 127 | 7 | P | P |
| Ledinci | 30 | 33 | P | P | P |
| Petrovaradin | 55 | 41 | P | P | P |
| Sr. Kamenica | 42 | 31 | P | P | P |
| Stari Ledinci | 11 | 13 | P | P | P |

**Source:** *Agricultural Census 2012, Agricultural machinery, level of settlement;*
*Note: According to the Law on Official Statistics and Protection of Individual Data, some data in tables for settlements with three or less of the three farms are hidden (shown with the letter "P")*

The following condition was registered for the following machines: 547 maize harvesters, 3,094 plows, 1,115 plates, 1,607 harrows, 1,700 seeders, 201 rotating harrow, 1,532 minerals fertilizer spreaders, 108 manure spreaders, 1,216 seeders, 1,800 sprayers, 3,803 trailers and 485 lawnmowers. On average, every agricultural holding in Novi Sad has 4.2 units of connecting machines and equipment (3.9 average for the Republic of Serbia), which is somewhat more favorable than the average of Serbia. On the other hand, spatial distribution of agricultural machinery (Agricultural List 2012, Agricultural Machinery, level of settlements) showed that the settlements of the largest agro-technical equipment are as follows: Kisač, Kovilj, Futog, Kać and Bukovac.

At the same time, the least agro-technical equipment has Veternik, Ledinci and Stari Ledinci (Agricultural List 2012, Agricultural machinery, level of settlement). For other settlements it can be said that they have average agro-technical equipment with a certain oscillation of the number of agricultural mechanization in settlements. Agricultural producers need to strengthen cooperation through the formation of machine rings. Machine rings to provide many benefits of their members and allow farmers to split into two basic categories: (1) those who receive the service and (2) those that provide them.

This differentiation resulted in a provider of services that are narrowly specialized only for individual operations, so that the quality of services provided is at the highest level. Consequently, by maximizing the use of machinery, the price of such services is lower, and recipients of services can address other problems in their agricultural production (inputs, placement of products).

Creating machine rings would result in more efficient production due to more rational use of existing resources, creating conditions for farmers that specialize in the provision of services to grow into private entrepreneurs, which is the dominant source of income, which in particular relates to expensive agricultural machinery.

Storage and finishing facilities and facilities. The storage and finishing capacities for the area of the city of Novi Sad were analyzed based on the data onto the Census of Agriculture 2012, the level of the settlement (Table 5).

**Table 5.** *Storage and finishing capacities in agriculture in Novi Sad, 2012*

| Storage and finishing capacities | Total Number | Own capacity | Used capacity |
|---|---|---|---|
| Corn bins | 3,380 | 148,143 $m^3$ | 66,833 $m^3$ |
| Ambari | 206 | 23,006 $m^3$ | 8,948 $m^3$ |
| Silos | 60 | 147,341 t | 130,720 t |
| Dryers | 18 | 8,378 $m^3$ | 361 $m^3$ |
| Facilities for silage | 29 | 15,022 $m^3$ | 13,110 $m^3$ |
| Facilities for storing agricultural machinery and equipment | 2,451 | 184,293 $m^2$ | 175,728 $m^2$ |
| refrigerators | 29 | 22,905 $m^3$ | 22,590 $m^3$ |
| Facilities for the accommodation of cattle | 893 | 10,212 number of places | 3,883 number of places |
| Facilities for housing pigs | 5,362 | 77,743 number of places | 46,826 number of places |
| Facilities for hen laying | 2,140 | 553,522 number of places | 379,103 number of places |
| Facilities for accommodation of other livestock | 746 | 103,488 number of places | 100,101 number of places |
| Machines for calibration, vacuuming and packaging | 20 | 18 | 0 |

**Source:** *Agricultural Census 2012 (Book 2);*

*Silos, barns, corn*. There are 28 agricultural farms with silos, as well as 60 facilities with a total capacity of 147,341 t. The largest capacities of the silo have the following settlements: Čenej (106,225 t), Novi Sad (18,091 t) and Kovilj (19,890 t). As far as barns, 183 agricultural holdings own ammunition (total number of barns 206). The largest total capacities are located in Ledinci (11,219 m³), followed by the settlements Kać (2,930 m³), Sremska Kamenica (2,055 m3) and Kovilj (1,821 m³). Kosher for corn has 3,380, and most of them are in the settlements Kisač, Kovilj, Kać, Stepanovićevo. *Objects in animal husbandry.* Cattle accommodation - 893; capacity: 10,212, number of seats; Objects for pig accommodation - 5,362; capacity: 77,743, number of seats; Objects for henhouse accommodation - 2,140; capacity: 553,522, number of seats; Silage facilities are listed in 23 agricultural holdings, total capacity 15,022 m³ (total number of these facilities is 29). The largest total capacity of facilities is located in Kovilj (9,581 m³), followed by Kisač (3,307 m³), Rumenka (1,050 m³), Futog (796 m³).

*Refrigerators*. According to the 2012 Agricultural Census (Keserović and associates, 2015), of the total number of refrigerators in Serbia, most of them are in Smederevo, Topola, Subotica, Grocka and Čačak, typical "fruit trees". The capacities are dominated by Subotica (63,441 m³), Arilje municipality (58,335 m³) and the city of Smederevo (58,306 m³). While the capacities in Arilje are intended for the storage of frozen raspberries, in other mentioned cities / municipalities it is mainly about keeping fresh fruit (apples, pears, peaches, etc.).

The number of refrigerators in the city of Novi Sad is 29, and around 73% of the total refrigerator capacity of agricultural holdings is registered in the settlement Begeč (16,690 m³). Next are the Rumenka settlements (2,788 m³), Kać (1,593 m³), Futog (1,102 m³), Čenej (640 m³), Novi Sad (74 m³) and others.

*Dryers* are recorded in 18 agricultural holdings, with a total capacity of 8,378 m3. Analysis of the spatial distribution of drying capacity indicates that as much as 96% of the total capacity is located in Kovilj (8,023 m³). The remaining drying capacities are located in settlements: Čenej (114 m³), Veternik (100 m³), Futog (75 m³), Kisač (33 m³) and Begač (15 m³).

*The machine for calibration, vacuuming and packaging* has a total of 20, with 8 of them older than 10 years. The capacities are located in the following settlements: Begeč (3), Kać (1), Kisač (2), Novi Sad (2), Rumenka (1), Stepanićevo (3), Futog (5) and Čenej (3).

Most of the area of the city of Novi Sad is arable agricultural land, where the most important is cultivation of crops, with conditions for the development of organic agriculture, production of vegetables and fruits, and due to the significant raw material base and the development of the food industry (Official Gazette of Novi Sad, number 64/2015). In accordance with such potentials, although the storage and finishing capacities of Novi Sad exist, it must be in the field of further construction, purchase and expansion of these capacities, as this increases the quality of products and facilitates placement.

*Formulation of strategic goals and main activities*. Dynamic conditions of life and business strategic planning make it necessary to manage local development (Official Gazette of the City of Novi Sad, No. 64/2015). The overall objective of local agricultural development should be directed towards improving the material and social status of the local population,

promoting an integral rural development model based on linking rural with the city economy and diversifying economic activities in the countryside.

Accordingly, the following results should be expected: increased competitiveness, more complete use of all resources, harmonization of agricultural production, increase to employment and income of the population, while respecting the principles of sustainability. Namely, a sustainable society is a society that has the ability to maintain balance between economic, social and ecological processes (Saric et al., 2013, pp. 77-90). Achieving these results requires the real creation of a "SWOT" matrix (Table 6).

The optimal strategy for the development of the agriculture and food industry of the city of Novi Sad in the "SWOT" environment is a mini - maxi strategy that implies minimizing weaknesses and threats while at the same time maximizing power and opportunities in the environment such as regional integration, education and advising in agribusiness and etc.

**Table 6.** *SWOT matrix of the agriculture sector in Novi Sad*

| STRENGHT | WEAKNESSES |
|---|---|
| • Novi Sad, in addition to the Belgrade agglomeration, represents the city center of the highest degree of urbanization in the Republic of Serbia;<br>• It is located on the Danube, an important European river, almost in the central part of Vojvodina, on important road, rail and water corridors (X, VII);<br>• High-income migration balance of the city of Novi Sad;<br>• The educational structure of the population in Novi Sad is more favorable compared to the level of the Republic of Serbia;<br>• On average, every agricultural holding in Novi Sad has 4.2 units of connecting machines and equipment (3.9 average for the Republic of Serbia), which is somewhat more favorable than the average of Serbia;<br>• The largest part of the city of Novi Sad makes for arable agricultural land, where the most important is cultivation of crops; | • One of the conflicts in the area is the devastation of high quality agricultural land and its conversion;<br>• The cities of AP Vojvodina, primarily Novi Sad, are facing constant traffic overabundance,<br>• "Moving the reproduction of the population" from village to urban environments;<br>• Poor educational structure of the population in rural and periurban settlements;<br>• The least agro-technical equipment has Veternik, Ledinci and Stari Ledinci;<br>• Insufficient cooperation between farmers on the use of joint machinery;<br>• Although the storage and finishing capacities in Novi Sad exist, it must be done in the field of further construction, purchase and expansion of these capacities, as this increases the quality of products and facilitates placement; |

| CHANCES | THRUST |
|---|---|
| • The main advantage of urbanization in Vojvodina is the optimal hierarchy of urban settlements;<br>• Vojvodina has physically arranged urban settlements and cities, developed identity, based on the affirmation of natural and cultural values;<br>• Regional integration;<br>• Institutional approximation of Serbia to the European Union;<br>• Creating a stimulating population policy;<br>• Accelerated replacement of existing mechanization is the only way to stabilize it and increase yields per unit area;<br>• Implementation of the production program based on the application of modern technology;<br>• Free Trade Agreement with the Russian Federation;<br>• Favorable conditions for external trade in goods from the field of agricultural food sector;<br>• Support the development of new storage and finishing capacities according to the available strategic raw materials and market requirements; | • Urban transition marked by polarization, the development of urban hotspots with a pronounced displacement of the population into cities;<br>• The problems of the settlement in Vojvodina are floods and landslides;<br>• Demographic emptying of rural settlements;<br>• Aging population;<br>• Depopulation trend;<br>• Inadequate internal and external migration;<br>• Differentiation and stratification of the rural population;<br>• There is a significant number of poor producers, without sufficient resources to monitor modern technological achievements;<br>• Structure and exploitation life of existing mechanization is unfavorable;<br>• Globalization of trade in food products and increasing competition in international markets; |

**Source:** *Research by author, 2017.*

The following *strategic goal* can be formulated in agricultural enterprises and large agricultural systems in the City of Novi Sad: *"Improving competitiveness and market operations in the agricultural sector, contributing to the sustainable development of rural areas, protecting the environment and rare natural resources"*.

In accordance with the strategic objective, specific specific objectives and measures for their implementation can be formulated.

*"Specific Objective 1. Improving Human Potential"*. In order to improve the competitiveness of the agricultural sector in the city of Novi Sad, it is necessary to implement adequate measures and projects in the field of human resources development. This specific objective would be realized through the following measures: 1) creating a program for the development of local advisory services and the employment of local advisers; 2) efficient organization of professional agricultural service; 3) institutionalization of advisory policy; formation of a national association

of consultants; 4) planned and systematic education of advisers; 5) transfer of contemporary scientific and professional achievements; 6) education, training and seminars for the manufacturer; 7) greater incentives from the agrarian budget for young farmers; 8) development of manifestations in the field of agriculture.

*"Specific objective 2. Institutional and legal support for the development of peri-urban agriculture, harmonized with EU practice"*. The main directions of the activities are: 1) Developing a system of budgetary and credit support for the development of agriculture; 2) Developing mechanisms for monitoring implementation of incentives and control of results; 3) Improve coordination and synchronization in the implementation of support measures between different levels of state administration (republic, city, municipality); 4) Strengthening the capacities of the local community in the field of development of peri-urban agriculture; 5) Improvement of legal regulations in agriculture; 6) Reorganization and improvement of existing institutions in agriculture.

*"Specific objective 3. Support the development of new processing capacities according to the available strategic raw materials and market requirements."* Productivity improvements can be achieved through investments in production (adoption of new knowledge and technologies, capacity building and modernization of machines and equipment, introduction of irrigation and drainage systems), marketing and introduction of a quality system in line with EU standards. This specific objective would be realized through the following measures: 1) tax support for investments in small plants for the processing of high quality products for export; 2) improvement of the production agricultural structure; 3) creating machine rings in order to achieve more efficient production due to more rational use of existing resources; 4) construction, purchase and expansion of warehouse and dredging capacities, as this increases the quality of products and facilitates placement; 5) encouraging association and integration).

## Conclusion

The vision of the agriculture of the city of Novi Sad involves the development of more propitious and more competitive agriculture composed of commercial and family farms dealing exclusively with agriculture and / or dealing with agriculture in terms of an additional source of income. Realizing agrarian competitiveness requires

macroeconomic management to change the basic elements of agricultural development strategies, first of all, towards the creation of sustainable agricultural systems, whose growth is driven by knowledge and innovation, as well as in the direction of market development and agricultural product chains.

Competitive and market-oriented agricultural sector of the city of Novi Sad must base its development on the entrepreneurial approach to employment and education in intensive agricultural production. Such development is based on the natural resources of the area and is in line with new technologies and market trends, closely linked to standardized production capacities, with the extension of environmental standards and the affirmation of rural areas. All this is supported by adequate agricultural policy and financial resources and harmonized institutional and legal frameworks towards good business practice in the European Union.

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# THE IMPACT OF SUBSIDIES ON LIVESTOCK SECTOR IN ROMANIA

*Chetroiu Rodica*[1], *Iurchevici Lidia*[2]

## Abstract

*The goals of present paper are to carry out an analysis of the impact of subsidies during the years 2007-2017, with the two categories of financial support (National Transitional Aid and Coupled Support in Animal Husbandry), for cow's milk, bovine and sheep meat. The methods used are comparative analysis of the trends of different economic indicators, graphically expressed, along with the evolution of subsidies. The study show that granting of subsidies saved the continuing downward trend in the number of dairy cows; also, the subsidies have not attracted production increases, but have been a barrier to fluctuations in the dairy milk market after elimination of milk quotas. In the period under review, prices of beef at farmgate were doubled, and the cost of production has increased considerably, so that after the crisis of 2014-2015, if subsidies would not be granted, producers would be registered financial losses. The prices for sheep meat doubled over 2007-2017, while production costs tripled, leading to losses in recent years where subsidies were not accessed.*

**Keywords:** *subsidies, cattle, milk, meat, sheep*

## Introduction

The implementation of agricultural quality policies should be based on a large amount of information on the evolution of agricultural market for all main product types, data on agricultural holdings, their productivity and competitiveness, structure of agricultural land, production methods, quality standards and environmental protection in realization of agricultural production. It is also necessary to develop studies on the impact of financial support policies for agricultural producers.

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The financial support to the zootechnical sector aims both at covering expenditures for production, as well as increasing the efficiency of agricultural production, increasing the quality of production etc. and ensuring a competitive level facing European producers, that benefit from significantly higher subsidies.

The impact of granting subsidies depends on the type and purpose of the financial support, so that for some categories of subsidies, immediate utility can not be discussed, because the effects are seen after 2-3 years, as is the case with the improvement of genetic material quality from farms.

This study intends to find out if accessing subsidies has had influence on stopping the decline of cattle herds, farm exits from crisis situations on the product market, obtaining increased incomes of livestock farmers, eliminating farmers' financial losses, covering of a part of production costs in the livestock sector.

## Material and methods

National Transitional Aid in Animal Husbandry is granted from the state budget to livestock farmers for bovine, sheep / goats, that are registered in Agency for Payments and Intervention for Agriculture (APIA) with unique identification code, according to the eligibility criteria, for the following schemes:
a) decoupled production scheme, for bovine species, in the milk sector;
b) decoupled production scheme, for bovine species, in the meat sector;
c) coupled production scheme, for sheep / goats species.

Coupled Support in Animal Husbandry is granted to active farmers, cattle, sheep / goats breeders and silkworm breeders, who meet cumulatively certain conditions specified in current legislation.

For the period 2007-2017, an analysis of the impact of subsidies from the two categories of financial support (National Transitional Aid NTA and Coupled Support in Animal Husbandry CSAH) was performed for the above-mentioned species / production categories.

Due to the fact that the milk quota system no longer applies from April 2015, this policy change is a major challenge for the milk sector. Compared to farmers in other sectors, those from dairy sector have less flexibility in adjusting production to market changes: production remains

constant, can not be reduced or reoriented in a short term, while high costs of investments in equipments and productive animals make difficult to change the nature of production.

## Results and discussions

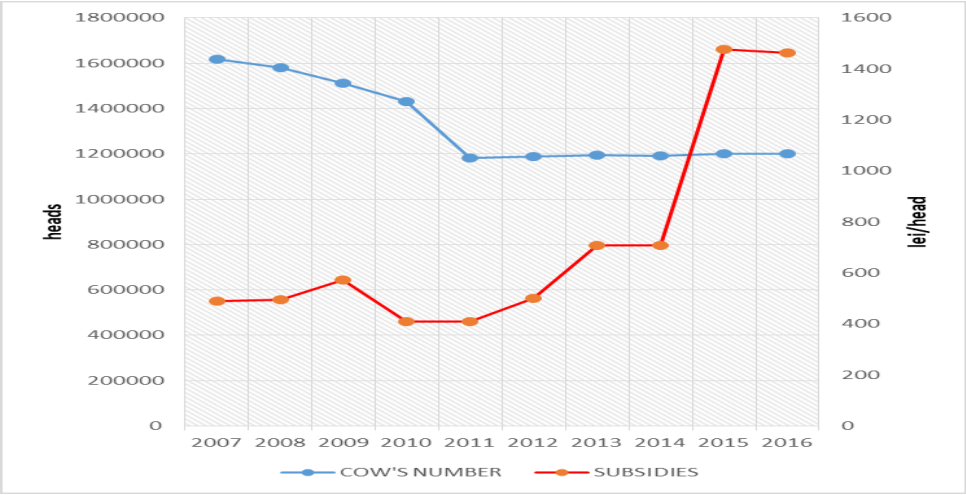
### *Cow's milk*

**Table 1**. *Evolution of cow's number and subsidies*

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| Evolution of cow's number (thousand heads) | 1619 | 1579 | 1512 | 1431 | 1181 | 1188 | 1194 | 1192 | 1201 | 1201 |
| Subsidies (lei/head) | 490 | 495 | 571.1 | 410 | 409.8 | 499.9 | 708.2 | 708.2 | 1476 | 1462 |

**Source:** *National Institute of Statistics, Ministry of Agriculture and Rural Development*

**Chart 1**.*Number of cows and subsidies granted*




**Source:** *National Institute of Statistics, Ministry of Agriculture and Rural Development*

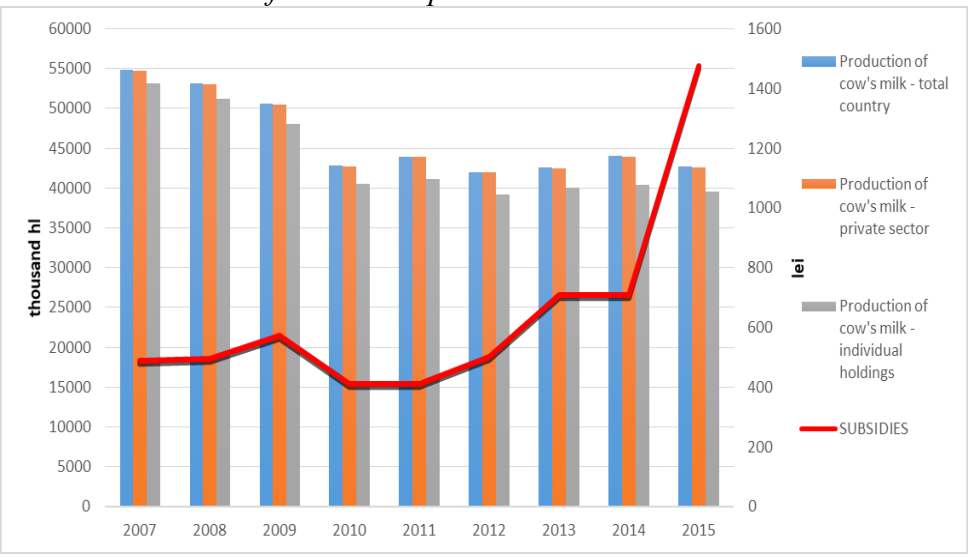
The data in Table 1 and Chart 1 indicates that subsidies saved continuous downward trend in the number of dairy cows in 2007-2010. In 2012, subsidies started to increase, maintaining flocks at this year's level, but even after 2014 the level of subsidies increased significantly, this has influenced to a small extent (0.7%) the increase in the number of cows.

**Table 2**. *Evolution of cow's milk production*

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Production of cow's milk - total country (thousand hectolitres) | 54875 | 53090 | 50570 | 42824 | 43947 | 42036 | 42593 | 44015 | 42663 |
| Production of cow's milk - private sector (thousand hectolitres) | 54740 | 52968 | 50458 | 42720 | 43876 | 41948 | 42486 | 43902 | 42536 |
| Production of cow's milk – individual holdings (thousand hectolitres) | 53187 | 51231 | 48056 | 40573 | 41182 | 39212 | 40096 | 40454 | 39530 |
| Subsidies (lei/heads) | 490 | 495 | 571.1 | 410 | 409.8 | 499.9 | 708.2 | 708.2 | 1476 |

**Source:** *National Institute of Statistics, Ministry of Agriculture and Rural Development*

**Chart 2.** *Evolution of cow's milk production and subsidies*




**Source:** *National Institute of Statistics, Ministry of Agriculture and Rural Development*

The evolution of milk production shown in Table 2 and illustrative in the previous chart shows a decline both at country level, in the private sector and in individual holdings. It can be argued that the increase in the level of subsidies since 2013 did not attract increase in production, but this financial support was a barrier to the fluctuations on the dairy milk market after elimination of milk quota, when crisis situations took place, independent of technological aspect of production, but due to difficulty of covering costs with revenues at the level of the profitability threshold.

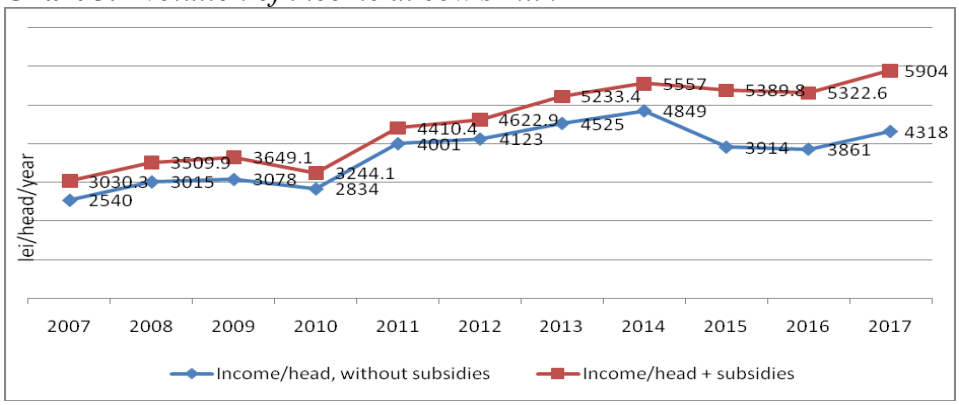
**Table 3.** *Economic indicators – milk sector, 2007-2017*

| Specification | MU | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average production | Kg / head | 3387 | 3426 | 3459 | 3060 | 3776 | 3701 | 3771 | 3879 | 3374 | 3357 | 3400 |
| Price | Lei / kg | 0.75 | 0.88 | 0.89 | 0.93 | 1.06 | 1.11 | 1.20 | 1.25 | 1.16 | 1.15 | 1.27 |
| Income/head without subsidies | Lei / head | 2540 | 3015 | 3078 | 2834 | 4001 | 4123 | 4525 | 4849 | 3914 | 3861 | 4318 |
| Income/head + subsidies | Lei / head | 3030 | 3510 | 3649.1 | 3244.1 | 4410.4 | 4622.9 | 5233.4 | 5557.0 | 5389.8 | 5322.6 | 5904.0 |
| Cost of production/head | Lei / head | 2460 | 2800 | 2840 | 2860 | 3600 | 3720 | 4010 | 4280 | 3900 | 3950 | 4350 |
| Profit without subsidies | Lei / head | 80 | 215 | 237.9 | -25.9 | 400.6 | 402.9 | 515.2 | 568.8 | 13.8 | -89.5 | -32.0 |
| Profit with subsidies | Lei / head | 570 | 710 | 809.1 | 384.1 | 810.4 | 902.9 | 1223.4 | 1277.0 | 1489.8 | 1372.6 | 1554.0 |
| Profit rate without subsidies | % | 3.3 | 7.7 | 8.4 | -0.9 | 11.1 | 10.8 | 12.8 | 13.3 | 0.4 | -2.3 | -0.7 |
| Profit rate + subsidies | % | 23.2 | 25.4 | 28.5 | 13.4 | 22.5 | 24.3 | 30.5 | 29.8 | 38.2 | 34.7 | 35.7 |
| Subsidies (NTA + CSAH) | Lei / head | 490 | 495 | 571.2 | 410.0 | 409.8 | 500.0 | 708.2 | 708.2 | 1476.0 | 1462.0 | 1586.0 |

**Source:** *Own calculations based on NIS, FAO, MARD data*

Between 2007 and 2017, cow's milk production fluctuated, reaching a minimum of 3060 kg / head in 2010 and a peak of 3879 kg / head in 2014. The price of milk at farm's gate was continuously increased until 2014 (1.25 lei / kg), followed by a slight decrease until the first semester of this year, when it reached 1.27 lei / kg. At the same time, the milk cost of production has generally had an upward trend, which has led to variable results for milk producers, who had losses in some years. In the following charts these developments are suggestively presented.

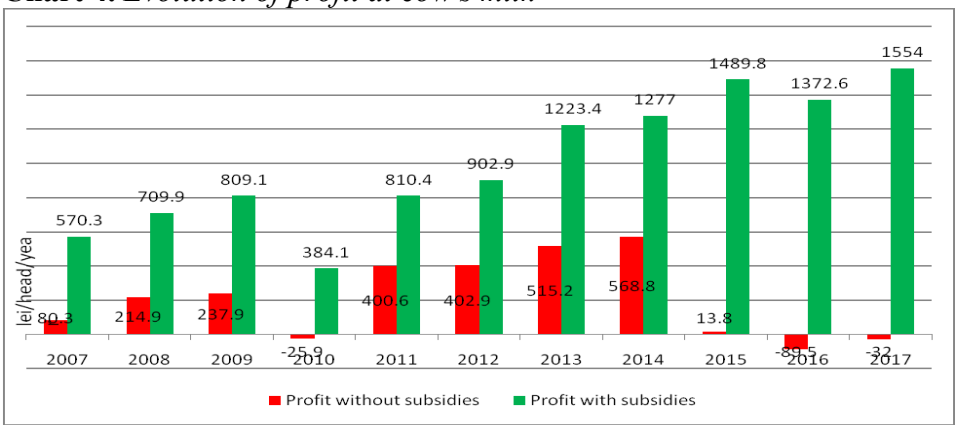
**Chart 3.** *Evolution of income at cow's milk*




**Source:** *Own calculations*

Chart 3 shows that the income of cow milk producers increased during the study period until 2014, after which the intervention of subsidies is evident, since after this period there are the largest differences between subsidized and non-subsidized incomes, due to elimination of milk quotas and falling of production prices.

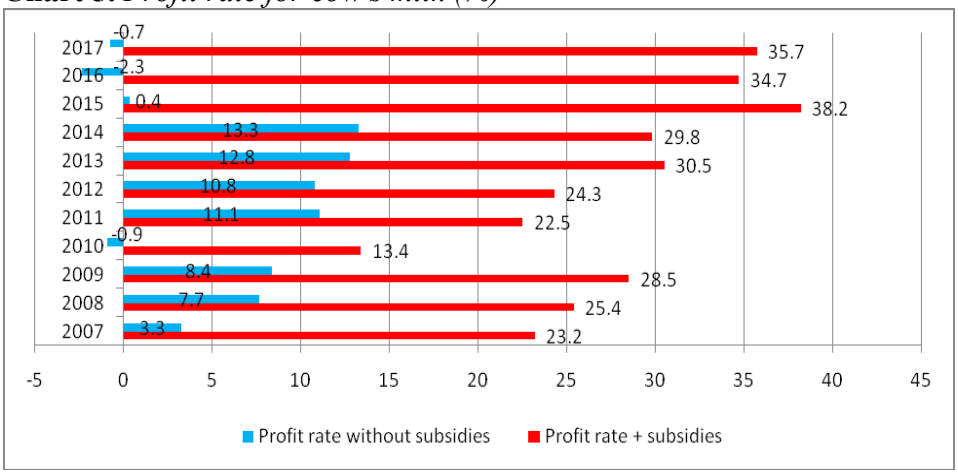
**Chart 4.** *Evolution of profit at cow's milk*




**Source:** *Own calculations*

Regarding the evolution of profit, there is a constant increase until 2014 (except for 2010) between 80.3 - 568.8 lei / head without subsidies and between 570.3 - 1554 (estimated) lei / head with subsidies, after which, in the case of non-granting subsidies, producers recorded losses (Chart 4).

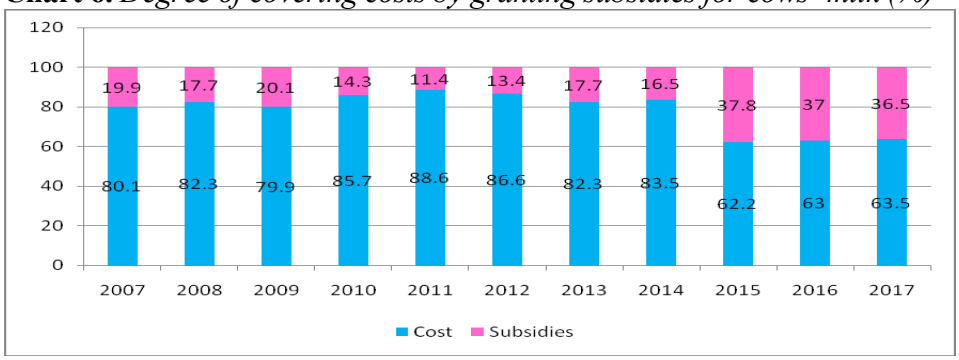
**Chart 5.** *Profit rate for cow's milk (%)*




**Source:** *Own calculations*

The profit rate for cow's milk varied, with very significant differences in profitability between those who received subsidies and those who did not receive this type of financial support, between minus 2.3-13.3% (without subsidies) and 13.4 - 38.2% (with subsidies).

**Chart 6.** *Degree of covering costs by granting subsidies for cows' milk (%)*




**Source:** *Own calculations*

Considering covering some production costs with subsidies, it reveals varying degrees of coverage, from 11.4% in 2011 and 37.8% in 2015, indicating a high dependence of profitability of production activities of the subsidies granted.

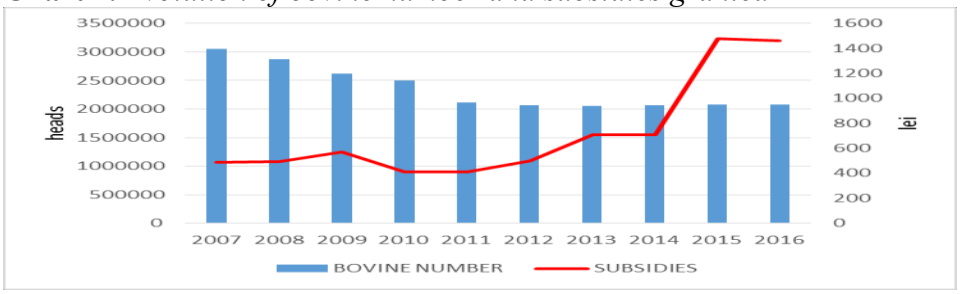
***Beef***

**Table 4.** *Evolution of bovine number*

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of bovine (thousand heads) | 3052 | 2869 | 2617 | 2501 | 2113 | 2063 | 2054 | 2069 | 2078 | 2081 |
| Subsidies lei/head | 490 | 495 | 571.1 | 410 | 409.8 | 499.9 | 708.2 | 708.2 | 1476 | 1462 |

**Source:** *NIS, MARD*

**Chart 7.** *Evolution of bovine number and subsidies granted*




**Source:** *NIS, MARD*

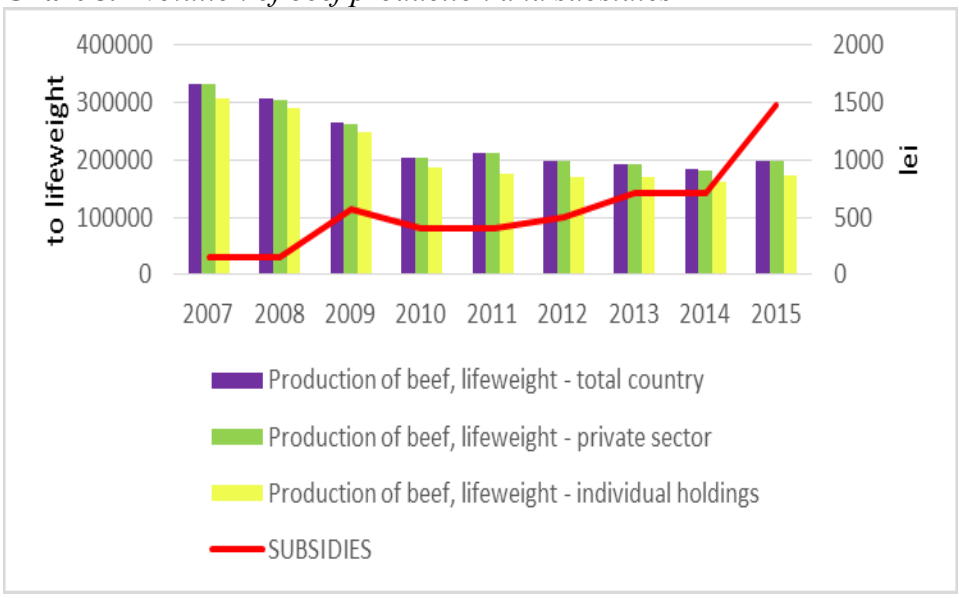
Evolution of cattle number followed a steady downward curve, indicating that the increasing intervention of subsidies did not encouraged the increase in herds.

**Table 5.** *Evolution of beef production*

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Production of beef, lifeweight - total country (to) | 333282 | 306373 | 264155 | 205347 | 211971 | 198510 | 192206 | 183562 | 199712 |
| Production of beef, lifeweight – private sector (to) | 331840 | 304427 | 263346 | 204783 | 211561 | 198118 | 191663 | 182999 | 199225 |
| Production of beef, lifeweight - individual holdings (to) | 306098 | 291307 | 249334 | 187270 | 177292 | 169223 | 169255 | 161566 | 172693 |
| Subsidies (lei/head) | 150 | 150 | 571.1 | 410 | 409.8 | 499.9 | 708.2 | 708.2 | 1476 |

**Source:** *NIS, MARD*

**Chart 8.** *Evolution of beef production and subsidies*




The data in Table 5, illustrated in Chart 8 shows a decrease in beef production, by almost 45% between 2007 and 2014, followed by a slight increase.

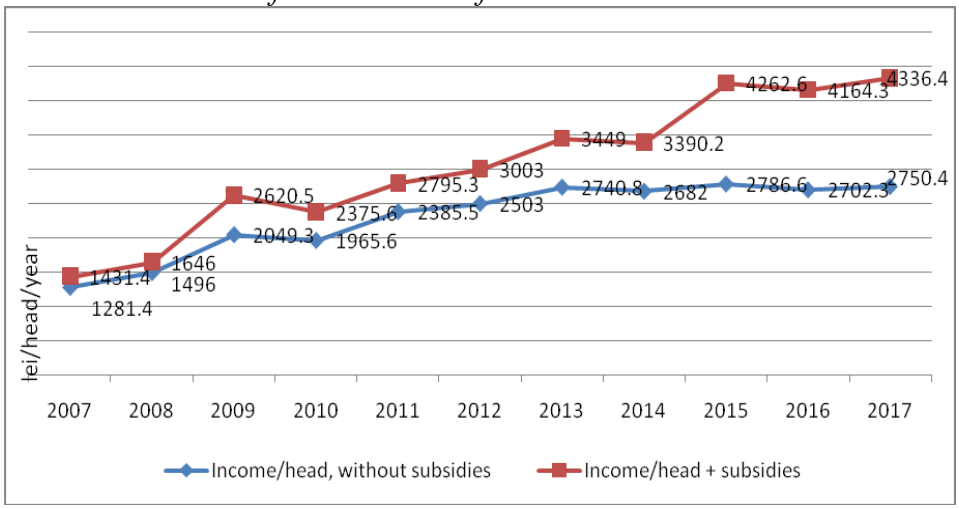
**Table 6.** *Economic indicators – beef sector, 2007 – 2017*

| Specification | MU | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average production | kg/ head | 430 | 425 | 428 | 406 | 433 | 453 | 456.8 | 450 | 460.6 | 455.7 | 458.4 |
| Price | lei/ kg | 2.98 | 3.52 | 4.8 | 4.8 | 5.5 | 5.5 | 6.0 | 6.0 | 6.1 | 5.9 | 6.0 |
| Income /head without subsidies | lei/ head | 1281.4 | 1496 | 2049.3 | 1965.6 | 2385.5 | 2503.0 | 2740.8 | 2682.0 | 2786.6 | 2702.3 | 2750.4 |
| Income/ head + subsidies | lei /head | 1431.4 | 1646 | 2620.5 | 2375.6 | 2795.3 | 3003.0 | 3449.0 | 3390.2 | 4262.6 | 4164.3 | 4336.4 |
| Cost of production/ head | lei/ head | 1200 | 1350 | 1850.0 | 1850.0 | 2200.0 | 2320.0 | 2500.0 | 2530.0 | 2900.0 | 2900.0 | 2900.0 |
| Profit without subsidies | lei/ head | 81.4 | 146 | 199.3 | 115.6 | 185.5 | 183.0 | 240.8 | 152.0 | -113.4 | -197.7 | -149.6 |
| Profit with subsidies | lei/ head | 231.4 | 296 | 770.5 | 525.6 | 595.3 | 683.0 | 949.0 | 860.2 | 1362.6 | 1264.3 | 1436.4 |
| Profit rate without subsidies | % | 6.8 | 10.8 | 10.8 | 6.2 | 8.4 | 7.9 | 9.6 | 6.0 | -3.9 | -6.8 | -5.2 |
| Profit rate + subsidies | % | 19.3 | 21.9 | 41.6 | 28.4 | 27.1 | 29.4 | 38.0 | 34.0 | 47.0 | 43.6 | 49.5 |
| Subsidies (NTA + CSAH) | lei/ head | 150 | 150 | 571.2 | 410.0 | 409.8 | 500.0 | 708.2 | 708.2 | 1476.0 | 1462.0 | 1586.0 |

**Source:** *Own calculations based on NIS, MARD data*

In the period analized, beef prices at farmgate were doubled, and the cost of production has increased considerably, so that after the crisis of 2014-2015, when no subsidy, producers should be registered financial losses.

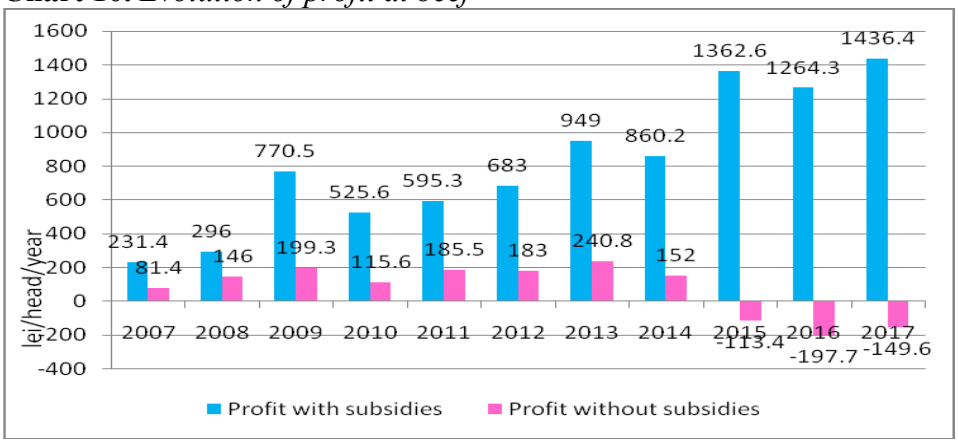
**Chart 9.** *Evolution of incomes at beef*




**Source:** *Own calculations*

According to data presented in Chart 9, the subsidies granted brought income 11.7% (2007) - 57.6% (estimated 2017) higher those who received financial support. Regarding the evolution of profits at beef, the lack of subsidies during the crisis period would have attracted farmers' losses, up to 197.7 lei / cap / year (see Chart 10).

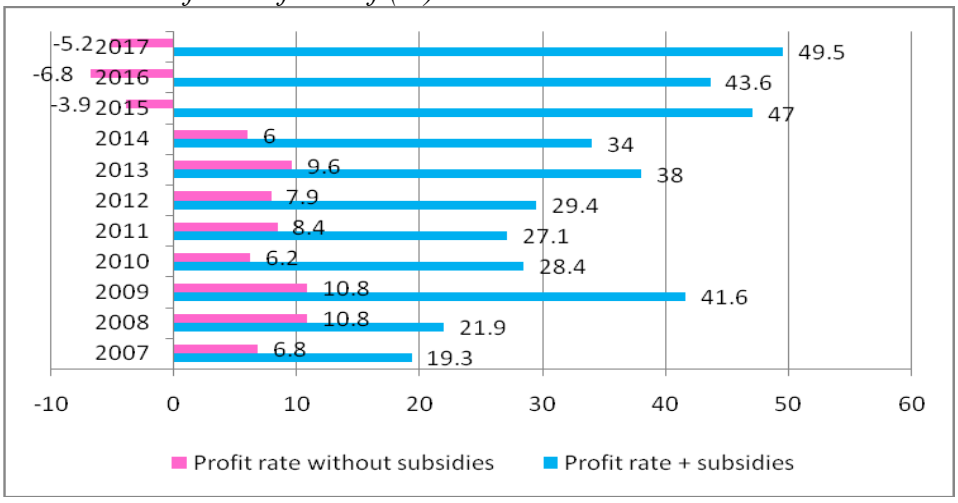
**Chart 10.** *Evolution of profit at beef*




**Source:** *Own calculations*

As a consequence, the profit rate for beef was between minus 6.8% and 10.8% in the case of non - subsidization and 19.3% to 49.5% with subsidies (see Chart 11).

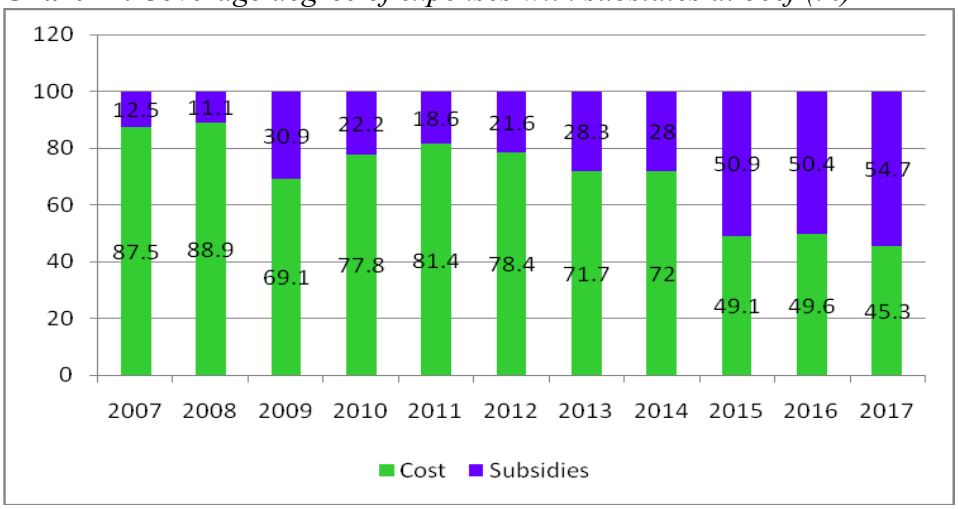
**Chart 11.** *Profit rate for beef (%)*




**Source:** *Own calculations*

Coverage degree of expenses with financial support ranged between 11,1 - 54,7% in the period under review (see Chart 12).

**Chart 12.** *Coverage degree of expenses with subsidies at beef (%)*




**Source:** *Own calculations*

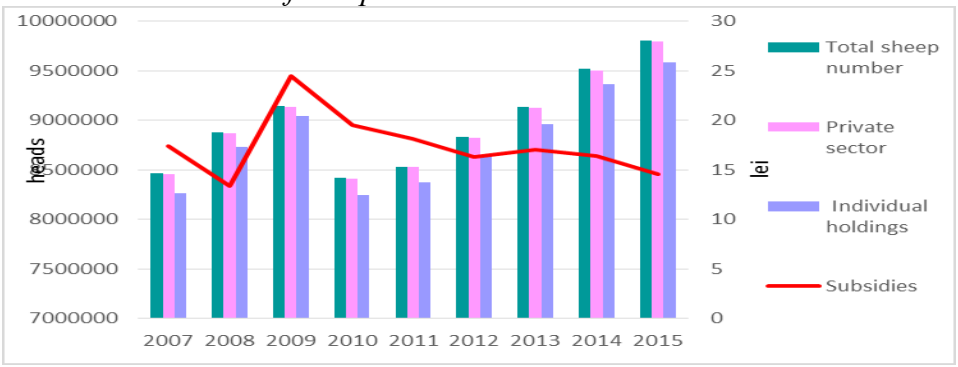
***Sheep meat***

**Table 7.** *Evolution of sheep number*

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Total sheep (thousand heads) | 8469 | 8882 | 9141 | 8417 | 8533 | 8834 | 9136 | 9518 | 9810 |
| Private sector (thousand heads) | 8460 | 8871 | 9132 | 8408 | 8526 | 8822 | 9123 | 9507 | 9798 |
| Individual holdings (thousand heads) | 8263 | 8732 | 9043 | 8246 | 8371 | 8649 | 8965 | 9369 | 9583 |
| Subsidies (lei/head) | 17.4 | 13.3 | 24.5 | 19.5 | 18.1 | 16.3 | 17.1 | 16.3 | 14.6 |

**Source:** *NIS, MARD*

**Chart 13.** *Evolution of sheep number and subsidies*




**Source:** *NIS, MARD*

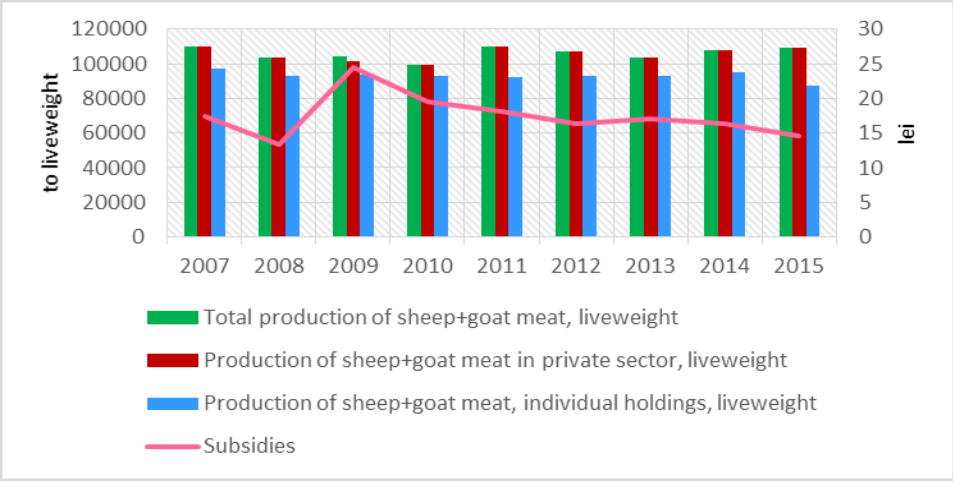
Evolution of sheep flocks has been very favorable since 2010, both in total and in the private sector, which has been steadily rising from one year to another, compared to evolution of subsidies, which felled on a downward trend after 2013, indicating that there was no correlation between financial support and increase of numbers (Table 7 and Chart 13).

**Table 8.** *Evolution of sheep and goats meat production, tons*

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Total production of sheep+goat meat, liveweight | 110188 | 103802 | 104244 | 99524 | 110034 | 107335 | 103619 | 107781 | 109607 |
| Production of sheep+goat meat in private sector, liveweight | 110069 | 103730 | 101707 | 99440 | 109977 | 107248 | 103530 | 107679 | 109511 |
| Production of sheep+goat meat, individual holdings, liveweight | 97069 | 92966 | 93508 | 93203 | 92654 | 93105 | 92869 | 94893 | 87632 |
| Subsidies | 17.4 | 13.3 | 24.5 | 19.5 | 18.1 | 16.3 | 17.1 | 16.3 | 14.6 |

**Source:** *NIS, MARD*

**Chart 14.** *Evolution of sheep and goats meat production and subsidies*




**Source:** *NIS, MARD*

The production of sheep and goat meat had a steady evolution, with small differences from one year to another, both in total and in the private sector, and, as in the case of flocks, it seems that the influence of the subsidies did not was significant in this regard.

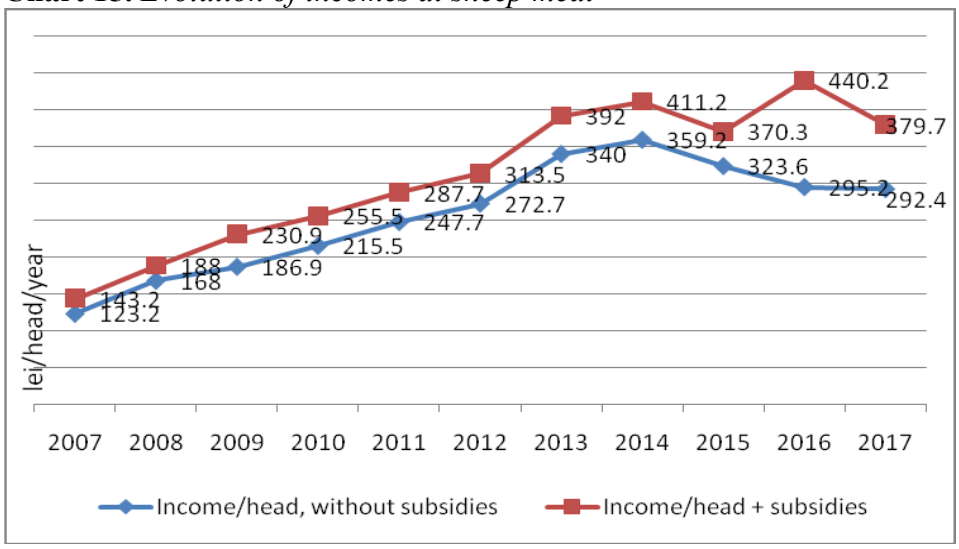
**Table 9.** *Economic indicators – sheep meat sector 2007-2017*

| Specification | UM | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average production | kg/ | | | | | | | | | | | |
| head | 35 | 40 | 35 | 40 | 35 | 40 | 40 | 40 | 40 | 40 | 40 | |
| Price | lei/ kg | 3,52 | 4,2 | 5,34 | 5,39 | 7,08 | 6,82 | 8,50 | 8,98 | 8,09 | 7,38 | 7,31 |
| Income | | | | | | | | | | | | |
| /head without subsidies | lei/ head | 123,2 | 168 | 186,9 | 215,5 | 247,7 | 272,7 | 340,0 | 359,2 | 323,6 | 295,2 | 292,4 |
| Income/ | | | | | | | | | | | | |
| head + subsidies | lei /head | 143,2 | 188 | 230,9 | 255,5 | 287,7 | 313,5 | 392,0 | 411,2 | 370,3 | 440,2 | 379,7 |
| Cost of production/ | | | | | | | | | | | | |
| head | lei/ head | 115 | 150 | 180,0 | 205,0 | 220,0 | 250,0 | 305,0 | 318,0 | 320,0 | 315,0 | 320,4 |
| Profit without subsidies | lei/ head | 8,2 | 18 | 6,9 | 10,5 | 27,7 | 22,7 | 35,0 | 41,2 | 3,6 | -19,8 | -28,0 |
| Profit with subsidies | lei/ head | 28,2 | 38 | 50,9 | 50,5 | 67,7 | 63,5 | 87,0 | 93,2 | 50,3 | 125,2 | 59,3 |

**Source:** *Own calculations based on NIS, MARD data*

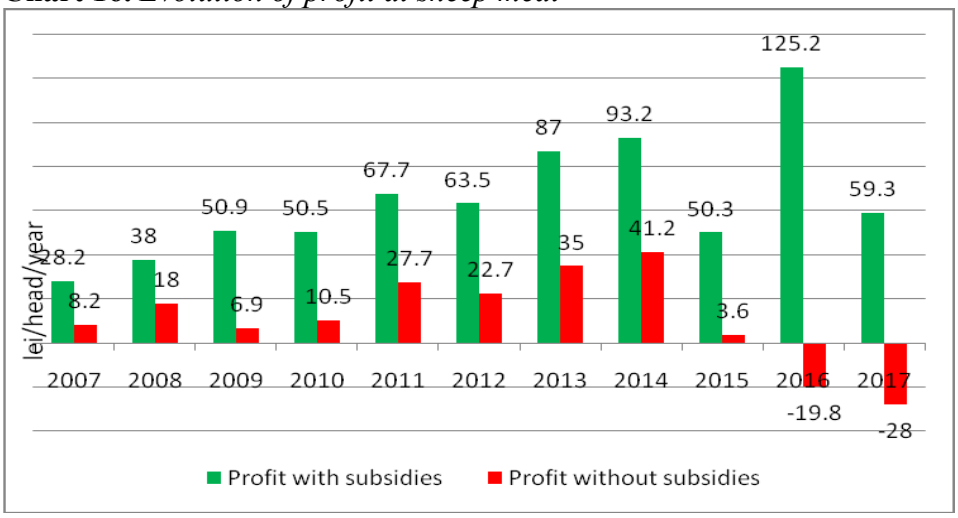
The previous table shows that farm gate prices for sheep meat doubled over the period 2007-2017, while production costs have tripled, leading to losses in recent years, where no subsidies were accessed. Clearly, financial support has helped to increase breeders' incomes.

**Chart 15.** *Evolution of incomes at sheep meat*




**Source:** *Own calculations*

**Chart 16.** *Evolution of profit at sheep meat*




**Source:** *Own calculations*

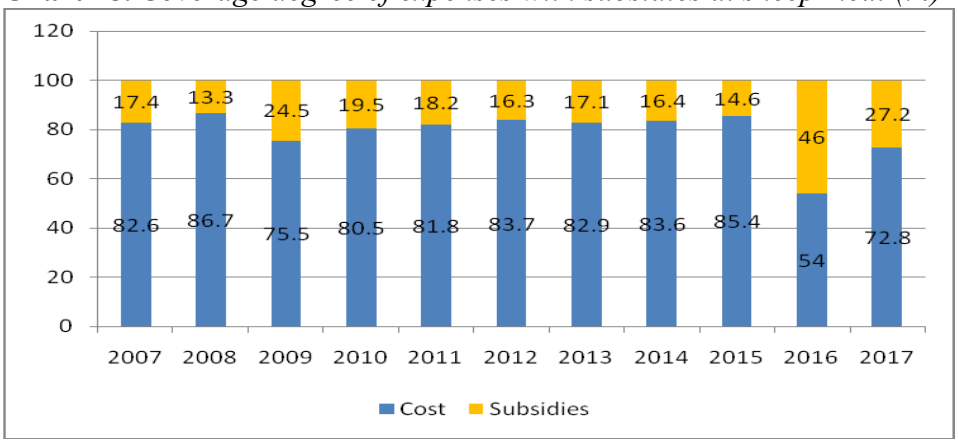
Regarding the profit obtained, it was decisively influenced by the access to subsidies, as in the absence of such support losses were recorded in recent years (see Chart 16). The profit rate was positive for those with subsidies (15.7 - 39.7%), and those without subsidies ranged from minus 8.8% to 13%.

**Chart 17.** *Profit rate at sheep meat (%)*


**Source:** *Own calculations*

Between 2007 and 2017, the cost coverage of sheep meat by subsidies varied between 13.3 and 46%.

**Chart 18.** *Coverage degree of expenses with subsidies at sheep meat (%)*




**Source:** *Own calculations*

## Conclusions

The financial support for livestock sector has been aimed both at covering expenditures for production, as well as increasing efficiency of agricultural production, increasing the quality of production and ensuring a competitive level on market.

The coverage rate of costs by subsidies ranged from 11.4-37.8% for cow's milk, 11.1-57.4% for beef and 13.3-46% for sheep meat. Considering the share of fodder in cost as between 65-75%, it can be said that on-time subsidies covered up to half of the feed costs.

The elimination of milk quotas meant for many farmers (small and medium-sized) a confrontation with a competition that they could not handle very easily. There is a prospect of prolonging on long-term situation, due to the fact that, at European level, the supply of animal products is higher than demand. Small and very small agricultural holdings have the largest share, both in the number of holdings and in the number of animals held. These farms are not representative in associations and also in partnerships for policy-making.

This study shows that accessing subsidies has had a decisive influence on:

- Stopping the decline of cattle herds
- Farm exits from crisis situations on the product market, which took place between 2014 and 2015
- Increased incomes of livestock farmers
- Eliminating farmers' financial losses
- Covering of a part of production costs in the livestock sector.

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*„Plants have a significant role in many processes on the Planet…People harvesting their fruits and use the energy that is the life initiator. We are, almost all of us, solar-powered. What a marvellous cooperative arrangement: plants, animals and people inhaling the other's exhalations. A kind of planet-wide mutual mouth-to-stoma resuscitation, the entire elegant cycle powered by a star 150 million kilometres away."*

*Carl Sagan: Cosmos*

# CONTRIBUTION OF SCIENCE AND PROFESSION TO THE DEVELOPMENT OF THE SERBIAN VILLAGES AND AGRICULTURE

*Danilo Tomić[1], Dragan Škorić[2]*

## Abstract

*Republic of Serbia has a broad network of scientific and educational institutions working on advancement of agricultural production, rural areas and food processing technologies, as well as on development of biotechnology for sustainable non-food products and processes (for industrial uses) and environmental protection (ecosystems preservation and advancement). Over the last five to six decades, significant results have been achieved within the all mentioned fields of activity. Of particular importance are: development of over 2,000 cultivars of grown plants, development of new breeds of livestock and production technologies, as well as the advancements within the fields of soil science, plant protection, health and protection of domestic and wild animals, sustainable use of natural resources, environmental protection, and implementation of many technologies for obtaining the final products. During the last two decades, caused by several objective and subjective reasons, in Serbia it has come to stagnation and slight decrease in scientific research. In order to accelerate scientific and technological development in the Republic of Serbia, structural changes of scientific and educational process, reorganization of scientific institutions and renewal of available*

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*scientific staff have to be done. Briefly, the core of development and application of classic and contemporary technologies is in better relation between human and nature, or more rational use of natural resources that are in line to the human needs. The developed world has been transferred into the society and economy based on knowledge. We also have to look in that direction. Food production is world-wide business. The increase in total revenues, profit and added values should become primary business motive to all economic entities. The social and agro-economics sciences have significant role within the mentioned processes, leading to increase of achieved GDP.*

**Key words:** *Science, profession, education, results, agriculture, villages, agro-economics.*

## Biotechnical approach

*Agriculture the „avant-garde" of technological process*

The development of science, technology and education has an extremely important role in social development. Science and knowledge were represented, they still are, and they will be also a significant support in society development. Agriculture is the foundation of society, while the food production represents important economic and political issues, as well as strategic orientation of the development of our entire country. Worldwide, from historical point of view, agriculture is just an avant-garde of technological progress. The first innovations, biological, chemical, genetic, such as bio-engineering, cloning, etc., have just started in agriculture. Therefore, scientific and technological achievements and their practical application in mentioned area must also become the leading and creative driver force to this development. In the post world war period, development of agricultural science and its application in practice have been too intensive, especially in the field of selection, agro-techniques, plant protection, in livestock breeding, fruit growing, as well as in the sphere of socio-economics, etc.

But, there should be no place to complacency. The time that is coming and expected changes, look for new achievements and results as „keeping up" and „confrontation" with global science. This presupposes the development, improvement, use and application of own and world accomplishments. Besides to traditional disciplines and researches in the fields of genetics, agro chemistry, pedology, agro-techniques, animal nutrition, zootechnics, production economics, organization, rural sociology, etc., it is necessary to

accelerate the preparation and trainings for scientific disciplines and research from the areas of the *third and fourth technological revolution*. These are information and computer technology, bio-technology and genetic engineering, nano-technology, robotics, etc. Development of mentioned disciplines and research should contribute a lot to increase of income, profit and value added, in other words to development of entire national economy. Exit from current economic and social crisis is not possible without faster enrolling into the third and fourth technological revolution, before all, knowledge based economy and society.

Previously, let's remember what first and second technological revolution brought. Related to development of human society, first technological revolution was happened right in agriculture. By improving the working tools, the man had been started to produce more and more. Simultaneously he decreased the fear of hunger and advanced the life conditions, gradually making free from the nature dispositions. Second wave of technological changes in human society has been started with implementation of machines into the production process. Actually, that was the first industrial revolution changing a world in many details. Urban population is growing. New urban areas and production facilities were building. Adequate relations among raw material base, factories, market and population were establishing. Development of science and technology was more intensive compared to previous period.

In fact, in agriculture were come to several green revolutions. *The first green revolution* took place at the beginning of the 16$^{th}$ century by discovering of America and transferr of number of plant species from America to Europe (corn, potatoes, etc.). *The second* started with the use of mineral fertilizers and steam engin, in the middle of the 19$^{th}$ century. *The third* had began with more intensive approach to selection, breeding and creation of new varieties, hybrids and breeds within the existing plant and animal species (beginning and mid of 20$^{th}$ century). With development and improvement of biotechnology and genetic engineering, we are at the start of *the fourth green revolution* (end of 20$^{th}$ and beginning of 21$^{st}$ century). That are the basic characteristics of *the second technological* or *the first industrial revolution* that was started at the mid of 19$^{th}$ century. *The second industrial revolution*, caused by information technologies introduction with the start of second half of 20$^{th}$ century, in same time represents the beginning of the *third and the fourth technological revolution.* Currently we are in the fourth technological revolution, which is characterized by digital-technology, nano-technologies and robotics.

*At this stage of development science is becoming more and more important*

Science is one of productive forces and a factor of progress of entire society. There is no society that has entered into contemporary civilization and which does not understand the role of science in production processes. Science also has an important role in shaping and developing of long-term development directions. Besides, it participates in determination of accomplishment intensity of long-term development plan for the society productive forces (Keyzer, 2005). From the aspect of agriculture, villages and food technology, scientific and research has a significant impact on previously determined developmental directions. Creation and education of scientific-research personnel is relatively slow and long-term process. Otherwise, certain scientific researches indicate that in growth of production around 35-45% is affected by technical-technological processes. Mentioned underlines the science as crucial factor which supports the growth of production, obliging to further development and improvement of scientific-research personnel (Marko, 1987).

The history of science is full of examples showing that inventions most often can not be predicted or that their application and consequences can not be quickly and completely perceived. To what extent future scientific and technological achievements will improve the plant and animal production, enabling the accomplishment of previously determined goals, will depend primarily on man ability to properly use them (Kastori, 2006).

Previous forty years of the 20$^{th}$ century were very important for the development of world-wide plant and animal production. Same implications have been also held on national level. During the mentioned period the yields of most grown plants and domestic animals have been significantly increased. A significant number of factors contributed to this success, before all, intensive scientific-research activity within the field of genetics and breeding that enables the creation of new cultivars with high genetic potential of agronomic properties. At the same time, growing methods have been improved, mostly under the influence of agricultural machinery and chemical industry (production of mineral fertilizers and pesticides). Also, compared to the previous period, channel for the transfer of scientific results to direct producers was significantly shortened. However, this positive trend in Serbia was only until the end of the 80' of last century, while to the end of 20$^{th}$ century, it turned to negative direction. Reasons that caused this negative phenomenon primarily are embargo, transition and unpreparedness of the society for global

change. The most dynamic period for the development of science within the field of agriculture and food technology was from 1960. to 1990. During this period, the society was focused to the development of existing scientific and educational institutions. At that time, several new scientific institutes and faculties were also opened. Besides, attention was given to the education and professional development of scientific and professional personnel. The result of these positive efforts was evident throughout the creation of large number of domestic varieties and hybrids of crop, vegetable, fodder and fruit species, and vine. Then, optimal production technologies for grown plants were achieved. To animal husbandry was also given great attention, as new breeds of domestic animals were created, or production characteristics of introduced breeds were improved. Then, optimal technologies of breeding and health care procedures for domestic animals were developed. In previous period, appropriate attention was not given to the rejonization of agricultural production, so natural advantages of certain regions for some production lines are not expressed (Marković, 1987). Mentioned period is characterized by the development of new technologies and new food products. Main goal of this paper is to evaluate the current situation and point out to further perspectives of science and profession development in the field of agriculture and food processing industry.

## *Results in biotechnical sciences*

Science in Serbia has, in the field of agriculture and food technologies, in the past 40-50 years, achieved considerable results in all scientific branches and disciplines (Ševarlić, Tomić, 2008). Great attention was given to the soil, as a natural resource of special importance for plant growing. Pedological maps of the soil in Serbia have been developed; parameters for increase in fertility have been studied along with the studies in soil damage and soil reclamation; it was done a lot on the regulation of the water-air soil regime; the melioration of anormal soils, soil protection from erosion in the function of food production, use of soil under irrigation in order to maximize yields, and a number of other important parameters and properties have been studied. Using genetic variability and modern methods of cultivation of grown plants, breeders in scientific institutions in Serbia in the past 50 years have created over the 2,000 cultivars of crop, vegetable, and fodder plants, fruit species and vines. In the previous period, these cultivars played an important role in agricultural production, from the aspect of increasing yields, quality parameters and production stability (Borojević, 1987). In particular, the contribution of our breeders in the expansion of our cultivars in the international market should be emphasized. It is estimated that in the period

2002-2010., yearly in Europe there were roughly three million hectares planted with our cultivars (corn, sunflower, soybeans, wheat, etc.). Agricultural faculties in Serbia in the previous period have played a significant role in the education of experts, as several thousand experts graduated from our faculties. Also, considerable amount of master theses and doctoral dissertations have been defended. It all points that our faculties have also taken a significant role in the creation of professorial staff and scientific workers.

In the previous period, fruitful international cooperation with a large number of world-wide countries was realized. A significant number of our scientific staff specializations, masters, doctoral and postdoctoral studies attended in developed countries. Also, a number of experts from developing countries completed regular studies, specializations, master and doctoral studies at the agricultural faculties in our country. A number of joint projects have been realized with the partners from developed and developing countries. Our scientists and professors from the agricultural faculties have participated, and are currently participating with research papers in almost all major international meetings. Serbia has a wide network of scientific institutions dealing with scientific issues in the field of agriculture and food technologies. The weak side in the system of scientific institutions in this field in Serbia is the uneven regional distribution of the institutions themselves, which is automatically reflected in negative way to the development of certain regions.
In Serbia there are the following scientific, educational and extension service institutions that deal with problems in agriculture and villages from various aspects (Ševarlić, Tomić, 2008).

1. Seventeen agricultural institutes;
2. Five agricultural faculties;
3. Two higher schools of agricultural studies;
4. Thirty-four agricultural stations;
5. Sixty-four high schools in the field of agriculture, food production and processing;
6. In addition to the aforementioned the other faculties and institutes deal with the problems of the villages and agriculture - directly or indirectly, depending on their scope of work.

Apart from the scientific and educational capacities, Serbia also has significant labor and production capacities within the rural areas, owned by 631,552 agricultural entities, family households, cooperatives and companies. At first glance, it could be noted that there is a wide network of scientific and educational institutions in the field of biotechnic.

However, their equipment, material status, personnel structure, scientific-research orientation significantly lag behind the scientific institutions in developed countries. Then, there is a lack of consent which research will be dominant in independent institutions and which at the faculties, what leads to the loss in rationality and efficiency. In the cultivating of important grown plant species, where we achieved respectful world-wide results, over the past ten years there has been a standstill in comparison with multinational companies. One of the main reasons being that the breeder in our institutes is simultaneously a scientist struggling to write a number of quality scientific papers, in order to be able to advance professionally title, while the breeder in multinational companies has only to create productive varieties and hybrids. Certainly we must change something in the organization of our scientific institutions in order to establish competitiveness and competence with institutions and companies in developed countries (Ševarlić, Tomić, 2008).

*Significant problems in scientific institutions*

For almost two decades there have been some negative tendencies related to science and profession in the field of agriculture and food technology. Problems are constantly growing, without adequate solutions. There is an irresponsible relation of the social community towards the science and profession, as well as the social ignorance of intellectual capital. There are also disadvantages in the science itself, presence of nepotism, hierarchy, ignorance of strict criteria during the selection of young scientists, family relations (from father to son or daughter), which have led to negative selection of personnel and creation of scientific mediocrity. There is not enough planning in young scientists training (at home or abroad), what affects the decrease in competence and competitiveness for the successful implementation of large international projects.

The fact is that we do not have large scientific teams (multidisciplinary) for key projects, as well as to tasks related to development of revolutionary scientific ideas, rural development and agriculture. Positive exceptions are too rare. We are aware that in all areas of social and economic activity in Serbia there have been come to significant changes during the past two decades. Reconsidering the national agriculture it can be noted that large agro-food combines have disappeared, primarily caused by wrongful privatizations. A few people took over tens of thousands of hectares of land in their possession. Our science and profession are practically moved away from the newly created large systems in agriculture. There is a large number of working age

population from rural areas, which is without employment. Especially are endangered group of young people which is now trying to find employment and happiness in big cities, but mostly outside the profession, while the older generations in rural areas are left to themselves, fighting for a naked existence. Further deterioration of the villages is continued, especially in the hilly and mountainous regions of Serbia. Natural resources available to population are transferred into the state of unutilized, while from day to day increases the number of poor people.

There is a question what happened in past two decades with our science and profession in the sphere of agriculture, as well as in what directions it is going and what are the major problems. Unfortunately, it could be concluded that there are no significant and positive developments in agricultural science. Due to globalization and liberal economy, our institutes are still not ready to face serious problems. Within the mentioned period neither the state nor the management of the institutes and faculties did not do the necessary reorganization and adaptation to newly created situations. As a negative example could be seen the Center for Agricultural and Technological Research from Zaječar, which was founded more than a hundred years ago. It is now under the bankruptcy, and it should be the carier of rural development, as well as development of agriculture and technological innovations in nationaly important agrarian region (Zaječar-Knjaževac-Negotin). A similar situation exists in the Fodder crops institute from Krusevac. We want to restore the importance of livestock production for the rural development, but those who need to realize that are practically sinking. There is no better situation in the Center for Cereal Grains in Kragujevac. Our biggest institutes from Novi Sad, Zemun Polje, Cacak and Smederevska Palanka are also shaken. From year to year, multinational companies are conquering our market with their seeds and technologies. There is a question, whether we want to develop our science, profession, agriculture and rural areas. Declaratively yes, but essentially society and employees in scientific institutions do not invest enough strength to change the current situation for the better.

We are boasting to much how raspberries are our strategic export product, and what have we done for its improvement? Absolutely nothing. We do not have research teams for creation of new varieties adaptable to our ecological environment or new planting material, development of new production technologies and new approaches within the field of protection from diseases and pests, as well as for development of new technologies used in processing of final products, etc. Now we are wondering that other countries (e.g. Poland)

are covering our traditional export markets. We are aware that the institutes are state-owned, as that the state must have an impact on their work and business. There is a question whether the state should have the same influence in those institutes that achieve over 90% of their incomes on the domestic and foreign market (selling of seeds, planting material, growing technologies, services, etc.). The answer is no. Such institutes should be more independent in making key business decisions. Unfortunately, even in these institutes, the state appoints a director according to party affiliation, without reconsideration whether he can successfully create the scientific and business policy of certain institute. The same situation is with boards of management in scientific institutes. Members are usually elected according to their party affiliation and not according to their abilities. Moreover, certain parties try to employ as many of their members in prosperous institutes, also without reconsideration of their scientific and professional abilities. In this way, there is no positive progress, but the opposite, wrong personnel policy is favored. Scientific institutes and faculties dealing with food technology have achieved significant results in creation of number of technologies for new food products. However, they do not have teams that will enable, together with the agricultural science and profession, establishment of SMEs active in food processing in order to achieve high-quality products for the domestic and international market.

*Directions in the development of bio-technical sciences: Where and how to proceed?*

Globalization is all around us, in all kinds of human activities, and in particular in science and professional creativity. In order to play a more significant role in knowledge at the international level, we ought to change a lot of things. Social concepts should be created well, in order to approach the organized creation of new knowledge. No less important is organized and permanent collection of available knowledge. Also important is that through the education of young generations, we increase the ability of new knowledge absorption. Then, through the improvement of the communication infrastructure, especially in the rural areas, it should be enabled an effective approach to knowledge and its transfer and exchange. Realization of all the above, requests the finding of optimal organizational models of acquired knowledge application. Now is the time when agriculture and food production (food technologies) are looking for the best-quality staff, state-of-the-art equipment, cutting-edge technology and high standards, which cannot be achieved without highly developed agricultural science and technology that must be on a global level and based on a developed education system at all levels from the elementary school to the university, as

one of the most efficient forms of transfer of knowledge to farmers. In order to achieve this, it is necessary: to develop programs that will ensure sustainable production and management of biological resources from arable land, forest and aquatic ecosystems, as well as to enable sustainable, competitive and multifunctional agriculture, forestry, aquaculture and rural development, throughout the convergent technologies; to improve the food, beverages and fodder quality and safety through new technologies; to develop the overall concept of the food chain. Besides, researches in the field of biotechnology should provide: sufficient quantities of health-safe, functional, novel and specific food; provide human and animal health; and improve the environment (MNTRS, 2000; NSNTR, 2008).

Most transition countries have harmonized and bring into the competent and competitive position their scientific institution in line with adequate scientific structures present in developed countries (especially with the EU). This must be done as soon as possible, in order to stop the collapse of our science. Preservation of core quality in national the most famous institutes in observed field of science (institutes from Novi Sad, Zemun Polje, Smederevska Palanka, Čačak), requires quick establishment of legal framework that will enable privatization of their parts engaged in process of breeding, seed and planting material production, with possibility that state still became a co-owner (with share of about 30%). The main goal of changing the ownership structure is recognized in increase of competitiveness, profitability and stability at national and international market. Staff from mentioned institutes engaged in basic research, as well as from other independent institutes, has to be formed several national institutes of special social interest. It is important to establish following national institutes: for crop and vegetable production, for soil, for plant protection, for animal husbandry, for veterinary medicine, for water management, for ecosystems, for food technologies, for forestry and for plant and animal genetic resources. Also, it has to be established a national complex institute for the study of villages, that should be a reference institute, a "*specific laboratory*" for the development of Serbian villages and agriculture, which would deal with systematic and long-term research, primarily from the economic and social aspects. Briefly, it would conduct the analysis, make a diagnosis and recommendations, and lead monitoring in mentioned, very important sphere of life and work.

There is also an alternative which does not include forming of national institutes, but involvement of scientists from independent institutes into the work of universities. In this way could be achieved high rate of rationality. Also, it initiates better conditions for education, as increase of stability,

competitiveness and profitability on national and international market. The programs of scientific research in future national institutes should be in line to the programs used in developed countries, but primarily in function of development of Serbia. Besides, by law should be defined the sources of their permanent financing. So, generally selection of scientific programs within the field of agrarian and technological sciences must be in function of development of national economy.

Advantage should be given to research that will guarantee:

- Sustainable production and management of biological and animal resources, as well as available water systems;
- Production of healthy, safe, functional, nutritive, specific and newly developed food;
- Student's education and creation of larger scientific teams that will be used in certain scientific branches and disciplines.

As main priorities within the researches in the field of agriculture and food technology should be marked:

- Sustainable use of land, increase in fertility, remediation and protection of soil;
- Economical use of water resources in the function of agricultural production increase and stabilization and ecosystems protection (irrigation), (MNTRS, 2000; NSNTR, 2008);
- Evaluation and utilization of grown and wild genetic resources throughout the conventional and new bio-technological methods related to breeding, in line with goal of obtaining the more productive varieties (hybrids) and breeds, that will serve as a basis for food production, especially functional, special and newly established food products;
- Implementation and development of new biotechnologies in order to enable sustainable management in intensive and organic agricultural production by the use of available biological resources;
- Development of new technologies and production lines in food industry, as well as improvement of technologies based on traditional products;
- Research and development of the new enzymes and microorganisms use in bioprocesses, and production of new products and biomass (Kastori, 2006; Segan, 1982).

By implementing mentioned programs, a large number of final food and industrial products for the domestic, regional and global market will be provided, and Serbia will be developed into the recognizable producer of final food products within the Europe. For the realization of the previously

mentioned projects, a young, high quality and competent generation of researchers should be needed. Therefore, it is necessary to create a detailed plan for the education and training of young scientists in the most famous worldwide scientific centers. At the same time, with establishment of plan of young scientists training, it has to be made a plan for establishment of necessary conditions in order to conduct the scientific activities on national level after finishing of international specializations (contemporary equipped laboratories, procedures of promotion, adequate support, etc.), (Ševarlić, Tomić, 2008).

*Agricultural extension services and their importance in the development of village and agriculture*

Sometimes there are ambiguities in the relationship between science and profession. Scientific achievements in the field of agricultural and technological sciences by the time become a part of profession, in other words, professional achievements, when their contribution to the development of society or social well-being has got a great importance. Today, this relationship is very dynamic and without involvement in modern scientific flows it is impossible to use scientific achievements in establishment and development of technical-technological capacities, as well as for general social development of the modern country, especially village as basic cell in rural development (Kastori, 2006). If farmer wants to produce more and to obtain products of better quality, it is necessary to have the requested knowledge. Modern commodity production requires professional education of farmers, in order to be able to adopt new knowledge, new technology and technique, and for this the best support could be get from scientific and professional workers from science, as well as employees from agricultural extension service in charged for transfer of knowledge to direct producers (Milojić, 1987). Permanent education is the necessity of the present time, and even more of tomorrow. It should work scientifically and professionally on this issue, as well as in solving of several organizational-technical topics, in order to make the knowledge available to every producer in any village in Serbia. While there were large agro-food combines, they had their own development departments and qualified professional staff. Their disintegration and bad privatization have led to weakening or disappearing of development departments.

Before 8-10 years, the Ministry of Agriculture, Forestry and Water Management of Republic of Serbia were linked agro-institutes, agro-services and agro-stations into the one entity agricultural extension services, which

main mission is to make a transfer of knowledge to direct producers. There are 22 extension services in the central part of Serbia, and 13 in Vojvodina. Currently is working on their integration into the one, unique system at national level. They have a responsible social function in the development of villages and agriculture, what they do according to their possibilities. Within the majority of agricultural extension service units, there is a lack of quality professional staff which should be a carrier of improvement of agriculture and rural areas. Also, there is no adequate system of permanent training of experts involved in their work.

During the last few years, it came to weakening of links between the extension service and group of scientific entities as are faculties of agriculture and technology, or independent scientific institutes. There is no synchronized process of education and knowledge transfer. It should be organized a modern system that will produce the qualified personnel and adequate knowledge that will be transferred to each producer. The material position of agricultural extension service is not at the required level, what inhibits the faster transfer of knowledge. Certain number of extension services does not have adequate infrastructure, laboratories, equipment, or other necessary technical assets for normal functioning.

In order to develop good level of competitiveness and competence within the mentioned field of activity, it is necessary to regulate the opening of private agricultural extension services. Of course, legislation must be at a high level in terms of the requirements for the opening and functioning of mentioned institutions. Analyzing the educational and professional institutions from the field of agriculture and food technology, it can be concluded that in previous period there has been no sufficient attention focused to the forecasting and reporting services at the national level, which are extremely important during the vegetation period. The concept of organization of mentioned services should be designed in this way that they have been located at universities, but linked in one synchronized system at national level (Ševarlić, Tomić, 2008).

## Socio-economic approach

*Challenges for agro-economists and rural sociologists*

Poverty is parameter of agro-economics ignorance
Theodore Schultz, winner of Nobel Prize for economy in 1979

Agroeconomists and rural sociologists are intensively engaged in the studies of the issues related to rural, agricultural and technological development, as at global, as well as at regional, national and local level. Agroeconomic researches have been very developed in the universities and institutes of Western Europe, testified by many diverse literary sources (Keyzer, 2005; Poppe, 2007; Petit, 1989; IEP, 2009; PFNS, 2014; EFNS, 2015; EPBGD, 2009; PFBGD, 2013; AGNS, 2015). There are also significant activities of the European and World Association of Agrarian Economists within which our colleagues are strongly involved (Tomić, Ševarlić, 2007; Tomić, 2008).

Agrarian economists and rural sociologists of Serbia show remarkable results in their research. They are trying to keep up with the colleagues from developed countries. Many of them were made additional specialization in these countries. The Serbian agroeconomic science and profession are located in four centers: Faculty of Economics in Subotica, Agricultural faculty in Novi Sad, Faculty of Agriculture in Zemun and Institute of Agricultural Economics in Belgrade. The associates of these institutions for decades have been actively involved in the projects of the Ministry of Education, science and technological development of the Republic of Serbia, the Ministry of Agriculture, forestry, water management and environmental protection. Also, they have successful cooperation on international projects too. During the last several decades, over the 700 projects have been successfully implemented. About 4,000 students from the sphere of agro economy have been graduated at faculties in the last five decades. About 350 of them finished the master program, while around 250 defended the PhD thesis (PFNS, 2014; EFNS, 2015; PFBGD, 2013).

In upcoming period there are many challenges in front the Serbian agroeconomists. We will mark some of them, such are (Poppe, 2007; Škorić, Tomić, 2015):

*Globalization of economy* - it is a worldwide and unstoppable process that has affected all economies in developed, less developed and transition countries. Multinational companies, with highly concentrated capital are increasingly presented in almost all countries, seeking for new resources and market areas, and leading by the logic of capital and profit. For the sake of truth, it should be said that mentioned companies are bringing new standards, high technology, labor ethic, etc. They are more and more present in the agro-business sector, within the all phases, as well as in the input industry, primary agriculture, food-processing industry and retail chains. They are serious competition to national companies, family and commercial farms, as well as to agricultural

cooperatives and family enterprises. All of previously mentioned entities should also strengthen their competitive position, among all, by choosing of traditional, specific and diverse production programs, highly adapted to available natural conditions, producers tradition and consumers preferences. Their production program should differ from program of multinational companies.

*Food trade liberalization* - besides the opponents to the national market opening for food import, our food trade is being liberalized. Our food products are increasingly exported to the international market, but on the other side, import of food is also growing. This can be a powerful stimulus to domestic food producers and authorized institutions to permanently work on increase and sustainability of national agriculture competitive advantages, related to dynamic and turbulent European and worldwide economy. Special attention is directed to the emerging economies, the so-called BRICS countries (Brazil, Russia, India, China and South Africa), which are not only big consumers, but also a large food producers at the global level. This fact will be very important to Serbia, after it's joining to the World Trade Organization, what is expected so soon.

*Spreading of IT sector* – during the history of the development of human society, many empires and religions have tried to conquer the world. By the fortune, these attempts were unsuccessful. However, in last several decades information technology has succeeded in this. Information could be transferred from one to the other end of the Planet in really short time period. Saying, that who owns the information rule the world is usually confirmed. By information could be also considered production inputs and outputs, as they have important role in planning and managing of production, processing activities, trade, e-business, logistic, as well in sector of services, science and education.

*Development and use of biotechnology* - Over the last two decades, significant financial assets of multinational companies have been invested in the development of biotechnology. Now, it comes the time when they want to encash these investments. Therefore, use of results of bio-technological researches has been widely spread in practice, primarily in the developed overseas countries, as well as in the countries in economic expansion. We have an opinion that Serbian agroeconomists should be more actively involved in these researches, as in reconsideration of their positive and negative effects. Positive effects have to be strongly encouraged and

supported, while negative ones should be neutralized and eliminated in accordance with current possibilities.

*Climate change* - without deeply conducted research, it is visible that the Earth has been affected by the serious climate changes. Reasons for that are numerous and primarily are lying in inadequate relation between man and nature. During the last 100 years, man has tried to overmaster and even beat the nature. This aggressive, conquering behavior of people, has led, besides technological progress, to many negative effects. Before all, these are appearance of a greenhouse effect, excessive warming, disturbances of biodiversity and ecological balance, etc. The consequences are reflected in frequent natural disasters at global and local levels, even in Serbia, as are tsunamis, typhoons, catastrophic floods, etc.

*Knowledge based economy* - since 2010., the EU as the most competitive worldwide economy has moved to a knowledge based economy, in order to confront the increasing competitiveness of the overseas and BRICs countries. Obviously, the agro-business has also moved to mentioned form of economy if it wants to endure competition within the newly created business environment. This implies stronger use of academic research, experimental or traditional, practically in all stages of production. In addition, this has to be followed by constant increase in competitiveness. This is an imperative of the 21$^{st}$ century, especially in the context of globalized and liberalized trade increase and development, or spread and application of new technologies in food production (Vlahović et al., 2009).

*At the knowledge level* - knowledge is the key element of raising the competitiveness. Serbia is a small country that with its human and natural resources participates with only one promil in total sum of world resources. According to that, the production quantity can not be its competitive advantage at the world market. It has to be found in top quality products, or their exclusivity, what requires top-level knowledge incorporated into the product at all stages of production. Beside the knowledge in biotechnical disciplines, it also required the top-level knowledge in marketing, management, legislation, finance, etc. (Vlahović et al., 2009).

*At the products level* - if company, cooperative or farm has wide assortment of products within the production program, management should select some products (short down the current assortment) that will favor or stimulate in order to reorient to foreign market. Competitiveness of selected products should be supported (Vlahović et al., 2009).

*At the level of farm/company* - if production program of economic entities involved in food production is shortened, or based on few products oriented to export, in order to survive at the market, level of competitiveness of economic entities has to be permanently improved (Vlahović et al., 2009).

*At the budget level* - or level of more efficient and professional administration. Previously mentioned levels of competitiveness are not sufficient for a successful market appearance, if there is a lack of state, national, or local budget support. These funds have stimulating role in the development of agriculture, or maintaining of its competitive advantage, but only in cooperation with other three levels of competitiveness.

*Balanced regional and rural development* - Global economy is characterized by uneven regional development. Noted differences are deepening, mostly between developed, developing and transition countries, as well as underdeveloped countries. For example, there are extremely high disproportions between the USA and Canada and African countries. Likewise, the European continent is characterized by large differences in the development level of the Scandinavian countries versus the Southeastern Europe countries. Similar gap could be seen in Serbia too. There are large disproportions between the development of Vojvodina, or the area of Belgrade city, and south or southeast parts of Serbia. In same way, the development of rural areas has been devastated, slowed down and represents serious threat to the further economic and social development of Serbia. So to the research of the issues related to rural areas and villages could be devoted much more attention in upcoming period, primarily from the aspects of production, ecology, technology, demography culture and sociology.

*Development of cooperatives and associations* - there is a constant need for development of awareness according to self-organization of farmers based on international cooperative values and principles, not only in agriculture, but also in processing of agricultural products and development of non-agricultural activities "around agriculture" in rural areas (home craft, rural tourism, etc.). The conditions in which are Serbian village and agriculture, especially the agricultural cooperatives, require urgent reform and greater state support to cooperatives and cooperative unions. Stronger official material support to cooperative form of organization is required, as well as strengthening of their technical-technological and IT equipment. In particular, financial support for attracting administrative personnel (primarily highly professional and cooperatively oriented experts) in order to overcome operational difficulties of existing and establishment of new cooperatives is

also needed. Besides the lack of reliable business environment, inadequate state relation towards the village, agriculture and cooperatives, examples of good cooperative practice indicate that the human factor has key role in cooperative development. For more successful development of cooperatives, harmonized activity at all levels of public competence is needed (from local to state), (Tomić, Komnenić, 2016; Ševarlić, Tomić, 2008; Škorić, Tomić, 2015).

*Development of input industry* - inputs have important role in production of quality, safety and cheap food. Their share in production costs is very high. Input production in Serbia, currently is usually done in multinational enterprises present at our market in next activities: seed and seedlings production, production of equipment, machinery and tractors, pesticides and other agro-chemicals, oil industry, fodder production, etc. So, there is a question, does Serbia need to develop mention lines of productions, or it has throughout joint-venture arrangements, direct foreign investments, or some other forms of business activities to make a links with multinational companies that operates in Serbia.

*Use of renewable energy sources* - besides food and raw material limitations contemporary world in its development is also facing the energy limitations. Some estimation is that in next 200 years all non-renewable resources would be spent. Because of that, developed countries are more and more turned to use of renewable energy sources, such are water, wind, sun, byproducts from agriculture (biomass), geothermal energy, etc. In Serbia that resources are not in use, or they are under the limited use. Costs of energy have high share within the full production price of agricultural-food products. Securing the competitiveness under the conditions of food trade liberalization requires greater use of mentioned energy sources. Besides, Serbia has around 400 thermal water sources, but just 40 of them, or 10% are in use. Mentioned wellheads are suitable for the development of spa tourism, greenhouse production of vegetable and flowers, etc. (Škorić, 2014).

*Development of food processing industry* - primary agricultural products have large share in the export of agriculture, what at the end can not be a marked positively. Our orientation should be directed to development of higher phases of processing, or finalization of agricultural products. That has multiple benefits. At first place, it will be opened a possibility for development of family business and SMEs that will be involved in processing of basic primary agricultural products. Secondly, employment in rural areas is increasing. Thirdly, in this phase of production is creating the value added. Then, by

production and export of final products available resources in this field of economy are better valorized. Establishment and development of processing capacities is possible in processing of cereals and mill products, as well as in processing of industrial plants, meat, milk, fruit, vegetable, medicinal, aromatic and spice plants. Food production, at all levels, requires educated labor, excellent equipment and technology, implemented standards as are Global GAP, HACCP, Halal, Kosher, ISO, etc. That's a necessity of a time we are living in. Our comparative advantage at open food market could not be a quantity, but a top quality of produced products. Criteria for directing the production has to be research of market and consumers behavior. His majesty consumer is recognized as a master in market economy, so because of that during the selection of production program, signals from the market should be carefully followed (Škorić, 2014; Škorić, Tomić, 2015).

*Activity at capital, labor, goods and land market*, or mobility of production factors in open market economy. These issues are deeply reconsidered in the agro economics literature of developed countries. Their mobility is very dynamic, significantly affecting the food production development. Capital is moving to more profitable sectors of production. In transition and less developed countries, as well as in Serbia, mentioned issues are in initial phase, and mobility of these production factors is too low. So, this problematic should be more present in research of agroeconomists at national and regional level.

Special attention should be given to the researches related to the *process of EU integration.* Reform of Common Agricultural Policy of EU (2003-2007-2013-2020) has to be in the focus of research of our agroeconomists. CAP reform is a moving target that has to be permanently reconsidered during the creation of national agrarian policies during the process of Serbian accession to the European Union.

*Reform of the system of education*, rapid development of science and technology is necessity in upcoming period. Human capital becomes key resource in rural and agricultural development, as well as in development of entire economy. It creates value added in association with physical and financial capital. Value added has to be important business motive within the ago-business sector. Its permanent increase satisfied interests of share holders, employees, business partners, buyers, suppliers, banks, state, etc (Tomić, Komnenić, 2016).

*Relation to sustainable use* of available natural resources, energetic efficiency and implementation of quality and ecological standards have to be constantly in the focus of the research of our agroeconomists.

*Besides good results* gained in previous period, in close future is still required for our agro-economists and rural sociologists to publish their papers in globally recognized and prestige scientific journals present in referent lists - SCI (Scientific Citation Index). That would increase their scientific competency during the competition for national and international projects, as well as to affirmate our agro complex and agroeconomic ideas. In same time, larger engagement of agro-economists is also important for the realization of projects related to increase of agribusiness companies' competitiveness, their promotions on international market, as for realization of projects of multifunctional development of rural areas. According to this, it's necessary that our agroeconomists follow and use the new research methods that are in line to the methodology of European and global agroeconomic science.

In particular, it should be tended to critical attitude towards current agroeconomic practice, then collegial dialogue, polemics and argumented replica at scientific meetings according to certain issues. Especially it is necessary to reaffirm the inviolability of review in national scientific and professional publications, as well as to apply European standards for the articles from the field of agro economy. For example, we are all striving for the introduction of international standards in food production. From the other side, international standards related to scientific publications consider appearance of index of terms (subject register) and index of authors (name register), what in our agroeconomic publications is still missing (Ševarlić, Tomić, 2008).

## New/old dilemma in theory and practice

The relationship between industry and agriculture has been actualized again being throughout the reindustrialization of transition countries. With mentioned dilemma was preoccupied the economists 150 years ago. Relation between large and small estates is more than hundred years old dilemma. Today, that is a relation between the large companies and SMEs. According to this, the issue of optimization of production factors is always actual, currently maybe more than ever. Interdependence of the state and market within the development of agriculture, from the aspect of relation between urban and rural areas is one more old/new dilemma. Could they exist one without

another? Probably not. Therefore, significant attention should be given to the sociological problems related to rural areas. Villages are devastated, aging and without young. They are at the crossroads between the disappearance and the survival.

Their disappearance would be catastrophic for the development and existence of urban centers, considering the organic relation between the village and the city. Briefly, start of third millennium is characterized with strengthening of market economy at global level that is primarily based on knowledge economy. That's why agroeconomists and rural sociologists have more and more important role in development of agro economy and rural areas in Serbia.

## Conclusions

Based on the evaluation of work of scientific, educational and professional institutions from the field of bio-technology and socio-economic sciences during the previous five-six decades in Serbia, following can be concluded:

- There has been a dynamic development of existing and foundation of new institutes, faculties and agricultural extension services.
- Significant results in personnel education and solving of scientific, tehnological and professional problems have been achieved.
- Globalization, embargo and economic crisis have had negative influence on a science and profession, as well as on achieved results in the past two decades.
- It is necessary to carry out the reorganization and rationalization of scientific institutions in Serbia.
- It is necessary to be more focused on the eduction of young scientists in order to be able to carry out and realize internationally important projects.
- The state must increase the financial support for the scienece in order to cretae preconditions for faster development of science and profession, and on that way faster development of complete Republic.
- In previous period, state and society did not give the necessary attention to the survival and the development of the village in Serbia.

The beginning of the third millennium is characterized by the strenghtening of market economy institutions which are based on a knowledge-based society and economy, what has to be a challenge for our researchers from socio-economic sciences, particulary agroeconomists and rural sociologists.

*Proposed measures for faster development of science and profession in agriculture and rural areas*

It is not possible to observe the future directions of agricultural and rural development separately, as they are a part of general social development. The need for sustainable development is increasingly emphasized in all spheres of science, profession and production, what implies lower and more rational consumption of natural resources, as well as their preservation for future generations.

It has to be done the reorganization and rationalization of the institutes and faculties network in the field of bio-technology, which will ensure the faster and more balanced regional development of country. It considers creation of competent national institutes and faculties, as well as the privatization of some parts of the existing institutes and faculties in line to the standard in developed worldwide countries.

State and society should provide significantly higher financing of science comparing the previous period (0,3% of GDP). The goal is to increase budget for science in the next five years to around 1% of GDP, then to 2% of GDP in the next ten years, and around 3% of GDP in next fifteen years. In this way adequate conditions will be created for science in order to take a leading role in country's medium-term development.

By well created plan and program, in the next seven to ten years, should be ensured education of a new young generation of scientists in Serbia, who will be highly competent to realize the priority projects, or to be engaged in important international projects.

At the same, it has to be worked on establishment of domestic scientific infrastructure (laboratories and modern equipment, etc.) in order to provide equal working conditions to new generation of young researchers as they are in developed countries.

It has to be made a responsible selection of medium and long-term projects from the field of bio-technical and socio-economic sciences which will be in the function of faster development of agriculture and villages of the Republic of Serbia. On that way it will be created the conditions for the production of healthy, safe, functional, nutritious and specific food for domestic market and export.

Create the conditions (material, human resources and organizational) in order do improve the work of agricultural extension services and forecast-reporting services regarding the rural and agriculutural developmnet. Make short-term, mid-term and long-term programs for the revitalization of villages, especially in the hilly and mountanious regions.

Besides the existing Institute of Agricultural Economics, the National Institute for rural research should be also founded. These should be referennce institutions "laboratories" for rural and agricultural development, which would deal with research systematically and on long-term basis, primarily from a socio-economic aspect. In short, they would deal with: analysis, diagnosis, solutions proposing and monitoring in mentioned, very important field of social life and work.

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# HUMAN RESOURCES MANAGEMENT IN THE BUSINESS SYSTEM FOR THE PRODUCTION, PROCESSING AND TURNOVER OF AGRICULTURAL PRODUCTS

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## Abstract

*Employees with their talents, knowledge, skills, motivations, creativity and development potentials are the key and most important resource of any company that creates its competitive edge in a global business environment in which technology and information are generally available. Employees are the most powerful and the most expensive resource, so managing them must be long-term and strategically thought-out. They should be managed in a wise, rational and humane way, including all the steps, i.e., human resources processes (planning, demand, recruitment, selection, socialization, career guidance programs, payroll and reward systems, employment relations and collective bargaining, trade union organization of employees, their health, safety, welfare, criminal and appeal procedure as well as directions for the improvement of human resources management. It determines whether and to what extent the theoretical knowledge and the practical application of this phenomenon coincide.*

**Keywords:** *human resources, planning, recruitment and selection, payroll system*

## Introduction

In a modern business environment, where information technologies are widespread and accessible to everyone, organizations can develop their competitive advantage only on one single resource – people. Employees of one company are most often the most expensive organizational

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resource, because business of the company to a large extent depends on their knowledge, skills and abilities.

In this regard, companies today are increasingly aware of the role that human resources management plays in business. Organizations seek, through strategic human resources planning, to anticipate future requirements in terms of knowledge, skills and attitudes of employees, which are built in relation to changes in the environment and business strategy. This provides the conditions for achieving the organization's priority goals.

Economic success primarily relies on the knowledge, competencies and personal characteristics that direct people towards their own and social well-being. Modern trends in the development of the countries of the market economy put human resources development at the top of the priorities of national strategies and policies of economic, social and technological progress. The process of transition, which has affected our country, requires a radical change in relation to human resources and the way they are used.

Hence, human resources management has therefore evolved as a scientific area derived from industrial change and economic development, in response to dramatic changes in society, which require the treatment of human factors as the most important factor in the functioning of one enterprise. This approach occurred in the eighties of the last century, before that it was mostly regarded as personal management. The transition to the new name has changed the focus of thinking from controlling labor costs to understanding the personality of employees and their abilities as the most important potential of an organization. Today it is impossible to be successful within any profession, without continuous professional development, which comes down to the principle of lifelong learning.

In this paper we will elaborate in more detail the concept of human resources management and its significance for the business success of the enterprise. Also, the organizational structure and the analyzed business of Biofoodex d.o.o., in the town of Štulac near Vrnjačka Banja will be presented. The analysis will be done from the aspect of human resources management and the possibilities of improving this area in order to improve business performance. The enterprise will therefore be analyzed in terms of human resource planning, recruitment and selection methods,

existing training and training of employees, their development, evaluation of the quality of their work, monitoring of individual work results and payment systems, legal framework of employment relations and safety and protection at work, the form of penalties and appeal procedures, as well as the retention of staff and the abandonment of the organization. Of course, the analysis is accompanied by a proposal for changes and improvement of human resources business.

## The topic and the aim of the research

The topic of the research is focused on the directions of the development of human resources management in a small enterprise that is basically engaged in the processing of agricultural products. The significance and actuality of research in this field lies precisely in the fact that it is at the center of complex organizational systems, as well as in the fact that the influence of the human factor on business and business success is growing.

The aim of the paper is to indicate, through the modern approach to human resources management, the necessity of applying more modern methods for attracting, nurturing, and in particular, retaining key resources in order to increase productivity, profitability and competitiveness of the enterprise.

## Methods and data sources

In the collection of data for this paper, the following were used: analysis of the content of the document (both primary and secondary materials - already carried out researches) and a questionnaire consisting of 33 questions, conducted among 33 employees. The method of performing attitudes and realizations was also used. Access to research is integrative and synoptic. No methodological procedure is given the exclusive advantage, but all are equally represented.

The data used in this paper are secondary, collected from relevant professional literature, publications, professional journals, official website of the observed enterprise, as well as data obtained through field research through company documentation (policies, texts, schemes and employee surveys).

**Scope of work, mission, vision and enterprise policy**

The main activity of the enterprise is: turnover, washing, cleaning, extracting seeds, pureeing and pasteurization of fruits: apricot, plum, raspberry, strawberry, pear, apples, cherries, rose hip, red dogberry, aronia, blueberries, blackberries and peaches.

The basic production program consists of the following products:

1. Homemade jam from: apricot, blackberry, raspberry, strawberry, plum, rose hip, red dogberry, cherry, aronia; strawberry jam, cherry jam, raspberry jam and plums with black chocolate jam, as well as homemade plum jam with cinnamon.
2. Homemade marmalade from: rose hip and red dogberry.
3. Homemade mixed jams from: apples, pears, carrots and peaches.
4. Homemade syrup from: aronia, blueberries, raspberries and cherries.
5. Homemade sweet jam from: plums, cherries, blueberries, forest strawberries, as well as quince with walnuts.
6. Homemade "*ajvar", "pinđur" and "ljutenica"*.
7. Pasteurized: cornices, tomatoes, peppers fillets, homemade beet.
8. Other: tomato puree, homemade salad, homemade tomato juice, homemade cherry compote.

The raw materials are delivered to the facility by the vehicles of the supplier, and the preparation of the product is done in a separate production part of the shop, on the equipment that is distributed according to the technological process, which includes cleaning, baking, peeling and cooking. At the very end of the working cycle, the process of packaging and preparation for storing products is carried out until the moment of commercial sale.

The mission and vision of the company, as well as the business policy of the enterprise, have the following appearance: (*Table 1*)

**Table 1.** *Mission, Vision and Business Policy of Enterprises*

| **Mission of the enterprise** |
|---|
| BIOFOODEX d.o.o Štulac is a company for the processing and preservation of forest and conventional fruits and vegetables. We exist since 1996 and behind us is a long-standing experience in the processing of forest fruits, as well as conventional fruits and vegetables, so we consider ourselves to be the leader in Serbia.<br>The management and all employees in the enterprise are committed to meeting the demands and expectations of their customers, providing high-quality and health-safe products and reducing the impact on the environment. |
| **The vision of the enterprise** |
| The long-term definition and the primary task of the enterprise is the production of quality and healthy products that are harmonized with the world standards and regulations, then the creation of optimal hygienic-sanitary and technical-technological working conditions with the use of modern and clean technologies, using high-quality and safe raw materials, as well as acquiring new and improving existing knowledge, experience and skills, and raising work discipline and responsibility to a high level. |
| **The policy of the enterprise** |
| • Satisfy the requirements and expectations of the users and gain their trust.<br>• Apply an efficient food safety system.<br>• Apply an efficient and effective quality management system.<br>• Protect the user's health by continuously improving product safety at all stages of receiving raw materials and starting materials until storage and dispatch of finished products.<br>• Maintain the maximum hygiene of the place, as well as all facilities, at the highest level to prevent the possibility of food contamination.<br>• Continuously maintain and improve GMP and GHP principles.<br>• By the more efficient use of resources and hazardous substances, improve the state of the environment by preventing their pollution.<br>• To constantly identify and re-examine the needs and requirements of users and create conditions for developing and improving technical equipment and continuous improving of the quality of products.<br>• To be fully compliant with all applicable world standards, laws and regulations.<br>• Increase the efficiency and effectiveness of the business system through continuous training of management and employees.<br>• Develop partnerships with subcontractors and suppliers.<br>• Continually increase company profits by continuously reducing costs and increasing efficiency. |

**Source:** *Adapted from internal corporate documents*

## Importance, goals, processes, patterns of planning and human resource demand

The concept of human resources refers to the totality of human resources in the organization, consisting of knowledge, capabilities, skills, creativity, motivation and work energy needed for achieving of organizational goals. It is the total intellectual, psychic, physical and social energy that can be developed in the pursuit of social goals (Bogićević, 2004: 3).

The unique attitude of all authors is that human resource management is a scientific discipline and one of the most important business and management functions in the organization. Only man can shape a vision, design a strategy, have ideas, make creations, think of new products, and the like.

Human Resource Planning is a process that anticipates human resource needs based on anticipated changes in the internal and external environment, i.e. optimization of the use of available skills and knowledge, improves the process of business planning and reduces costs through forecasting and matching of supply and demand for human resources and anticipates and analyzes the effect of alternative human resource management policies.

The human resource planning process consists of the following phases:

- Environment Analysis,
- Predicting Needs for Human Resources,
- Predicting the ability to provide human resources,
- Making plans,
- Establish feedback (Lončarević, 2006: 185).

In the observed enterprise anticipation of needs for staff is done for a shorter period of time and there is no standardized procedure applied on that occasion. As each year the number of workers in the higher sectors increases, however, the number of hired people has been oscillating according to the years. The job descriptions of all employees in the enterprise are provided through the Ordinance on job placement systematization, i.e. by defining the type of job positions and the number of executors, the conditions required for work at all working locations, and descriptions of jobs and work tasks at these jobs. The status is shown in the following Table 2.

**Table 2.** *Personnel structure in the enterprise*

| WORK PLACE | LEVEL OF QUALIFICATION | NUMBER OF EXECUTORS |
|---|---|---|
| Director | VII | 1 |
| Technologist | VI and VII | 2 |
| Administrative employee | IV and VII | 5 |
| Storekeeper | IV-VI | 3 |
| Assistant worker in processing fruits and vegetables | III-IV | 11 |
| Worker in processing fruits and vegetables | III-IV | 11 |
| Assistant worker in processing peppers | II-III | 2 |

**Source:** *Adapted from internal corporate documents*

Prediction of human resource demand should be answered to the question of how many employees, of which professions and which qualifications will be required by the enterprise in the planned period to achieve the

planned goals. For this purpose, subjective (qualitative) or objective (quantitative) mathematical methods are used.

In the observed period of the above mentioned objective methods of predicting human resource demand, statistical methods are used as the most reliable.

**Recruitment, selection and socialization of new employees**

Human Resource Recruitment is an activity that naturally continues on planning of human resources and which represents the process of identifying, attracting and securing of qualified candidates in such a number that enables an enterprise to choose between the most suitable for filling vacant positions.

The company has more opportunities to fill vacant positions:

- by organizing jobs,
- using overtime,
- job mechanization,
- introducing a flexible workplace,
- by introducing part-time jobs,
- transferring the parts of job and,
- cooperation (Živković, 2012: 29-30)

Recruitment includes analysis and job descriptions, then determining which candidate is required and writing specifications. The process must be in line with the company's business policy.

Potential candidates for filling vacancies can be recruited both from the organization itself, from internal sources as well as from the external labor market, i.e. external sources, which again have their advantages and disadvantages.

This enterprise recruits from internal and external sources: by rotating employees between jobs that have temporary character and by promoting employees to hierarchically higher positions in accordance with years of work in the enterprise and acquired work experience.

During the season, the enterprise hires 30-50 employees through a temporary-time contract. They are engaging permanent experts in the

field of application, implementation and verification of food safety management system, defining the powers and responsibilities of the agreement or signed contract.

Enterprise policy is such that it stands for the employment of people from this area, in order to reduce unemployment at the level of the entire municipality. Advertising on vacancies is also done online.

The recruitment process is continuing directly to the recruitment process of human resources, which is one of the most important activities of human resources management. The main goal of the selection is, therefore, to forecast the future performance of the candidate and to minimize the mistakes in deciding on the selection of candidates for employment. In this regard, a major role in the selection of candidates and have direct managers in jobs for which candidates are elected, but very often and employees who will work with the selected candidates.

The selection process consists of: initial exams, completing the application form, testing, interviewing candidates, preliminary job offers, checking biographical data, medical and physical examination and job offerings. A true biography or CV is the first instrument used in the selection process, based on the assumption that past behavior is a good precondition for future behavior.

In order to prevent the inadequacy of the selection process and the consequences of such a situation, it is necessary to have two basic criteria fulfilled: reliability which implies the degree to which the defect and justification is obtained, which implies the existence of an adequate relationship between the relevant criterion and the manner in which a choice is made.

In this enterprise specific characteristics, closely related to a particular work place, are not particularly emphasized, since only the enterprise provides the necessary practical training and also the theoretical reference to its business.

Significant selection methods are tests and types of tests. Tests are measuring instruments by which people are compared on the basis of the particular characteristic that is the subject of measurement. They are standardized in terms of content, scoring and administration, which provides a basis for determining candidate data (Bogićević, 2004: 129).

Without the intention of describing the content of certain types of tests we will mention that this enterprise applies conventional methods of selecting candidates. Testing is essentially reduced to tests when obtaining certain certificates, training and introduction of standards in the company, and for higher positions, knowledge tests, and personality tests have been recorded, and for test related to work trial period is used.

Interview is the most complete and broadest selection method which supplements unclear information from other sources but also examines the way people communicate, then their friendliness, openness, general appearance and attitude. The aim of the interview as a selection instrument is to predict the business impact of the candidate on the basis of his or her oral answers to the questions asked (Dessler, 2007: 122).

The observed enterprise uses unstructured interviews that have a lack of information due to a large amount of information, which puts the candidate in an awkward position by asking inappropriate and unpleasant questions. The interviews are mostly individual, and according to the type of questions they are situational.

Continued increase in the volume of work imposes the need for a greater level of structuring of interviews in order to ensure fairness and the choice of suitable candidates, especially for positions requiring higher levels of schooling and related knowledge.

After the selection of the candidates and their acceptance of the job offer, new employees need to be introduced to the job, acquainted with the organization, working conditions, rules of behaviour, associates, organizational culture as well as their rights, obligations and responsibilities in accordance with the employment contract. This initial period represents the most critical stage in which a permanent stamp is placed on the behavior of employees, their attitudes and attitude toward work. This is actually a process of socialization whose purpose is to help new workers to get acquainted with their working environment and bring their behaviors to an acceptable level as soon as possible.

**Earnings and reward systems, employment relations, collective bargaining and trade union organization**

Earnings consist of: basic earnings, earnings for work performance and increased earnings. The basic earnings are expressed in the gross nominal

value of the work contract for full time and standard work performance based on the degree of professional qualifications, the complexity of the job, the responsibilities in the work and the conditions in which the job is performed at the workplace.

In addition to the aforementioned, the employee may also be paid for solidarity, jubilee reward, loan approval in case of longer and more severe illness of an employee or a member of his family, purchase of food for winter and heating, as well as assistance in the case of destruction or damage of property, natural disasters and other events.

Rewarding and stimulating of managers is based on a set of different cash and non-cash prizes for their work or contribution to achieving company goals. Compensation can be tangible and intangible, although after retirement, some managers can generate income from their enterprises on the basis of consultancy or counseling services.

No Union of employees in the enterprise exists nor is a collective agreement defined. It is not noticed that this enterprise recognizes the importance of gathering employees in the trade union and collecting wider solidarity as well as satisfaction with the way in which employees are treated in the enterprise.

An examination of the motivation of the employees to improve the success of the business was carried out within the scope of the observed enterprise. (*Table 3*)

**Table 3.** *Characteristics of samples (distribution of respondents in relation to gender, age, work experience and qualification)*

| | | Frequency | Percentage (%) |
|---|---|---|---|
| **Gender** | Male | 11 | 33,33 |
| | Female | 22 | 66,67 |
| **Age structure** | Under the age of 20 | 2 | 6,06 |
| | 21-30 | 4 | 12,12 |
| | 31-40 | 9 | 27,27 |
| | 41-50 | 12 | 36,36 |
| | 51-60 | 6 | 18,18 |
| **Work experience** | Less than 1 year | 2 | 6,06 |
| | 1-5 years | 4 | 12,12 |
| | 5-15 years | 15 | 45,45 |
| | Over 15 Years | 12 | 36,36 |
| **Level of qualification** | Primary school | 2 | 6,06 |
| | Secondary school | 23 | 69,69 |
| | Higher school | 2 | 6,06 |
| | University | 5 | 15,15 |
| | Master/doctoral degree | 1 | 3,03 |

**Source:** *Data obtained by surveying respondents*

When it comes to the social factors of the employees in the observed enterprise, it can be said that they are at a fairly satisfactory level. (*Table 4*)

**Table 4.** *Social factors of employees in the enterprise*

| | Rating | Frequency | Percentage (%) |
|---|---|---|---|
| **Good interpersonal and business relationships** | 5 | 17 | 51,52 |
| | 4 | 13 | 39,39 |
| | 3 | 3 | 4,09 |
| | 2 | 0 | 0 |
| | 1 | 0 | 0 |
| **Respect by colleagues and the collective** | 5 | 15 | 45,45 |
| | 4 | 13 | 39,39 |
| | 3 | 5 | 15,15 |
| | 2 | 0 | 0 |
| | 1 | 0 | 0 |
| **Organization's care about employees** | 5 | 20 | 60,6 |
| | 4 | 12 | 36,36 |
| | 3 | 1 | 3,03 |
| | 2 | 0 | 0 |
| | 1 | 0 | 0 |
| **Colleagues care about an employee as an individual** | 5 | 13 | 39,39 |
| | 4 | 17 | 51,51 |
| | 3 | 2 | 6,06 |
| | 2 | 1 | 3,03 |
| | 1 | 0 | 0 |

**Source:** *Data obtained by surveying respondents*

As regards good interpersonal relationships and business relationships, 51.52% of them rated this with 5, 39.39% with 4 and 9.09 with a grade 3. With regard to respect by colleague and trust in colleagues, 45.45% of employees has rated this category with 5, 39,39% with 4, and 15,15% with 3.

To the question of whether the organization takes account of the employees and the climate among people, 60.60% of them agree completely, 36.36% rated it with 4, 3.03%, with 3, etc.

The relationship between employees and supervisors in the enterprise can be seen on the basis of questions, ratings, frequencies and percentages (%) in Table 5 and the possibility for the development of employees in the enterprise is viewed on the basis of information in the following Table 6.

**Table 5.** *Relationships of employees with enterprises' supervisor*

| | Rating | Frequency | Percentage (%) |
|---|---|---|---|
| **The supervisor encourages creativity, a good working environment** | 5 | 2 | 6,06 |
| | 4 | 20 | 60,6 |
| | 3 | 8 | 24,24 |
| | 2 | 3 | 9,09 |
| | 1 | 0 | 0 |
| **The supervisor enourages by his own example** | 5 | 2 | 6,06 |
| | 4 | 19 | 57,57 |
| | 3 | 9 | 27,27 |
| | 2 | 3 | 9,09 |
| | 1 | 0 | 0 |
| **The supervisor accepts suggestions in terms of improving the quality of work** | 5 | 3 | 9,09 |
| | 4 | 19 | 57,57 |
| | 3 | 8 | 24,24 |
| | 2 | 3 | 9,09 |
| | 1 | 0 | 0 |

**Source:** *Data obtained by surveying respondents*

**Table 6.** *Opportunities for employee's development in the enterprise*

| | Rating | Frequency | Percentage (%) |
|---|---|---|---|
| **Making decisions independently** | 5 | 9 | 27,27 |
| | 4 | 14 | 42,42 |
| | 3 | 5 | 15,15 |
| | 2 | 3 | 9,09 |
| | 1 | 2 | 6,06 |
| **Additional education** | 5 | 2 | 6,06 |
| | 4 | 12 | 36,36 |
| | 3 | 18 | 54,54 |
| | 2 | 1 | 3,03 |
| | 1 | 0 | 0 |
| **Opportunity for promotion at work** | 5 | 2 | 6,06 |
| | 4 | 3 | 9,09 |
| | 3 | 19 | 57,57 |
| | 2 | 9 | 27,27 |
| | 1 | 0 | 0 |

**Source:** *Data obtained by surveying respondents*

As the biggest motivators for work, employees included salary and personal development, interpersonal relationships, contribution to the enterprise, and the necessity of keeping the job. (*Table 7*)

**Table 7.** *The employees biggest motivators for the work*

| | Frequency | Percentage (%) |
|---|---|---|
| **Salary and personal development** | 33 | 100 |
| **Job creativity** | 29 | 87,87 |
| **Interpersonal relationships** | 25 | 75,75 |
| **Contribution to the enterprise** | 15 | 45,45 |
| **Keeping the job** | 4 | 12,12 |

**Source:** *Data obtained by* surveying *respondents*

The non-material factors that have the greatest impact on a well-done job in the opinion of employees are: the ability to progress, creative work, feedback on success, flexible working hours, participation in important decisions, good management, job security and organizational climate. (*Table 8*)

**Table 8.** Non-material factors that have the biggest influence on motivation

| | Frequency | Percentage (%) |
|---|---|---|
| **Ability for progress** | 33 | 100 |
| **Creative work** | 33 | 100 |
| **Feedback on success** | 33 | 100 |
| **Flexible working hours** | 30 | 90,09 |
| **Participation in important decisions** | 30 | 90,09 |
| **Good management** | 29 | 87,87 |
| **Job security** | 28 | 84,84 |
| **Organizational climate** | 27 | 81,81 |

**Source:** *Data obtained by surveying respondents*

## Health, safety, well-being of employees and criminal and appeals procedures

The right to safety and safety at work is defined by the area regulated by the Occupational Safety and Health Act, the Labor Law, the Law on Social Insurance - Health, Pension and Disability. Only employees who are healthy and safe at their workplace can be satisfied with their position in the enterprise and are therefore successful in their work. During the socialization with newcomers in the observed enterprise, during the first month, training for safety at work is carried out. The enterprise provides work to employees in secure conditions and enables them to work safely. Employees are obliged to comply with safety and health regulations.

Appeal refers to a complaint formally presented to the management's representative or to the union's official. Appeals are rare occurrences, as a small number of workers question their superiors' decisions, and even fewer of them will risk being labeled as those who are doing the trouble.

Rules related to forms of punishments are: The right to safety and safety at work is defined by the area regulated by the Occupational Safety and Health Act, the Labor Law, the Law on Social Insurance - Health, Pension and Disability. Only employees who are healthy and safe at their workplace can be satisfied with their position in the company and are therefore successful in their work. During the socialization with

newcomers in the observed company, during the first month, training for safe work is carried out. The company provides work to employees in safe conditions and enables them to work safely. Employees are obliged to comply with safety and health and safety regulations.

Appeal refers to a complaint formally presented to the management's representative or to the union's official. Appeals are rare occurrences, as a small number of workers question their superiors' decisions, and even fewer of them will risk being labeled as those who are doing the trouble.

Rules related to forms of punishment are: negligence, unreliability, disobedience, interference in rights or threats to the rights of others, theft and breach of security. When solving complaints and disciplines, managers must be consistent. Penalties in the observed enterprise are almost unavoidable, and so far they have not received a formal form, but have fallen into the level of warning, mainly related to the use of protective equipment and safety procedures at work. Appeals procedures have also failed to realize their full realization, as it mainly implied consideration of critical issues by interviewing the director and employee.

**Abandoning an organization and keeping the staff in the enterprise**

The main reasons why employees leave the job are:

- External factor (transferring a spouse to another job, illness, etc.),
- Functional turnover (all resignations due to poor productivity of individuals or the inability to engage in organizational culture),
- Rejection factors (job dissatisfaction),
- Attracting factors (height of salary, progression potential) (Živković, 2012: 207).

The enterprise pays attention to employees with high performance and offers a variety of incentives to keep employees such as: job security and salary, favorable working conditions, various programs of training and development, benefits, promotion, etc.

In the observed enterprise the dismissal of the job is defined by the Rules of Procedure, and in the case of consensual termination of employment, the employee terminates the employment relationship based on the written agreement between the employee and the employer.

The interest of this enterprise is the minimal fluctuation of people, because the employees are satisfied with the management structure, they have no overtime and their basic rights are not jeopardized, they are loyal to the enterprise and have a high degree of mutual trust and quality assurance, conflict situations are resolved quickly, there is a fair system of rewards and sanctioning, and a high level of morale among employees is also evident.

**Changes in order to improve human resource management**

Because of the size of the company in the observed enterprise there is no separate sector of human resources. It is necessary to develop systematic human resource planning for the longer period of time, as well as to strengthen the role of experts, and not just training for performing the job. Employees, especially young people, want to abandon the traditional work model, secure job positions supported by permanent learning and the creation of a learning organization system. Due to the need for engagement of a large number of workers conditioned by the constant increase in production volume, agency mediation is recommended, as well as the start of Internet advertising.

Interviews that are being implemented need to be more structured, it is necessary to introduce unconventional selection methods and to let this job to a specialized employment agency.

It is noticed that during the transition period, the union's form of association does not have the necessary strength to significantly improve the representation of the rights and interests of employees.

In terms of earnings and material reimbursement, it is necessary to do much, because it is one of the main motivational factors of all employees. In the context of stimulation, bonuses are only available in the pre-holiday period. As the main motivators of the employed, they mention the increase of salary, greater advancement possibilities, and work on strengthening interpersonal relationships, new forms of stimulation and flexible working hours.

Care of the health and safety of employees is at an exceptional level and attention is paid to them by constantly improving and following the latest standardization procedures.

Today, the enterprise recognizes steady growth and development, it automates its own production, introduces novelties into production processes, requiring greater engagement for the development of its employees, in order to develop a contemporary concept of a learning organization.

## Conclusion

Human resources should be managed effectively, in a wise, rational and humane manner in order to achieve organizational and individual interests, but also to invest in them permanently. It is necessary to take a much more serious approach to recruitment and selection of staff, to prevent any nepotism and find suitable candidates; then dedicate yourself to the long-term development of the staff; adequate remuneration and incentives that are beyond short-term bonuses, in other words stimulate employees for a longer period of time.

Despite the strong internal communication, the desire to strengthen good interpersonal relationships has been emphasized in terms of strengthening communication skills and self-confidence. Also, employees are largely interested in training outside those that are indispensable for everyday work, and believe that the enterprise is not sufficiently engaged to fulfill their demands.

Starting from work analysis, through human resources planning, recruitment and selection, training and education, rewarding and motivating, health and safety concerns, career management, but sometimes their degradation and dismissal as well, it has been shown which steps are necessary for possessing adequate staff within the enterprise.

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# DEVELOPMENT OF RURAL TOURISM IN NORTH BANAT RESEARCH OF THE PERCEPTION OF THE LOCAL POPULATION[1]

*Drago Cvijanović[2], Tamara Gajić[3]*

**Abstract**

*Rural tourism is not a developed form of tourism product in Serbia, although there are indeed all the preconditions for its development. The reason for the stagnation of the development of tourism, and all its forms, is the poor political and economic situation that hit the region and Serbia in the nineties of the 20th century. The current theme in all world research is the acceptance of the development of rural tourism by the local population. Reviewing existing literature and research on a given issue, and using secondary documentation and research work, the authors of the paper pointed to the perception of the local population about the development of rural tourism in the municipalities of the North Banat District. The analysis of the results has determined that the local population has a positive attitude to the development of rural tourism, but also that they are aware of the difficulties and obstacles in its development.*

**Key words:** *rural tourism, local community, North Banat, Serbia.*

[1] The paper is part of the research at the project III-46006 "*Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region*", financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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## Introduction

It is clear that Serbia has all the preconditions for the development of rural tourism, starting from anthropogenic, natural, geomorphological resources, to cultural and ethnic differences and events. In the last years of the 20th century tourism has not had a positive direction for its development, and all this has contributed to the poor economic and political situation in the entire region.

Agriculture and industry are the most developed sectors of the economy in this area, and tourism has remained in every sense of the word tertiary industry. Serbia in its entirety is the country of rural areas, as about 85% of the space is rural. Rural tourism includes all activities in the rural area (Vujko et al, 2014). However, except the mentioned factors as determinants of the tourist development of rural areas, the key role can be played by residents of receptive destinations and their perception of the significance and effects of development caused by this economic activity. Their readiness to understand the importance of tourist activity as a mass phenomenon, affect the direction and strength of tourism development (Nunkoo et al, 2012). In the world, this topic is a current issue, and many theorists in their works explore the attitudes of the local population about the development of rural tourism.

The population of receptive destinations can affect the total stoppage of tourism, but often also to strengthen the development of this economic activity (Sheldon et al, 2001). Where tourism is recognized as a branch that contributes to economic development and profit-making, it is certainly supported by the local population. In contrast, there are places where tourism has negative implications, and is totally nonaccepted by residents (Zhang et al, 2013). Social awareness is expressed about the importance of controlling the movement of tourism in order to preserve the receptive regions, in accordance with the principles of sustainable development. The local population is a key player in any development, and it is normal that there is awareness and concern about uncontrolled growth and consumption (Teye et al, 2002). Only long-term planning and support at the domestic level can prevent catastrophic disturbances of the shape of the natural balance (Tosun, 2006).

The authors of the research carried out the research in the municipalities of North Banat and on the basis of the analysis of the obtained results determined the level of support of the local population for the

development of rural tourism in their municipalities. Starting from certain hypotheses, the authors have established the attitudes of the population for certain issues concerning the problems of positive and negative development of this economic activity, as well as their opinion on the contribution of the entire development community.

## Background of the study

*Rurality in the Europe and Serbia*

Rural tourism records constant growth in Europe. Modern trends such as staying in nature, protecting nature, preserving and revitalizing local traditions, customs, cultural and historical monuments have contributed to this, all on the basis of sustainable development (Petrović et al, 2017). Rural tourism successfully incorporates all these elements into its offer. The importance of rural tourism is reflected in the interaction of agriculture and production and the promotion of traditional products and services, gastronomy, exploitation of rural resources, etc.

Rural tourism is linked to rural areas, which are the main receptive areas of the rural market profile of tourists, and broadcast centers are mainly urban areas (Peters, 1999). This form of touristic movement is not characterized by massiveness, unless it is an attractive event that will attract more visitors, where emphasis is placed on this event (Allen et al, 1993; Iorio et al, 2010). The specificity of rural areas is contact of tourists with nature, heritage, tradition, people habits, and active participation in many rural activities. The development of rural tourism is largely controlled locally and evolves towards the long-term development of a particular area. Rural tourism has many definitions, most of which include all tourism related activities in rural areas, as well as in cases where rural culture is a key component of the offered tourism product (Canoves et al, 2004; Gajić et al, 2017).

Particularly emphasized is the contact of tourists with the entire rural environment and the participation in the activities that these rural places provide. Tourists are offered the possibility of enjoying themselves in a natural setting, getting to know the culture, the tradition, in the style of life of the local population (Hall et al, 1998; Hall, 2004). Simply put, rural tourism should be a unique experience and be based on all the principles of sustainability and voluntary organization of the local population. Tourists must be able to enjoy the authentic experiences and essence of

the rural way of life (Petrović et al, 2017). The rural tourism product is certainly not only a tangible part of the offer, it is about the broader meaning that includes the experience of a unique image of life achieved through personal contact with the local population and some invisible segments such as traditional hospitality, customs, legends, beliefs, culture, relationships with nature, communications, etc. (Braumwel et al, 1994).

Rural areas often have an economic potential that is largely unused or better used for the benefit of the rural population and overall national development (Hall, 2004). Rural tourism development goals: increase farm income, competitiveness of rural areas, equalization of living conditions in rural and urban areas, valorisation of local resources, exploitation of unused resources. Tourists can be involved in rural activities passively and actively (Jeong, 2017). Increasingly, with the presentation of the rural offer, there is a promotion of educational and entertaining activities specific to the field. Thus, the rural tourist product is determined on the tourist market and positioned in a place where it will be different from other rural areas of other countries.

The development of rural tourism could contribute to better economic development of given destinations, as well as increasing the level of employment, which is also a key problem of smaller areas in Serbia (Gajić et al, 2017). For now, rural tourism takes place on small family farms, with the goal of attracting an increasing number of tourists and better promotion on the tourism market (Cvijanovic et al, 2016). By developing rural tourism on small properties or households, it influences the presentation of a specific culture of people, traditions, customs, habits of many nationalities as Serbia is specific (Vujko et al, 2014). Serbia needs to find a better position on the European tourism market, because Europe is known to be the leader in rural tourism development. Rural areas of Serbia are faced with major problems of depopulation or emigration of the working-age population due to the ever-worsening conditions for life. It is believed that the development of rural tourism would influence the reduction of this phenomenon in the society, and young people would stay in the villages to deal with agricultural as well as tourism (Jeong, 2017).

Rural areas in the world face a downturn through the outflow of the young population, a lower base of skills and lower average productivity (Lankford, 1994). All this reduces the critical mass needed for efficient public services, infrastructure and business development, creating a vicious circle. However, many rural areas have taken advantage of their opportunities and realized

them, profiting from existing potentials such as location, natural and cultural facilities and social capital (Briguglio et al, 1996).

In the European Union, 57% of the rural population lives there, with an average population density of 38 inhabitants per square kilometer in predominantly rural regions. Rural areas in more advanced economies in Europe often earn low income and have a high unemployment rate. Romania and Bulgaria have a total of 7.5 million households with less than 5 ha of land. Cooperatives and commercial farms are located in a large percentage of the arable land in Slovakia (76%), Bulgaria (74%), the Czech Republic (72%) and Hungary (50%). Small, individual farms cover most of the cultivated land in Slovenia (94%), Latvia (90%) and Poland (86%).

According to the 2002 census, about 778,900 private farms are recorded in Serbia, with an average size of 2.5 ha of arable land. Unemployment rate in rural areas reaches 21%, and GDP per capita, only 74% of the national average. Households of up to 3 ha have about 328,000 and make up about 56% of all households in rural areas (Master Plan for Sustainable Development of Rural Tourism of Serbia, 2011). Over 600,000 farms have less than 5 ha of land. The agrarian population includes older people aged 60 years with a lower level of education and a large percentage of dependents over 15 years of age. In Serbia, rural areas account for up to 85% of the total territory with 55% of the population living there, generating 41% of the country's GDP. Unemployment rate in rural areas reaches 21%, and GDP per capita is only 74% of the national average. From 1991 to 2002, the number of inhabitants in rural areas of Serbia decreased by 3.6%, compared to the total drop in the number of inhabitants in the country by 1%, and from 2002-2011(Master Plan for Sustainable Development of Rural Tourism of Serbia, 2011).

There are 6,158 settlements on the territory of the Republic of Serbia, of which 193 belong to the city (3,1%), and 5,965 are other settlements, which are automatically considered as rural. At present, it is estimated that more than 32,000 beds in rural areas play an important role in the rural tourism sector, and about 300 rural households with 8,000 beds offer catering services and generate more than 150,000 overnights annually. It is estimated that every household engaged in rural tourism certainly earns a profit of 5,000 euros. Those who have luxurious accommodation and better offer, the annual salary goes up to 12,000 euros (Master Plan for Sustainable Development of Rural Tourism of Serbia, 2011). In one household, from 750 to 1,500 nights per year is achieved. More than 1,000 overnights annually,

reach 60 households. About 240 objects realized 700-1000, and 150 had 350-700 overnights. About 300 households have less than 350 overnights a year. The average length of stay of tourists in households is 2.8 days.

*The attitude of the local population*

The development of the tourist industry largely depends on the perception of the local population, and it has been more and more prominent topic in the world of research. The opinion of many theorists is that prior to any development, consideration should be given to the opinion of the local population and provide their support, which can have an integral importance in planning the development of this activity and attracting tourists (Briedenhann et al, 2004; Ko et al, 2013). Tourism can lead to both positive and negative effects for the local community, and leads to a change in relationships within the community itself.

For the successful planning and policy of rural tourism development, the attitude of the inhabitants of the receptive region is taken into account (Gursoy ey al, 2002). Many believe that, to the extent that tourism influences the local community to that extent, the community returns and in this way determine the development of tourism in a destination (Aas et al, 2005). The local population gives guidance on which forms of tourism are acceptable and to what extent (Andereck et al, 2005). Prior to the intensive development of tourism in some area, it is necessary to understand the attitude of the local population about this development, because without the support of the community, it is difficult to achieve the development of rural tourism in the destination (Kim et al, 2013). By involving the local population, by meeting their demands and expectations, the possibility of long-term planning for the development of a rural tourism product is created (McClosey et al, 2011).

Consequently, gradual unemployment, depopulation, will be reduced, much better plans and projects will be created by the sector managers for its development (Youn et al, 1994; Sharpley, 2014). Studies of tourism with a focus on its subjects are mainly based on local residents, on one hand, and tourists, on the other hand. The local population is involved in tourism in different ways. Some participate directly in tourism (providing catering services), some indirectly (by selling certain products related to tourism), while others do not participate in tourism in general (Huh et al, 2008). Local communities should have a significant participation in projects related to the implementation of tourism in their communities. Local

residents may be inherent to the environment in which they live (have limited interest) if the business and recreation in relation to some other place (Kim et al, 2013). Many theorists have noted that individuals began to include more in the tourism industry when they saw the positive effects of the development of this area, where the exchange of resources there are more benefits than costs (Lawson et al, 1998; Andereck et al, 2005).

Also, greater involvement of local population in tourism development realized by other researchers which also reflects on the positive effects and cost overruns. Some authors focuses on the positive and negative effects of tourism trends in the development of local communities and the perception of the local population (Linberg et al, 1997; Hung et al, 2011). Knowing the attitude of the local population helps reduce negative effects, cost reductions and positive development of this industry (Marzuki et al, 2012). The cooperation of local institutions and their members contributes to the positive development of joint decision-making and goal-setting, but the benefits from all of this can be a single (Breugel, 2013). However, some authors point out that the local population has little or significant influence on decision-making and directing the development of some tourist destinations (Almeida et al, 2005). Identifying the positive effects of tourism developments is to influence the attitudes of the local population, which in this case more involved in its development, continue to support the programs and goals of development, and if it encounters the negative effects of tourism, local citizens to discourage the further development (Mason et al, 2000).

## Methodology research and hypotheses development

*Description of study area*

The survey was conducted in the municipalities of the Northern Banat District in the municipalities of Kikinda, Kanjiža, Čoka, Senta, Ada, Novi Kneževac. It is a northeast part of Serbia with a total area of 2,329 km² and 50 inhabited places, and Kikinda is the regional center of the District. According to the 2011 census, 151,382 inhabitants live in this District. When considering tourism, only two municipalities with realized tourist traffic will be listed: Kikinda with 7,169 tourists and 332 beds, and Kanjiža with 13,579 tourists in 2016 with a total of 456 beds.

**Table 1.** *Structure of the population in Serbia (2011).*

| Region | City population | Rural population |
|---|---|---|
| Serbia | 56.4% | 43.6% |
| Vojvodina | 56.67% | 43.33% |
| Central Serbia | 56.29% | 43.71% |
| Belgrade region | 81.36% | 18.64% |
| Other part | 46.13% | 53.87% |

**Source:** *Statistical Office of the Republic of Serbia*

**Table 2.** *Hypothesis development for research*

| Objectives of research | Hypotheses | Questions |
|---|---|---|
| Objective 1<br><br>Support | H1 – There is a strong attitude of the local population that the development of rural tourism should be supported<br>H1 a - Community participation is significante | -Rural tourism should be more present in the development of municipalities<br>-Society needs to be more involved in the development of rural tourism<br>-Authority should further support the development of rural tourism<br>- Long-term planning increases the development of rural tourism<br>-We are involved in the planning and development of rural tourism |
| Objective 2<br><br>Implications | H2- Local people have a clear view that the development of rural tourism brings positive effects | -The development of rural tourism opens new jobs<br>-The development of rural tourism attracts new investments<br>-The development of rural tourism increases the standard of the population<br>-The development of rural tourism affects the construction of infrastructure |
| | H3- Local people have a clear view that the development of rural tourism brings negative effects | -The local population suffers from the consequences of the development of rural tourism<br>-The development of rural tourism increases noise and pollution<br>-The development of rural tourism increases the cost of living<br>-The development or rural tourism increases crime |

*Sampling and methodology procedure*

The authors of the paper conducted a survey in the period of March and April 2017, which included a total of 280 respondents, of which 249 questionnaires with complete answers were taken into analysis. Data is processed in SPSS software, version 23.0. The frequency and descriptive statistics are shown, and for the purposes of this paper only part of the entire research is presented. Basic tables are presented showing the perception of the population or answers for the questions posed by hypotheses. Survey questions were made according to a standardized questionnaire (Rasoolimanesh, M., Ringle, C., Jaafar, M., Ramayah, T., 2017), with some modifications for this research.

The results from the table indicate the basic structure of the respondents. Out of a total of 249 respondents whose answers are taken into account, the highest percentage are women in the survey (51%), then others aged between 31 and 45 (39.45), and the smallest percent of those who belong to the older age group, over 60 years. When studying item of education in the surveyed municipalities, the population with secondary education is predominant (49%), while there is a lowest number of respondents with higher education (6.8%) are predominant. When it comes to earnings, it is noticeable that the surveyed population moves most in the category of those who earn between 200 and 400 euros (59.4%), and at least to those with higher incomes over 600 euros (8%).

**Table 3.** *The basic demographic structure of the respondents*

| Item | | Frequency | Percent |
|---|---|---|---|
| Gender | Male | 122 | 49% |
| | Female | 127 | 51% |
| Age | 18-30 | 69 | 27.7% |
| | 31-45 | 98 | 39.4% |
| | 46-60 | 49 | 19.7% |
| | 60+ | 33 | 13.3% |
| Education | Elementary | 35 | 14.1% |
| | Secondary | 122 | 49% |
| | High ed. | 75 | 30.1% |
| | MSc, PhD | 17 | 6.8% |
| Earn | 200-400 e | 148 | 59.4% |
| | 400-600 e | 81 | 32.5% |
| | 600+ e | 20 | 8.0% |
| Total | 249 | | 100% |

**Source:** *the Results of authorized examination*

## Results and discussion

The local population had the opportunity to respond with yes, no and do not know, and so the standardization of variables was set on that way. For the purposes of this work, the basic tables are given, without cross-comparison and the setting of dependent and independent variables. The questions are divided according to research topics, as shown in the table, where research hypotheses are set. Rural tourism must be more represented in the development of the investigated municipalities, according to research data, where most of the respondents confirmed this item. This is seen from both tables, frequencies and descryptive statistics.

**Table 4.** *Display of analyzed results - descriptive statistics (frequency and percentage values)*

| **SUPPORT FOR RURAL TOURISM DEVELOPMENT** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Rural tourism should be more present in the development of municipalities*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 154 | 21 | 74 | 61.8% | 8.4% | 29.7% |
| ***Society needs to be more involved in the development of rural tourism*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 158 | 32 | 59 | 63.5% | 12.9% | 23.7% |
| ***Authority should further support the development of rural tourism*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 171 | 21 | 57 | 68.7% | 8.4% | 22.9% |
| ***Long-term planning increases the development of rural tourism*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 133 | 44 | 72 | 53.4% | 17.7% | 28.9% |
| **COMMUNITY PARTICIPATION** | | | | | | | | |
| ***We are involved in the planning and development of rural tourism*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 53 | 117 | 79 | 21.3% | 47.0% | 31.7% |
| **POSITIVE PERCEPTIONS** | | | | | | | | |
| ***The development of rural tourism opens new jobs*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 111 | 36 | 102 | 44.6% | 14.5% | 41.0% |
| ***The development of rural tourism attracts new investments*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 115 | 50 | 84 | 46.2% | 20.1% | 33.7% |
| ***The development of rural tourism increases the standard of the population*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | **Percent** | | |
| Yes | No | Don't know | 140 | 53 | 56 | 56.2% | 21.3% | 22.5% |

| *The development of rural tourism affects the construction of infrastructure* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Answer** | | | **Frequency** | | | | | **Percent** |
| Yes | No | Don't know | 66 | 126 | 57 | 26.5% | 50.6% | 22.9% |
| **NEGATIVE PERCEPTIONS** | | | | | | | | |
| ***The local population suffers from the consequences of the development of rural tourism*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | | | **Percent** |
| Yes | No | Don't know | 47 | 151 | 51 | 18.9% | 60.6% | 20.5% |
| ***The development of rural tourism increases noise and pollution*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | | | **Percent** |
| Yes | No | Don't know | 43 | 153 | 53 | 17.3% | 61.4% | 21.3% |
| ***The development of rural tourism increases the cost of living*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | | | **Percent** |
| Yes | No | Don't know | 63 | 126 | 60 | 25.3% | 50.6% | 24.1% |
| ***The development or rural tourism increases crime*** | | | | | | | | |
| **Answer** | | | **Frequency** | | | | | **Percent** |
| Yes | No | Don't know | 61 | 148 | 40 | 24.5% | 59.4% | 16.1% |
| **Total** | | | **249** | | | **100%** | | |

**Source:** *Results of the authorized examination*

When it comes to the fact that both society and authorities need to be more involved in the development of rural tourism, there are significant deviations. There is the highest number of respondents who consider this to be true (63.5% that the society is more involved, and 68.7% to join the government in the development of rural tourism). The arithmetic mean for the first question is 1.68, and the standard deviation is 0.903, while the second answer is 1.60 and the standard deviation is 0.846.

**Table 5.** *Descriptive Statistics (development of rural tourism)*

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| RT should be more present in development of municiplities | 249 | 1 | 3 | 1,68 | ,903 |
| Society needs to be more involved in DRT | 249 | 1 | 3 | 1,60 | ,846 |
| Authority should further support DRT | 249 | 1 | 3 | 1,54 | ,842 |
| Long term planning increases DRT | 249 | 1 | 3 | 1,76 | ,875 |

| | | | | | |
|---|---|---|---|---|---|
| We are involved in planning and DRT | 249 | 1 | 3 | 2,10 | ,722 |
| RT opens new jobs | 249 | 1 | 3 | 1,96 | ,926 |
| RT attracts new investments | 249 | 1 | 3 | 1,88 | ,887 |
| RT increases the standard | 249 | 1 | 3 | 1,66 | ,822 |
| RT affects new infrastructures | 249 | 1 | 3 | 1,96 | ,703 |
| Population suffers consequences | 249 | 1 | 3 | 2,02 | ,628 |
| Increases noise and pollution | 249 | 1 | 3 | 2,04 | ,621 |
| Increases the cost of living | 249 | 1 | 3 | 1,99 | ,704 |
| Increases crime | 249 | 1 | 3 | 1,92 | ,633 |
| Valid N (listwise) | 249 | | | | |

**Source:** *Results of the authorized examination*

When asked whether the development of long-term plans influences the development of this activity, the answer is most positive (53.4%), while those with negative responses and indeterminate ones are less, where the mean is 1.76, and the standard deviation is 0.842. On the basis of the obtained answers, the first hypothesis (H1+), that there is a strong attitude of the local population that the development of rural tourism should be supported, is confirmed. The mean of questions about the involvement of the local population in the development of rural tourism is 2.10, and the standard deviation is 0.722. The highest percentage of respondents claimed that they were not involved in the development of rural tourism. This denies the subhypothesis H1a that community participation is significant.

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he development of rural tourism opens possibilities for new jobs: the approximate number of respondents with confirmatory and indefinite response (mean 1,96: standard deviation 0,926). Whether rural tourism plays a role in the improvement of living standards shows the perception of the local population, where it is noticed that 56.2% of them declare themselves to be, while the highest percentage of respondents who believe that the development of rural tourism contributes to the creation of new investments. Based on the analyzed data, it is evident that the question whether the development of rural tourism influences the construction of new infrastructure is 1.96, and the standard deviation is 0.703, because the

majority of the respondents gave a negative answer. Hypothesis H2, that local people have a clear view that the development of rural tourism brings positive effects, can be confirmed, because most of the questions are confirmed, except for the last one that they declared that the development of rural tourism will not contribute to the creation of new infrastructure.
The local population had the opportunity to declare the negative implications of tourism development. Whether the respondents suffer some consequences from the development of this activity, the largest percentage of them 60.6% gave a negative answer (mean = 2.02, standard deviation 0.628). How much rural tourism, with its massive development can cause noise, speaks the attitude of the respondent which is mostly negative (61.4% of them think that it does not create noise). Also, the respondents confirmed the fact that the development of rural tourism does not increase the costs of living, and that its massive development does not affect the increase in crime in the investigated municipalities. The hypothesis H3 that local people have a clear view that the development of rural tourism brings negative effects is disapproved based on analyzed data.

## Conclusion

Thanks to turbulent history, but also failures in the policy of supporting rural development, it is today economically and socially ruined. Rural areas in Serbia, although significantly represented as a resource, have not been sufficiently utilized for the development of tourism activities and the promotion of rural tourism products on the global tourism market. Especially, the nineties of the twentieth century, when the whole region was covered by a bad political and economic situation, is especially important. At that time, Serbia remained isolated from the region and therefore stagnated tourism, along with many other industries (Vujko et al, 2014).

It is very complex to plan the development of rural tourism, especially in today's conditions of enormous heterogeneity in a physically small area, as well as the economic backwardness of rural areas. The authors of the paper carried out the research in the North Banat area, and for the purposes of this paper only part of the research work will be presented, which deals exclusively with the perceptions of the local population about the development of rural tourism in a given area. Otherwise, the research is a wider work, but basic analyses is given in order to easily and clearly understand the data that point to the attitude of the population. It was surveyed in six municipalities: Kikinda, Kanjiža, Čoka, Senta, Ada, Novi

Kneževac in the period March and April 2017. The data processed undoubtedly indicates the positive attitude of the local population when it comes to the development of this form of tourist product. That power and society must be more involved in planning and development, are shown in the data from the given tables and the confirmed hypothesis of H1 and the H1a subhypothesis.

According to the respondents, the development of rural tourism has mostly positive effects, such as opening new jobs, raising standards and investing new investments. However, they are very indecisive when it comes to building new infrastructure. The hypothesis H2, that this form of tourist offer has positive effects, is confirmed. However, in the research, the authors also set the hypothesis that the local population has a clear view that there are negative implications of the development of rural tourism, where this hypothesis H3, after insight into the analyzed data, is denied.

In order to plan the development of rural tourism as a massive phenomenon, it is necessary to involve the authorities, external and local entities. It is one way to ensure a better rural population, preserve and improve rural resources, reduce comparative shortcomings in relation to competition, and find new ways to use rural resources. An integral system of rural development is a certain organization of central and local institutions in terms of administration, knowledge, information and decision making systems, social networks, etc., which operate in a coherent way, and in that sense they are able to realize the ideas of integral rural development theory.

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# VALUE CHAIN OF AGRICULTURAL-FOOD PRODUCTS[1]

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## Abstract

*With its specific determinants, during the previous decades, retail has been characterized by distinct competitiveness, concentration, consolidation and globalization. Diversification of the retail market has led to the saturation of the supply, which imposed the need for searching of sources of competitive advantage and creation of values in other domains besides those classically considered as retail. Companies are trying to change their business in order to find new ways of accessing to customers. Internationalization and consolidation of retail was reversed upside down the appearance of traditional retail. Fast and efficient operating procedures and new technologies are considered as permanent challenges for retailers. The term of supply chain management is relatively new in professional literature. First time it was mentioned in 1982. Supply chain represents a set of institutions involved in the process of goods transfer from the place of production to the place of consumption.*

*Retail is the last link in the supply chain. Successful management of the supply chain will result in significant savings and increased customer satisfaction. Retail is responsible for equalizing the individual needs of customers with the size of supply produced by a large number of producers. Managing to the supply chain of agricultural-food products should take into reconsideration only strategic suppliers within the value chain. Without close interaction with other supply chain members traders cannot fully realize their role in the supply chain. Entities involved in*

[1] This paper is a result of the project III – 46006 Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube Region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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*retail of agricultural and food products resort to managing the supply chains in order to face increased market insecurity and complexity, as well as competitive situations trying to reduce level of supplies across the entire value chain. Products' value chain describes the full range of activities needed to bring the product from production, transportation, processing and retailing to the final consumer. It has been expanded by series of combinations that involve engagement of equipment, labour, knowledge and skills, raw materials for the production of an agricultural or food product.*

*Efficient managing of supply chain of agricultural and food products should support the customers' satisfaction. Retailers operate at the point closest to customers, so they are in the best position to answer the questions when, where and how customers want certain goods. Supply chain management in retail of agro-food products represents a challenge in the phase of implementation and execution. It should be emphasized that traders of agro-food products which want to be successful, and understand the importance and functioning of supply chain management have to use the capabilities of all supply chain members in order to be more successful and profitable.*

*The value chain of the agricultural and food products is consisted of all members of supply chain that are active in the process of the value creation and products delivery to the final customers. Trade with agro-food products is resulting the value added, creating the assumptions of the competitive advantage at the market.*

**Key words:** *value chain, supply chain, agricultural and food products, value added.*

## Introduction

Managing the supply chain is inseparable from the size of value chain management. The value chain of agricultural-food products contains all members of the supply chain that participate in the process of creating the values and products delivery to the final customer. As the trade is highly competitive activity which must have much better and more quality relation within the supply chain that will result with additional value for the final buyer, nowadays it's the source of competitive advantage on the market.

From the need for more efficient relationship with the customer, a number of modern concepts have emerged, where the most famous is an Efficient Consumer Response (ECR). Starting point in ECR is also found by development of the concepts of supply chain and value chain management.

In order to achieve better efficiency, it is necessary to interconnect all members from the supply and value chain management. The emphasis is on the structure and processes between producers and traders i.e. on the integration of logistic processes. In order to strengthen their competitiveness, the chain members create even stronger connections creating partnerships in which they do not lose their independence - creating of strategic alliances (Ćejvanović et al., 2016).

## Theoretical determinations of the chain oriented by the value

The value chain is the series of nine primary and supporting activities which increase products or services values and which connect supply with demand side of the business activity. Because of that creating a profitable value chain requires adjustment between the consumers' wishes (the demand chain) and things made in supply chain. In order to maximize the value of supply chain, it is necessary to harmonize the flow of supply according to fast changing in consumers' wishes and demands (Perkov, Ćosić, 2012).

For some time, there has been controversy about the true value of the company, is it:

- The value assigned by market (market value);
- The value stated in the balance sheet of the company (the book value of assets reduced for liabilities);
- Expected performance, profit or cash;
- Nothing from previously mentioned;
- All previously mentioned is considered as the company’s value;

In order to achieve the success, for many companies the main goal is to maximize the so-called shareholder value. Value based management is focused on maximizing the shareholder value. Value based management can be classified as managing based on the value.

Criticism of mentioned theory appeared in 1980., when was promoting the aspect that the main goal of company was not only to increase values for owners (shareholders) but for all stakeholders. Regardless of which interest groups the company values are intended for, managing the companies' values is in the focus of the value based management. Value based management is also linked with the company's business efficiency (business performance).

Currently, management based on values is oriented to indicators that include costs of capital such as EVA methods - economic added value - in order to present the real company value, as well as CFROI method - the cash flow of return on investment.

During the managing of the company values, performance management indicators are the final results of the established and selected strategy. Managers must link the chosen strategy with the process of creating the value, in other words to choose the strategy that result with increasing of market share, customer satisfaction, increase the sales, etc. It should also result the increase of company value.

Managers must set the foundation of the value based orientation of entire organization and all levels of management in order to increase the value. Also they should to redefine the whole supply chain so that all chain members could be in position to reach the same value (Ćejvanović et al., 2016).

## Creating the value in chain

As was previously mentioned term supply chain is usually identified with the meaning of the term value chain. It was introduced by Porter, describing the profitability at each level or chain segment. By value is marked relative profit gained by each partner in chain. Value within the chain depends from the type of product that chain members are offering to the customer, in other words, depending of which kind of need it has to satisfy.

Supply chain is the creator of the value only when each member in chain is capable to create and catch certain level of the value. Value could be also reconsidered from two various aspects:

- Value is when something or someone is satisfying certain need, or expectation, in other words gives the feel of additional or greater value than real one.
- Value is the measure opposite to the costs. Many companies should increase the focus on the value component in compare to costs within the supply chain, what will resulted the decrease of final costs if chain efficiency go up.

In supply chain, focus on value added could recognize that it's a real one (final value) only when entire chain is brought closer to the consumer (buyer).

The challenges in creating the values primarily cover the faster conduction of processes e.g. faster adaptation of products, faster realization of products on the market, faster repay of receivables, etc. It is necessary to rationalize all processes within the chain, improve the products quality and increase the efficiency of delivery. Basically that means focus on challenges such as:

- Decrease of supplies;
- Adequate reaction on orders;
- Shorter and more reliable delivery within the entire chain;
- Products delivered according to postulate of exact quantity, quality and defined time in relation to appropriate costs;
- Close cooperation and linkage of all members within the chain based on mutual understanding.

Value creation could not be done individually within the chain. It's a two-way process that requires focus from all members. Also, it covers a decision making about mutual cooperation and coexistence within the chain. Besides, it's based on certain requirement, like what will be the best strategy for them, as well as what should they exactly exchange.

Exchange among members could be referred on anything, in order to create the value with mutual benefit (Ćejvanović et al., 2016).

- Personnel – exchange/lending of professional staff;
- Raw material – design, common supply;

- Facilities and equipment – common usage;
- Money – mutual lending, investments;
- Information – access to data;
- Working procedures – exchange of ideas.

If creation of value is considered from the aspect of shorter or longer period, in terms of links within the chain and mutual exchange of all elements, their connection could be presented as like in Table 1.

**Table 1.** *Creating value*

| Co-operative | Fellow's |
|---|---|
| Transactional | Exclusive |

**Source:** *Emmet, Crocker, 2009.*

Mentioned relations could be described or clarified as is presented in Table 2.

**Table 2.** *Relations in value creation*

| Position | Need for relation | Need for exchange | Description | Example |
|---|---|---|---|---|
| Transactional | Low | Low | Each member has its own goal and they are working commonly just to finish some short term activity | Routine products |
| Exclusive | Low | High | Specific short term exclusive exchange | Launching of new products |
| Co-operative | High | Low | Working together in order to secure supply, but there is no need for exchange | Problematic products |
| Fellow's | High | High | All parts are focused to common good and open access to mutual resources | Critical products |

**Source:** *Ćejvanović et al., 2016.*

## Examples of agricultural product's value chains

The value chain identifies primary and support activities. It defines a set of related activities that are conducted within one business unit. Each activity creates the costs and links between certain activities. The value chain also includes a business gain that buyers are willing to pay above the costs of conduction of both groups of activities.

A value chain is a line of primary and support activities by which the value is added to the products or services, or which links the supply with demand side of company's business.

Because of that the establishment of profitable value chain requires the harmonization of changes in customer wishes, i.e. the demand chain and part that was created within the supply chain.

In order to maximize the value of the supply chains, it is required to adjust the supply flow with the value flow starting from consumers, due to rapid changes in their taste, desires and demands (Perkov, Ćosić, 2012).

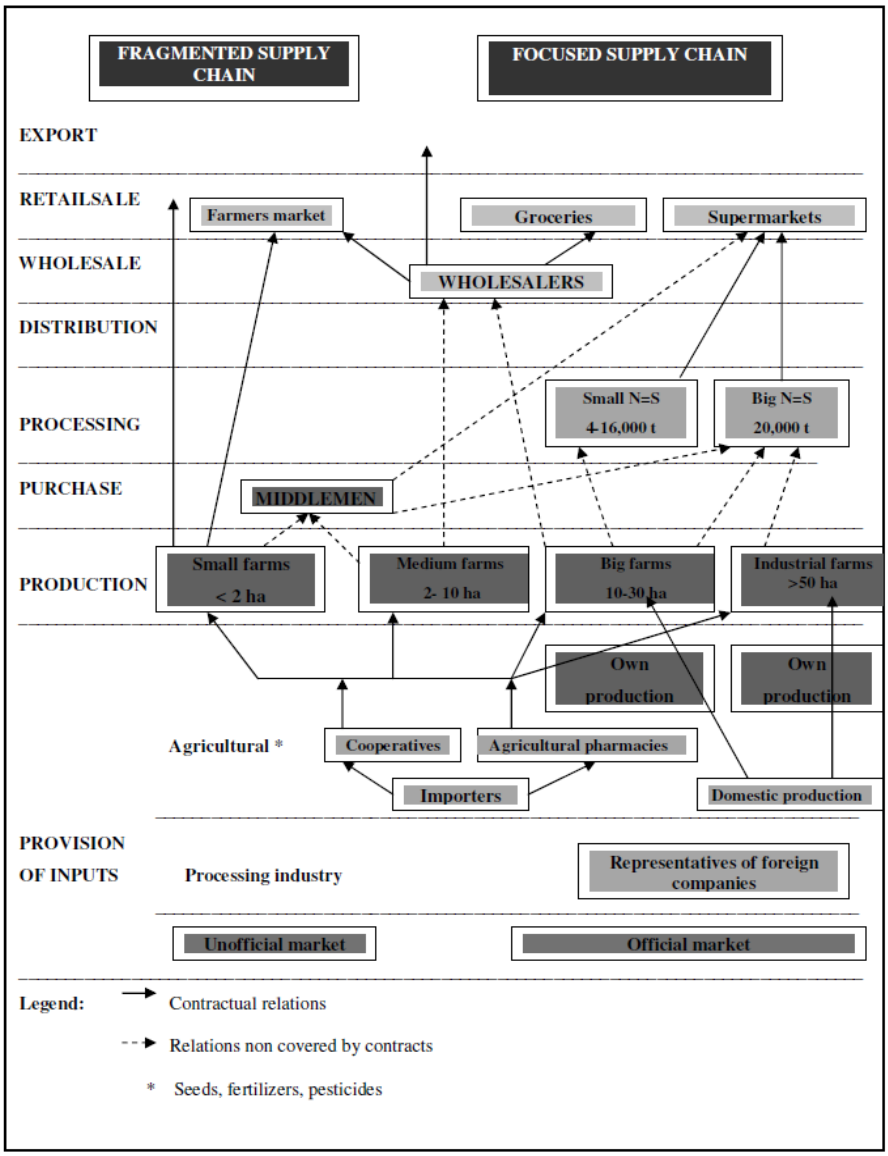
## Value chains of fruits and vegetables

The value chain of fruits and vegetables has its own specificities due to the different characteristics and types of fruits and vegetables.

Their production is of great importance because it provides to rural - agricultural holdings secure nutrition (primarily vegetables) and income (primarily fruits).

Most of fruits and vegetables and their products are offered on local markets or wholesale markets. Before all, that is caused by the lack of long-term contracts with processors or traders, lack of storage capacities and organized logistics, low level prices that does not enable investment in modern production technologies, which will secure enough volume of high-quality products that could be realized at the market, previously integrated within the existed value chains (FMPVŠ BH, 2014). In the Picture 1. is presented the value chain at fruits and vegetables.

**Picture 1.** *Value chains of fruits and vegetables*




**Source:** *FMPVŠ BH, 2014.*

Middle-sized producers (Picture 1.) oriented to the market (2-10 hectares), that are usually the main force for the development of the fruit and vegetable sector in competitive countries, unfortunately are not present in significant number, although they develop in certain amount better share in the value chain throughout the contractual relation with intermediaries.

But, they are usually short, primarily with storage capacities, equipment and labour (human resources). Besides, there are several large agricultural holdings and companies that have better machinery, equipment, human resources and marketing activities. Those holding supply stores within the retail chains, as well as export the part of their current production.

Collecting of fruit and vegetable (from smaller holdings) is mostly done throughout the intermediary traders, while larger producers could directly supply processors, wholesalers and retail traders. Main issues in collection process are:

- Lack of modern storage capacities;
- Lack of modern centres for distribution that imply new technology for processing and standardization of offered products;
- Inadequate transportation, caused by lack of proper transport capacities and underdeveloped (road) infrastructure;
- High costs of collections caused by dispersed locations of small agricultural holdings;
- Presence of grey economy (FMPVŠ BH, 2014).

There are rare exceptions that succeed to combat the main issues and organize supply chain in a way that meets customer requirements in terms of insured quantities and quality. Processing companies generally are not vertically integrated. From the aspect of input supplying, some of them are covered by contracts with small agricultural producers, while in terms of retail sale they usually do not have their own retail facilities.

According to mentioned, their power to negotiate with large retail chains is usually weak, especially in a situation described by strong competition of similar legal entities from neighbouring countries. Besides that, processors are facing the next problems:

- Inadequate quality and volume of domestic inputs;
- Obsolete technology;
- Low rate of capacities utilization;
- Growing of inputs costs;
- High rate of organic waste and increasing requirements related to environment protection;

- Limited and traditional assortment - prevails the „primary“ processing;
- Limited activities of marketing and promotion.

Although, large retail chains dominate at the market, their share in fruit and vegetable trade is still relatively low (around 10%), much lower than in trade with meat and meat products, fish or milk and dairy products.

Large retail chains have more significant market share in the segment of processed fruit and vegetables trade. On other side, domestic producers are underrepresented in mentioned process, as imported products are dominated, making the strong competition to producers from Bosnia and Herzegovina (FMPVŠ BH, 2014).

## Value chain of milk and dairy products

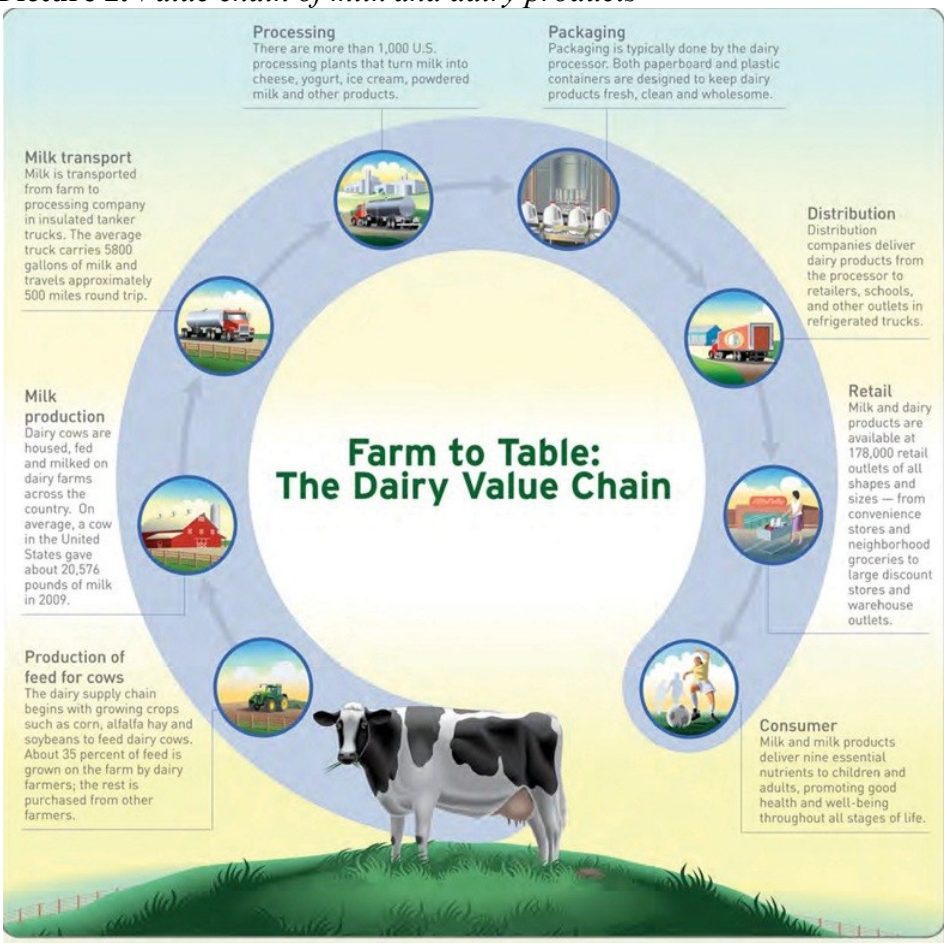
Milk and dairy products value chain represents a row of nine primary and supporting activities, throughout which is adding the value to products or services, or provides the link between the supply and demand side of company's business. Therefore, the creation of a profitable value chain requires the adjustment to change of clients' wishes, i.e. harmonization of demand chain with things created in supply chain.

In order to achieve maximal value within the supply chains, it is necessary to harmonize the flow of supply with the flow of value starting from consumers, due to rapid changes in their tastes, desires and demands (Perkov, Ćosić, 2012).

A value chain in the production of milk and dairy products constitutes a line of activities and procedures that are necessary in order to enable products availability to consumer. The value chain of milk and dairy products begins with the production of feed for dairy animals.

By their metabolism, dairy animals are producing the fresh milk which is transported to dairies on further processing into the several final products. After that, the final dairy products are packaging and preparing for distribution. Milk and dairy products are distributed to retail facilities where they are available to the customers (end consumers). The value chain of milk and dairy products is presented in the Picture 2.

**Picture 2.** *Value chain of milk and dairy products*




**Source:** *ICUSD, 2012.*

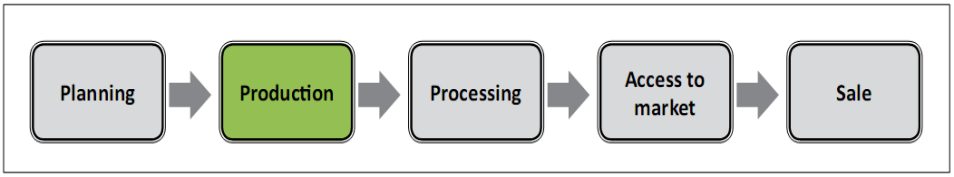
Each value chain has its own specificities that has be presented in detail and explained. This is also the case with the value chain for milk and dairy products, which is clearly presented in the Picture 2. It could not be seen from previous picture that value chain is also influenced by certain secondary institutions, laboratories for milk quality analysis, as well as by the foreign trade policy of one or several countries.

## Value chain in rural economy

The value chain of agricultural and food products within the rural economy are specific, having a certain peculiarities for each product individually. For all agro-food products are common that the value chain

starts with planning, followed by the production and processing. Then, the product is distributed to retail, where it could be available to consumers. The value chain of agricultural and food products in rural economy are presented in Picture 3.

**Picture 3.** *Value chain of agricultural-food products in rural economy*




**Source:** *FAO, 2012.*

Throughout the analysis of the value chain of agro-food products in rural economy, it could be concluded that certain attention to issues related to weaknesses in value chains has been considered.

It has to be done in such a way that the available opportunities will be utilized in order to turn latent natural and human resources of rural areas into the real and strong advantages that will provide adequate building and development of rural economies and communities.

## Conclusion

Recently, logistics and distribution have become more and more significant. Within their determination they are experiencing the renaissance, or notable metamorphosis of approach to the logistic performances of the company. Just in last ten years logistics has been recognized as one of the main company functions. It has been widely accepted by managers that the global approach to logistic issues and offered modalities (solution) is needed.

Creating of agricultural and food products value have not been realized individually within the supply chain. Creation of the value is a two-way process that requires focus and decision making about mutual cooperation and coexistence within the supply chain from all participants. It is based on the requirement what is the best strategy for them, as well as what should be exactly exchange between them.

The way which will improve the value chain of fruits and vegetables is recognized in certification of production process as the integrated

production. It could be achieved without large investments and major changes in production procedure. Fruit and vegetable producers have to accept the changes required from the European market.

Market standards are not regulated by the government, but in practice wherever the cooperation between the primary producers and fruit and vegetable processors is developed, elementary standardization has been adopted by limited number of producers. Mostly those are Global GAP (for primary production) and HACCP (for processing industry). Certification according to HALAL standard is also increasing.

A value chain in milk and dairy products production is constituted from the row of activities and procedures that are necessary in order to enable the availability of products to final consumer. It starts with the production of feed for dairy animals. By their metabolism dairy animals are providing the fresh milk that is transported to dairy plants on further processing into the several final products. Then, the final dairy products are packaging and preparing for distribution to retail stores where they are accessible to final consumer (customer).

Value chain of agricultural and food products in rural economy has its own specificities, depending by the focused product. Generally, the value chain of agricultural and food products in rural economy are starting with planning. Further it's realized throughout the production and processing activities, up to the distribution of products to the retail stores and final consumers.

Research presented in this paper are showing that agriculture and value chain of agricultural and food products have number of weaknesses, as they are not capable to compete at national and foreign market. Consequence of mentioned producers' weaknesses is their un-competitiveness, as well as incompatibility of their production capacities that should satisfy the needs of contemporary market.

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# POSSIBILITY OF SUISTANABLE PRODUCTION OF SOYBEAN IN CLIMATE CHANGE IN THE REGION OF BACKA TOPOLA AND NOVI SAD

*Gorica Cvijanović*[1], *Gordana Dozet*[2]

## Abstract

*Climate changes cause decrease of the height and the quality of yield of cultivated plants. According to measures implemented in the plant production with the aim of decrease of the greenhouse gases, aims of the researches should be directed to improvement of the production of the significant crop cultivation under the principals of the sustainable production. Significant position in new systems of the production belongs to soybeanbeans. Soya bean is very significant plant specie from the aspect of the vitamin providing for the human nutrition.Therefore, soybeanbean is significant for adequate relation with symbiotic bacteria from ecological and economy aspect. In integral system of cultivation (from 2008 to 2010) in region of Backa Topola during pre-seed fertilization with 50 kgN.ha$^{-1}$ and with the inoculation of the seeds by mixed cultures of the symbiotic bacteria and bacteria promoters of the growth of the plants can be reached stabile content of the proteins of the grain of 41,5% in the variety of Proteinka. In organic system of the variety of Valjevka soya bean (2013- 2015) by the stimulation of the seed with electromagnetic field of the low frequency the content of the protein from 40,22 – 40,24% can be reached by fertilization with 30 – 50 kgN.ha$^{-1}$.*

**Key word:** *climate changes, soybean, suinstainable production, Backa Topola, Novi Sad*

## Introduction

The end of the 20$^{th}$ century is specified by the measures that are conducted because of the reduction of the harmful gases that influence on global climate

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changes. European Union for this practical-political region about 20% of the budget was implemented for the period from 2014 – 2020.

In the period from 2006–2016 an average temperature of the air at the global level was higher for 0,83–0,89 $^{0}$ C. In that period 2015 was the warmest year because the increase of the average temperature was about 1 $^{0}$ C degrees (IPCC, 2013).Global warming influences significantly on the yields of the cultivated plant spices. The temperature increase has been identified as one of the main causes of the lack of the increase of yield of winter wheat in France, despite improvements in the plant breeding (Brinsson et al., 2010). International analyze of the influence of climate changes on the agricultural productivity in Europe gives clear picture of the worsening of agro climatic conditions through the increase of the drought and shortness of the vegetation period over big parts of south and central Europe. The lost caused by extreme weather and climatic anomalies in drought 2012 were more than 2 billion dollars because the increase of the maize yield was 55%, of soya bean 50–70%, sunflower 30%. Other studies show the increase of the unfavorable years for the agricultural production in various time zones (Trnka et al., 2014). According to Rotter et al, (2015) it is expected the future yield to be especially damaged by frequency and severity of extreme climate changes as heat waves and droughts.

The most important influence of the climatic changes in the future can be related on decrease of yield and the quality of the fruit caused by increase temperatures and the intensity of the drought, increase of the danger of the last spring frost, increase of the danger of the diseases and of the pests and emergence of new ones as well as of increase of the fertility of the field.

## Causes of global warming

There is the global warming without any doubts and it is considered to be caused by increased concentration of the gases that provoke the effect of greenhouse. The main cause of the existing effect of the greenhouse is carbon dioxide that belongs the most important gases that absorb heating radiation (infrared IC) emitted from the Earth. Average concentration of carbon dioxide itself in the atmosphere in 2016 reached 400 ppm, which is for about 40% more than in the period from the mid to the end of 19$^{th}$ century. The participation of the carbon dioxide is 61% in total gases of the greenhouse effect (methane 15%, nitrogen oxides 10%, Freon 9%, the rest ozone and water vapor 5%). The level of some important gases of the greenhouse has increased for about 25% from the start of the industrial

period about 250 years ago. The concentration of the carbon dioxide is mostly by the anthropogenic origin, about 73% is the result of the combustion of the fossil fuels. According to many studies this concentration of carbon dioxide has resulted by the increase of the air temperature on the global level. In the report of the Intergovernmental Panel on Climate Change – IPCC it is written that the emissions of the greenhouse gases caused by human activities significantly influence on the increased warming of the atmosphere.

According to recent analyze conducted by NASA (National Aeronautics and Space Administration), Goddar Institute for the space studies (GIIS), medium temperature has been increased for about 0,8% ºC since 1880 (0,3-0,6 ºC/100 years), since the regular measuring of the temperature has started. The process of the urbanization is one of the main causes of the disturbance of the natural sustainable systems which consequence is the global climate change (World Energy Council, 2007). For example in 2015 the number of mega cities in the world reached the amount of 22 mega cities (Population Reference Bureau, the official web presentation). In the first half of the twentieth century there was noticed smaller increase of the temperature while the significant increase (2/3 of the total amount of the temperature increase) since 1975. For this period it is connected the significant increase of the industry, consummation of fossil fuels as well as demographic migrations village – city.

The first decade of the 21$^{st}$ century was the warmest since 1880. Long term aim of the UE is decrease of the gases emission thus the average global temperature would not raise more than 2 $^{0}$C comparing to the period of the end of the 19$^{th}$ century (UNFCCC, 2010). That would demand that global emission of the greenhouse gases until 2050 has to be decreased from 40 - 70% comparing to 2010 (Edenhofer et al., 2014). The increase of the average temperatures as a consequence has not only global warming but other extreme changes as droughts, heating waves and other extreme changes that influences significantly on the big variability of the plant yield in the last decades such as happened to corps (Hawkins et al., 2013), potatoes, wheat and barley (Supit et al., 2012) and provoke economic consequences.

The influence of global warming on the region of Republic of Serbia has been represented by the tendency of the increase of the temperature of the air. According the data from the period from 1951- 2015. the most intense increase of the annual temperature of the air 2,0–2,5 $^{0}$C/100 years is constantly present on the north of the country, on the region of Loznica and

on the wider outskirts of Belgrade and on the region of Negotinska krajina. On the basis of the climate modeling within the project "Orientgate" (http://www.orientgateproject.org) for the period from 2021-2050 and 2071-2100 that compared with the referent period from 1971-2000 (Djordjevic and Krzic, 2014) the increase of the temperature will be significant for both periods (Tab 1) .

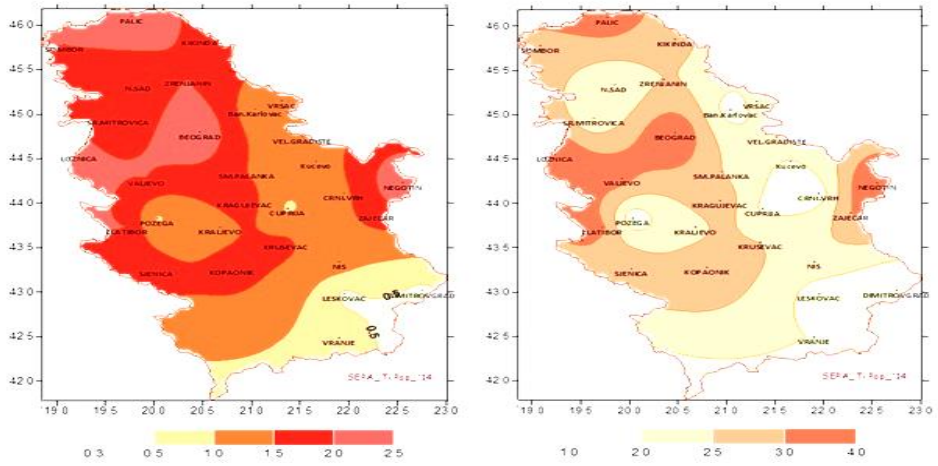
**Table 1.** *Projected increase of the average a daily temperatures of the air ($^0$C) for the period 2021-2050 and 2071-2100*

| **Changes in the period** | **2021-2050** | **2071-2100** |
|---|---|---|
| Average annual temperature | +2 (+2,5) | +5,65 (+5,6) |
| Average seasonal temperature | | |
| winter | +2,95 | +6,3 |
| spring | +1,7 | +4,65 |
| summer | +1,25 (+1,3) | +5,4 (+5,45) |
| autumn | +2,4 | (+6,05) +6,10 |
| Number of the hot days annually (temperature >25$^0$C) | +12 | +60 |
| Data in brackets show the results of the projection for parts of Belgrade | | |

**Source:** *http://www.orientgateproject.org*

In Serbia has been increased the intensity and the lasting of the meteorological droughts (Popovic, 2007) as a result of the increased temperatures, decreased summer rains and higher number of the longer drought periods. This trend will be continued especially on the southeast and east of Serbia. (Pic.1).

**Picture 1.** *Territorial division of the trend, annually (left) and summer (right), the temperature of the air ($^o$C/100 annually) in the region of Republic of Serbia, 1951 to 2013)*




**Source:** *http://www.hidmet.gov.rs*

According to the date of meteorological measures in Novi Sad and Backa Topola the average temperature in period 2014 -2016 was for +1,7 $^0$C in Novi Sad and for +0,9 $^0$C in Backa Topola higher than temperature for the period 1964 – 2-15 (11,4 $^0$C). On the basis of the measures obtained there were noticed higher average air temperatures in Novi Sad than in Backa Topla that is economically and demographically less developed (Tab 2).

**Table 2.** *Average temperatures of the air ($^0$C) for the period 2014-2016 and deviations from perennial average for Novi Sad and Backa Topla.*

| Location-period | Average 1964-2016 | 2014 | 2015 | 2016 | Deviations 2014-2016 |
|---|---|---|---|---|---|
| Novi Sad | 11,4 | 13,0 | 13,1 | 12,3 | 1,4 |
| Bačka Topola | 11,4 | 12,3 | 12,2 | 12,4 | 0,9 |

**Source***: Meteorological measures at the stations in Novi Sad and Backa Topla*

Demographic increase of the inhabitants has important influence at the degradation of the environment. According to the data FAO only in the developed parts of the world the daily needs for food of people have been increased from 2.470 to 2.730 calories. Owing to these drastic changes agriculture as the basic occupation for the providing of enough food endures the most. Agriculture is the main sector where emission of greenhouse gases has been the least decreased. In total emission of the nitrogen the agriculture in UE - 28 in 2013 participated with 93%. In the last three years by implementing certain measures the emission of the nitrogen gases has been decreased for 6%. Apart from the nitrogen the agricultural sector in the highest percentage (50%) participates in the emission of the methane $CH_4$ (EC, 2005).

Based on the obligations that UE accepted the decrease of greenhouse gases up to 2020 there should be until 20% among which is envisaged the reduction of the level of the emission of the gases (GHG) from agriculture till 10% in regard to 2005 (Directive No 406/2009/EC). Agriculture will face many challenges during the following decades. Extreme weather conditions, and to a lesser degree changes in seasonal and annual precipitation and their mutual influence with the temperature will cause most probably the serious consequences on the agriculture. According to analyses carried out by Intergovernmental Panel Climate Changes it is possible that by 2050 the significant negative effects will have caused prolonged droughts, heating waves and floods as well. It is expected that these extreme weather conditions will be of higher intensity and that will happen more frequently and in more parts of UE and probably cause the

damage of the yield. According to Minguez et al (2007) on the region of Europe (Western France) some parts of eastern south Europe (Hungary, Bulgaria, Romania, Serbia etc. ) caused by hot and dry summers the yield of the cultivated plants will be decreased. The predicted climate changes will influence on the choice of sorts of cultivated plants because the locations of agro–climatic zones will probably move towards the northern latitude. Adverse impact is also to be expected in the distribution, appearance and intensity of the existing pests, diseases and weeds as well as in the appearance of the new ones.

One of the ways of the decrease of the greenhouse gases in the field of the food industry are the sustainable systems as precision farming and low input sustainable Agriculture. Low input sustainable agriculture in the world represents widely accepted way of the food production firstly from the aspect of the energetic efficacy and improvement of the environment (Gerovit at al., 2013). This way of production suppose the plant cultivation that have less requires for inputs as well as biological preparation.

## The significance and the advantages of the soybean cultivation in sustainable systems

Annual legume spices that is very interesting for the sustainable systems of the soybean production (*Glicine max* (L) Merr.). The first reason of justification of the increase of the surface under soybean is for sure favorable chemical composition of the grain. In the soybean grain there are between 35 and 40% of the proteins that contain all eight essential amino acids necessary o the human body.

In the world, in period 2004 – 2014 surface under soybean were 100,615 million that is for 13,10% more than in period 1996 – 2004 when under soybean there were about 77 million ha. Average yields were higher for 6,69% for the same period. It can be said that the increase of the yields contribute to the enlargement of newly created sorts, adjusted for various agro ecological conditions. The demand for the soybean production is increasing especially in EU because of the wish to decrease dependency of the import. Participation of EU in total world soybean production is 2,91%.

Participation of Republic of Serbia in total world production is 0,14% while participation related to EU is 3,43 % /(Tab.3)

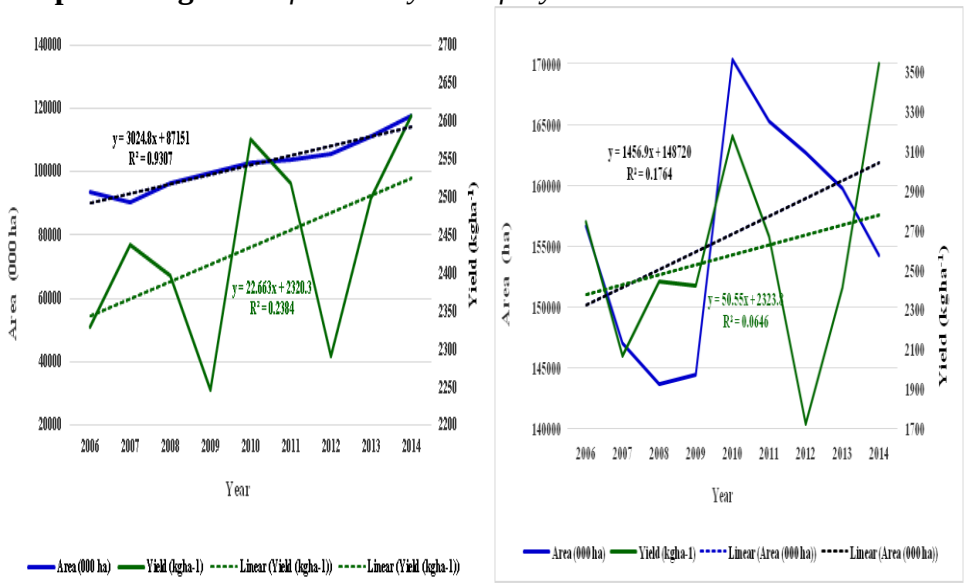
**Table 3.** *Soybean production (000 t) in the world and in EU*

| Continents | Yield t ha $^{-1}$ | Production 000 t | Share of area, %** |
|---|---|---|---|
| **The bigger soybeanbean producers in word 2014** | | | |
| World | 2,6 | 308.436 | 100 |
| America | 3,0 | 271.214 | 87,93 |
| Asia | 1,3 | 25.761 | 8,35 |
| Europe | 2,0 | 9.001 | 2,91 |
| Africa | 1,3 | 2.377 | 0,77 |
| Oceania | 2,2 | 80 | 0,03 |
| **The bigger soybeanbean producers in Europe, 2014** | | | |
| Europe | 2,0 | 8.990 | 100 |
| Russia | 1,4 | 2.682 | 29,83 |
| Ukraine | 2,2 | 3.945 | 43,88 |
| Italy | 4,0 | 600 | 6,67 |
| Romania | 2,6 | 205 | 2,28 |
| Serbia | 2,1 | 309 | 3.43 |

**Source:** *FAO statistics; http: //faostat.fao.org/2016*
***calculation of the author on the base of the statistic data*

Increase of the surface and the yields of soya bean in the world and in the Republic of Serbia have positive correlative dependence and the trend (Graph. 1 and Graph. 2).

**Graph. 1 - left -** *Surfaces and yields of soybean in the World*
**Graph. 2 – right -** *Surfaces and yields of soybean in Serbia*




**Source:** *http://www.fao.org/faostat/en/#data/QC*

Due to the specificity to provide nitrogen from the system of legumes risobium is a very good first crop because after the harvest there remains a big quantity of organic nitrogen that is slowly mineralizing in the following year it is used 1/3 of the nitrogen that is consisted in them and that increases the yield for 0,2–0,3 t ha t $ha^{-1}$ of the following cereal (Djukic et al., 2017, Dozet et al., 2013).

Apart from its position in rotation of crops soybean is very adequate for the combined breeding systems thus increases yield and protection of the main yield of the disease and the pests. Combination of soybean with maize or with wheat is significantly decreased accumulation of nitrate nitrogen in the land and with it the possibility of contamination of the underground and surface watercourses (Malone at al., 2014). The role of soya bean in the combined crops is very significant especially in the places where there is a risk of the diseases, pests, weeds, erosion and other risks. The soybean seeds in the finishing is not treated by the remedies for the protection of the disease and that is why it is adequate for the organic system of the production. Due to its qualities and the advantages there was established The Association of the Danube countries region "Danube Soybean" whose main aim is the promotion of the cultivation of genetically unmodified soybean (GMO free) as the base for the production of the high quality food of declared geography origin.

Soybean grain is used in many products for human nutrition thus it is necessary that the part of the soya bean production is without usage of mineral fertilizers and pesticides. Clinical studies show that soybean consuming decreases risk factors for cardio vascular diseases. That led to the approval of health request for the soybean consummation i.e. soybean proteins, as food in the prevention of coronary disease of hart. Similar health requests for soybean proteins were also approved in the UK, Brazil, South Africa, Filipinas, Indonesia, Chorea and Malaysia (Xiao, 2008).

The conditions for the soybean production and other plant species vary from the year to the year. Soya bean is especially sensitive to the stress caused by drought that leads to the yields variability. In the period July - August the maximum daily water requirements in soybean and they are 100-120 mm. This period coincides with the period of the most frequent water deficit. According to Dragovic (1994) the drought in reproductive phase of the forming of the legumes decreases the yields for 21% in the phase of the grain filling beans of the droughts that lasts for 52 days that decreases the yields for 35%. Total daily water requirements in soya bean

on the base of many researches and practical examples for the region of Vojvodina is from 440 to 450 mm.

By the regressive analyze ($R^2$) of the movements of the temperature and the soybean yields on the region of Backa Topla it was determined that the temperature did not have the significant influence on the increase or decrease of the yields while by the increase of the precipitation ($R^2$ = 0,24), there was determined increase of the yields ($R^2$=0,14), that indicates that soybean is more important disposition of the precipitation than the amount of it for the vegetation period.

All these characteristics give prevalence to soybean in the production and motivate the scientific and professional public for the finding of the new methods that may influence the increase of the yields of the soybean proteins in the system of organic production in the conditions of climate changes.

## The possibility of the protein content in the soybean by the implementation of the various inputs in sustainable forms of the soybean production

New production tecnologies request the addoptation of the most important measures and are cosisted of the reduced systems of the land coltvation, usage of the organic and micorobiology fertilisers (Cvijanović et al., 2007; 2015).

## Integral system of the soybean production

Nowadays conditions of the production it is necessary to implement the various models of the production, strategy of the production management and the inclusion of many natural assets and organisms. Within new technologies there can be involved various groups of the microorganisms that are isolated from the natural habitats and can be applied to the seeds, land or foliar through the leaf.

Among microorganisms of the active bio fertilizers the high importance has the group of symbiotic nitrogen fixation (*Bradyrhizobium japonicum)* and microorganisms that live in the association with plants. In this process microorganisms fix inert atmospheric nitrogen transforming it in the forms available for the plant nutrition. Considering that microorganisms that develop and live in the land combined with the roots of the plants by their stimulating activity influence on the development and the yield of the plants with the products of their metabolic activity (hormones, vitamins,

auxin, gibberellins). In the period of 2008 - 2010 on the area of Backa Topola the most adequate year for the soybean production was 2010.

The average monthly temperature during the vegetation was 18,5 $^0$C, that was the lowest temperature for the examined period. In this year there was determined the highest amount of the precipitation 645 mm. In such a different agro ecological conditions the aim of the research was to examine the influence of the various groups of microorganisms in the production of Proteinka soybean variety on the content of the protein in soybean in the conditions of integral production. The fertilization was done in the treatment before sowing by urea 47% N in the amount of 30, 50 and 80 kgN.ha$^{-1}$. Before the harvest there was performed inoculation of the seeds by various types of microorganisms. In one variant there were used the symbiotic bacteria *Bradyrhizobium japonicum*, and in the other variant there was performed mixture of symbiotic bacteria with bacteria with promoters of the plant growth (PGP) *Azotobacter chroococcum, Azospirillum lipoferum i Pseudomonas sp.* In such conditions of the production the content of the proteins was three times increased from 0,93% to 1,71%. The highest amount of the proteins (40,80% -41,18%) ($p<0.05$) was determined in 2010. Due to good agro meteorological conditions in this year there was determined the lowest increase of the protein content (0,93%), between inoculation variance (Tab.4).

**Table 4.** *The content of the proteins (%) in the conditions of integral soybean production by application of various groups of microorganisms bio fertilizers*

| | | 2008 | 2009 | 2010 | Average |
|---|---|---|---|---|---|
| Average monthly temperature in vegetation (°C) | | 19,5 | 22 ,8 | 18,9 | 19,2 |
| Amount of precipitation in vegetation (mm) | | 351 | 356 | 645 | 450 |
| Fertilizers 30 kgN.ha$^{-1}$ | *Brad. japonicum* | 40,22 | 40,48 | 40,48 | 40,39 |
| | *Brad. jap.*+ PGP | 40,64 | 41,00 | 40,85 | 40,83 |
| Fertilizers 50 kgN.ha$^{-1}$ | *Brad. japonicum* | 39,87 | 40,97 | 40,68 | 40,51 |
| | *Brad. jap.*+ PGP | 40,99 | 41,25 | 40,90 | 41,05 |
| Fertilizers 80 kgN.ha$^{-1}$ | *Brad. japonicum* | 40,27 | 39,62 | 41,26 | 40,38 |

**Source:** *researches of the author*

Adoption of the mineral nutrition from the soil and their grade of exploitation in soybean depend on meteorological conditions during the vegetation period so in the years with significant water deficit there was determined lower protein content. In the researches there was not determined statistically significant increase of the protein content in soya bean with the increase of the quantity of mineral nitrogen.

Furthermore the highest quantity of the nitrogen (80 kgN.ha$^{-1}$) influenced on the decrease of the protein content in soya bean during both types of inoculation. However, in all variants of fertilization in average by mixed inoculation reached higher percentage of the increased protein content in the grain (1,63%-1,71%). On the base of the obtained results it can be said that in the conditions when the temperature of the air is higher than perennial average in the region of Backa Topola in conditions of integral soybean production, by fertilization with 50 kgN.ha$^{-1}$ there can be realized economically payable yields of the protein in soybean. According to the researches done by Trnka Olesen et al (2011) in big parts of south and central Europe the changes of climate agro climate conditions expressed through increased stress of the plants and the shortening of vegetation thus increases the risk of the loss of the yields (Trnka et al., 2014). It can be said that in the various agro ecologic conditions by the application of the various groups of microorganisms can be alleviated the effect of the stress and realized safer production. However, protein content, the yield and the oil are hardly genetically tied characteristics so by increase of the proteins can provoke the decrease of the oil content in soybean which was determined by the researches of Popovic et al., (2013).

## Organic way of soybean production

Due to listed advantages of soybean growing its representation in the organic production is increasing. The average price of soybean from organic production with the official report from the 19$^{th}$ July 2017 was 17,89 $/bushel (http://www.ams.usda.gov/mnreports/lsbnof.pdf), while from the conventional production it was in the period from 10$^{th}$ to 17$^{th}$ July 2017 without daily vacillation: 10,39 centi/bushel (http://www.quotesoybeanbeans.com/).

In the conclusions of Dozet et.al. (2014) on the base of the conducted experiment and total agro economic comparation and conventional soybean production it is stated that the yields in organic production are lower related to conventional way of growing but observing the price per unit of measure that the ecological soybean production is economically justified.

Total surface area in the process of certification (including organic status of the plot area and plot area in conversion period) in Republic of Serbia are 7998 ha, plus meadows and pastures 1549 ha. The soya bean production by ecological principles (organic production) has tendency of the increase of the surface and in 2015 there was sown more organic soybean for 46,4% in

relation to 2012. In 2015 there was sown 31,3% compared to other industry plants (http://www.dnrl.minpolj.gov.rs/o_nama/organska.html).

In organic systems of the production the prevalence is given to bio fertilizers. However the last years the number of the researches related to application of some methods in the field of bio physics that will mark 21$^{st}$ century (Lazetic et al., 1990). Application of Pulsed electromagnetic fields (PEMP) as bio stimulators can be considered the main concept of "quant agriculture" that is intensively debated last years (Aladjadjiyan 2012). Exposure of the seeds to the magnetic fileds before the harvest is one of the safe ways to improve germination the development of the plants and safer production in changed and hardly predictable climatic characteristics (Vashisth and Nagarajan, 2010). According Aladjadjiyan, (2012) activation of the plant growing especially of the germination can be accelerated by using of the optimal frequency of the outer electromagnetic field. The prevalence of the using of PEMP as a bio stimulator of the seeds has the advantage related to traditional systems of the production because they do not have toxic remains. The results of the seed stimulation with PEMP depend on the characteristics of the seeds, of the type of the plant, frequency and the time of stimulation lasting. Nedialkov et al. (1996) by using pre harvest treatment with magnetic fields approved the positive influence on the seed of soybean, maize, peas, beans and gombo in terms of increase of the yield related to the control. According to newer researches Baghel et al. (2015) it was determined that the treatment of plants of soybean and maize increases the intensity of the process of the photosynthesis, biomass and the yield while Kataria et al., (2015) determined that by the treatment of the seed of soybean and maize there was increase of the rate of the germination and the seedling increase, faster adoption of water and activation of enzymes responsible for the sprouting and 37.93%. That is why, according to (Staykova et al., 2008) is necessary to find out the right combination for the various plant species.

The researches of the organic system of growing soybean variety Valjevka were conducted in Novi Sad on Rimski sancevi in the period 2013-2015. As the main fertilizer there was used the poultry manure in various quantities that satisfy the quantity of nitrogen of 0, 30, 52 kgN.ha$^{-1}$. Right before the harvest there was conducted stimulation of the soybean seeds by pulse electromagnetic field (PEMP). Stimulation was conducted on the dry seed by the field of the low frequency 15 Hz that lasted for 30 minutes.

In the researched period there were recorded various agro meteorology conditions. The most adequate year for the soybean growing was 2014, 2013 was the average while 2015 was very unsuitable because of the big drought in the period of vegetation April- September (Tab. 4). Stimulation of the seeds influenced in the average on the increase of the protein content from 1,6% in 2013, in 2014 with 4,45%, while in 2015 the increase of the protein content was 3,55% which was on the level $p<0,01$ of the significance in relation to the variant without stimulation. The content of the proteins was smaller in 2015 in both variants of th3e researches. The protein content in soybean in 2015 during the stimulation of the seed (39,28%) was for 1,45% less than the protein content (39,86%) in 2013 that was an average year for soybean production. 2015 had the less suitable agro meteorology conditions it can be said that by the stimulation of the seed can decrease the consequences of unsuitable agro meteorology conditions and in and easy way provide the safer production.

**Table 5.** *Protein content (%) in soya bean under organic fertilization conditions with seed stimulation by pulsating electromag. field*

| | | 2013 | 2014 | 2015 | Average |
|---|---|---|---|---|---|
| Average monthly temperature in the vegetation (°C) | | 18,7 | 18,3 | 19,8 | 18,9 |
| Amount of precipitation in the vegetation (mm) | | 448 | 595 | 389 | 477 |
| Fertilizers 0 kgN.ha$^{-1}$ | *Without stimulation* | 39,05 | 39,06 | 38,80 | 38,97 |
| | *Stimulation* | 39,37 | 40,02 | 38,88 | 39,42 |
| Fertilizers 30 kgN.ha$^{-1}$ | *Without stimulation* | 39,83 | 38,65 | 38,83 | 39,10 |
| | *Stimulation* | 40,25 | 41,25 | 39,21 | 40,24 |
| Fertilizers 52 kgN.ha$^{-1}$ | *Without stimulation* | 38,83 | 39,18 | 36,17 | 38,08 |
| | *Stimulation* | 39,96 | 40,95 | 39,75 | 40,22 |
| Average % proteins | *Without stimulation* | 39,23 | 38.96 | 37,93 | 38,58 |
| | *Stimulation* | 39,86 | 40,74 | 39,28 | 39,96 |

**Source:** *Cvijanović M. 2017*

## Conclusion

Without any doubts the global warming leads to aggravation of the agro climatic characteristics significant for the primary plant production. Due to the unpredictable heating ways, droughts and the shorten of the vegetation

period leads to the decrease of the yields of the basic tiller cultures. The number of the unsuitable years of the agro culture production in the various climate zones is increasing constantly. Sustainable way of soybean production in the conditions of the increased average temperature of the air and the leak of the precipitation Sustainable soya bean production in conditions of increased average air temperature and lack of precipitation in order to increase protein content / yield is possible.

In the integral production by inoculation of the seeds with mixed bacteria species of microorganism groups (symbiotic and bacteria promoters of the plant growing) it is possible to realize stabile production of soya bean with the content of the protein of 41,05% during the fertilization with 50 kgN.ha$^{-1}$.

In the organic production by using of the methods from the biophysics field (by stimulation of the seeds by electro magnetics field of low frequency can be realized economically justified production of soya bean with the protein content of 40,24 % with the fertilization with 30 kgN.ha$^{-1}$, while with the fertilization with 50 kgN.ha$^{-1}$ the protein content was 40,22%.

The yields in the organic production are lower relative to the conventional way of growing but considering the price on the unit measure, ecological soya bean production is economically justified.

## Acknowledgement

Paper work is part of the project research no. III46006, financed by the Ministry of Science and Environmental Protection of Republic of Serbia

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# WORLD'S LAND GRAB AND SUSTAINABLE AGRICULTURAL DEVELOPMENT, FOOD SECURITY AND RURAL POVERTY

*Ivan Lovre*[1]

## Abstract

*After the outbreak of the 2007-2008 global financial crisis caused a food crisis, the world faced a revived interest in the global food system and its potentials to feed the growing world population and ensure the ecological sustainability of the planet. The crisis manifested all the instability and vulnerability of the food system to the shocks of extreme climatic disorders, energy and financial markets, as well as the state market interventions. It has become obvious that the combination of these factors has a devastating impact on the poorer part of the population with a growing influence depending on the poverty degree, natural resources and the environment. Nowadays, not even Western theorists dispute that extensive acquisitions of agricultural land represent deep contradictions in the corporate food regime.*

**Keywords:** *Acquisitions, Investments, International institutions, Agricultural land, Food security, Rural poverty.*

## Introduction

During the global financial and food crisis in 2008, the world witnessed an unprecedented (excluding the period of colonial conquest) global race for the appropriation of large areas of agricultural land. In journalism and literature, the term 'land grab' was created, defining the loss of agricultural land of the rural population due to extensive acquisitions either by foreign corporations, funds or states, or by purchase, leasing arrangements or some other form of long-term control. Agricultural (and to a lesser extent, forest) land has become the potential for investment benefits in food-deficient countries, but also for private investors who have sought new financially beneficial sources during the economic disorders. The trend is so conspicuous that it causes, on the one hand, a solicitude avalanche by

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media, researchers, activists and ecologists who argue that private land investment have encouraged the development of monocultural, export-oriented agriculture, endangering global food security. On the other hand, however, the proponents of extensive land acquisitions advocate the idea that investments enable the countries with fragile food security to gain access to agri-food resources, and that the "host countries" benefit from these investments in the form of improved agrarian infrastructure, new technologies in food production and growing employment advantages, denoting this trend as a "win-win" outcome. Although the rhetorical verification of this outcome is expanding, there is no evidence that the rural economy and the living standard of the rural population have been improved in the countries where extensive land acquisition has taken place. Moreover, despite the appeals of international institutions (including the United Nations and the International Food Policy Research Institute - IFPRI) for the adoption of the International Land Acquisition Code[2], most of the acquisition agreements are neither transparent nor they have improved the status of small agricultural households.

Beyond doubt, international acquisitions of agricultural land are unprecedented in recent world economic history. "Land grabbing under colonialism was tragedy, this time (it is) repeating as farce."[3] Therefore, the intention of this paper is to highlight the trends and motives of international acquisitions of agricultural land, control transfer from the public to the private sector and from domestic to foreign entities as the crucial factor in the food production, as well as their implications for food security and rural population.

[2] In 2009, in its publication "Land Grabbing by Foreign Investors in Developing Countries: Risks and Opportunities," IFPRI appealed for the adoption of an international code of land acquisitions. According to this Institute, the code should be binding for both foreign investors and host countries, in order to protect the interests of small farmers, the environment, biodiversity, water and land resources from the dangers arising from large scale investments in agricultural land. In 2014, framed by FAO, the World Food Safety Committee adopted the Principles for Responsible Investment in Agriculture and Food Systems (see more in FAO, CWFS, 2014). In 2012, the same Committee adopted guidelines for responsible governance of agricultural, fishery and forestry resources. However, from the very title of this guide (Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests) it is clear that the elaborated principles are non-binding (FAO, CWFS, 2012 and FAO, 2016a).

[3] McMichael, P. (2012), p. 681.

## The rationales for acquisitions of agricultural land

The phenomenon of the sale and purchase of agricultural land is the result of a combination of factors that are motivated by price volatility on the world market, the global food crisis, and a high level of speculative activity. However, the three basic factors determine massive land acquisitions: 1) the efforts of food-deficient countries to ensure a satisfactory level of food security 2) the growing demand for biofuels and industrial processing of agricultural products; 3) the investment rise in both the land market and the agri-product market, in order to generate profit.

Factors affecting food security are numerous. The rise in food prices, influencing the deterioration of payment balance and inflation rate, as well as climate changes, low-quality and scarce land, and water resources shortage coupled with economic growth and demographic change have motivated many countries in Asia and the Middle East to review their food security policies. Endeavors of many countries to stabilize the supply of food on the domestic market have manifested themselves as acquisitions of agricultural land abroad, hoping to avoid significant disturbances in the demand and food supply balance. The fear of global food shortages is still inherent since the food prices are on a relatively high level. At the same time, being the core of the global food problem, the emergent food demand has not been reduced in the countries of Sub-Saharan Africa. In addition, the Persian Gulf States, with scarce agricultural resources and abundance of oil and foreign exchange reserves, have experienced supply and demand imbalance, as their food deficit has burdened their payment balance. Net food imports in these countries increased from $8 billion in 2002 to around $30 billion in 2015. Therefore, these countries make efforts to gain agricultural resources necessary for food production. The countries of the Far East (primarily China, Japan and South Korea) are also seeking for significant acquisitions of agricultural land abroad as a part of their strategy for achieving food security.[4]

Another important point, which defines extensive land acquisitions, is derived from energy strategies of primarily developed countries. The shares of renewable energy production and consumption have been generally defined by energy development strategies of most of the developed

[4] The example of China is more than illustrative. China, with a share of 19% in the world population, has only 8% of the world's agricultural land.

countries.[5] Agricultural crops (cereals, oil crops, sugar cane, etc.) are very suitable (technologically and financially) for this type of industrial processing. Attracted by the growing demand for biofuels, investors (mainly from the private sector and developed OECD countries) literally rushed purchasing vast areas of agricultural land in developing countries, with the aim of making them suitable for the production of biofuels. Generally speaking, bioenergy crop production in underdeveloped countries has comparative advantages over their production in developed countries, primarily due to lower labor costs, lower costs of buying and leasing land.

Finally, institutional and private investors have identified agricultural land as an exceptional investment advantage that creates significant incomes.[6] The growing interest of investors can partly be explained by their reorientation from the traditional commodity markets to the agricultural product market, which is motivated by the "explosion" of agricultural and food product prices. The price increase of agricultural and food products has led to the profits exceeding those made on traditional markets of metals and oil. After 2008, the number of investors expecting a high level of capitalization in the agricultural product market has rapidly increased, and investments in land and agricultural operations have expanded throughout the world. Moreover, apart from institutional and private investors, many developed and developing countries with emerging economies have formed state or public-private funds with the primary goal of investing in the purchase or lease of agricultural land.

On top of these factors, the fact that a demand for agricultural land is a derived demand, since it originates from the demand for agricultural products, should not be ignored. This means that the demand for land responds to the growth of prices (demand) of agricultural products. The implications of the growth in demand for agricultural products on the land

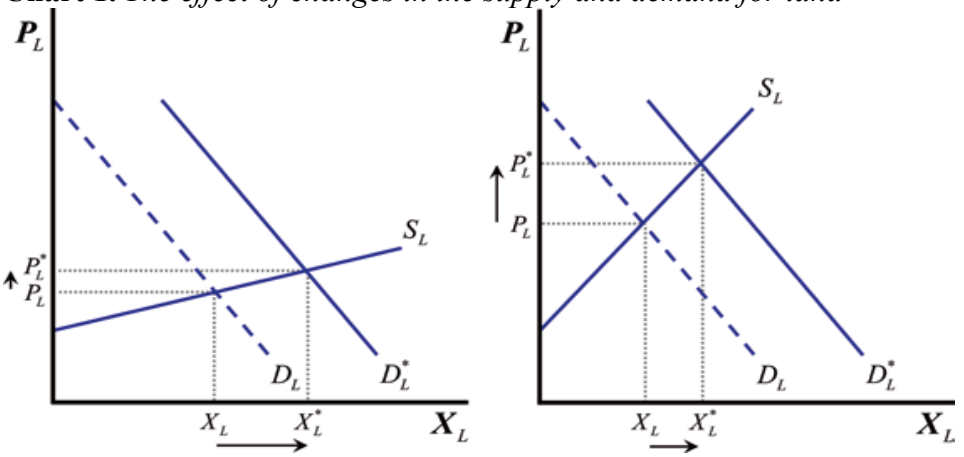
[5] For example, the EU has set a goal of 10 percent of energy used in land transport to come from biofuels by 2020.

[6] The paper length does not allow a more detailed presentation and analysis of extensive acquisitions by investment funds and companies. Here are a few examples: Morgan Stanley has bought 40,000 ha in Ukraine, Goldman Sachs has taken over the production of livestock and poultry meat, including agricultural land in China, the Swedish investment group Black Earth Farming and Alpcot-Agro, together with the British investment group Landkom, bought 600,000 ha in Russia and Ukraine, while the Al Quadra investment group from Abu Dhabi has bought huge land plots in Morocco, Algeria, Pakistan, Syria, Vietnam, Thailand, Sudan and India. Trigon Agri A/S, based in Denmark, controls about 170,000 ha of agricultural land in Russia, Ukraine and Estonia, etc.

market under the conditions of scarce and abundant land supplies are described in *Chart 1*. The growing demand for agricultural products causes the movement of the land demand curve and the implicit growth in demand for other inputs. If the supply of land is more abundant (left part in *Chart 1*), the supply of land will be more elastic causing the rise in land prices (or rents) and the expansion of arable land. However, in the conditions of less scarce land (right part in *Chart 1*), the price of land (or rents) will rise more distinctively with lower land expansion. Of course, it should be kept in mind that the land supply price elasticity is close to zero. Numerous empirical studies have shown that this size ranges from 0.05 in the short term to 0.15 in the long term. All these theoretical-empirical considerations should be taken into account in the following text, which deals with the orientation implications of the FAO development projections of the world agriculture.

The most reliable projection of aggregate demand for agri-food products was made by FAO. According to FAO, the projected demand for agricultural products is expected to grow at a rate of 1.1% per annum[7] by 2050 and this point should be taken into account in the assessment of the acquisition of agricultural land in the future.

**Chart 1.** *The effect of changes in the supply and demand for land*




**Source:** *Hertel, W. T., Baldos, C. L. U. , 2016, pp. 47.*

[7] Aggregate demand for agro-food products is well approximated by the form: $AT = s + dE_d$ (AT - aggregate demand; s - population growth rate; d - income per capita growth rate; $E_d$ - income elasticity of demand). The projection listed in the text is based on the elements of the form: s = 0,75%; d = 0.85%; $E_d$ = 0.4. See further at Alexandratos, N., Bruinsma, J. (2012): "World Agriculture Towards 2030/2050: the 2012 Revision", *ESA Working paper*, No. 12-03, FAO, Rome.

Apart from the demand for agro-food products, two more exogenous factors determine the agricultural land use extent: productivity and changes in land supply. Productivity is a function of biophysical properties of soil, climatic conditions, availability of water resources, degree of soil degradation and the achieved technological level. Changes in the land supply are determined by a number of factors, among which the most important are urbanization, climate change and a demand for non-market services from agricultural land.

In addition to the aforementioned exogenous factors, the endogenous factors affecting changes of agricultural land use are price elasticity of demand for agro-food products, price elasticity of supply of agricultural products and price elasticity of land supply.

The following mathematical relation approximates the influence of individual, exogenous and endogenous factors on the equilibrium volume of growth in land use[8]:

$$Q^* = \left[\frac{\Delta_A^D + \Delta_L^S - \Delta_L^D}{1 + \frac{\eta_A^{S,I}}{\eta_A^{S,E}} + \frac{\eta_A^D}{\eta_A^{S,E}}}\right] - \Delta_L^S \qquad (1)$$

where the symbols denote the following:

$Q^*$ – equilibrium volume of agricultural land use;
$\Delta_A^D$ – changes in demand for agricultural food products;
$\Delta_L^S$ – changes in supply of agricultural land;
$\Delta_L^D$ – changes in demand for agricultural land;
$\eta_A^D$ – price elasticity of demand for agricultural products;
$\eta_A^{S,I}$ – price elasticity of supply of agricultural products;
$\eta_A^{S,E}$ – value elasticity of land supply.

From the equation (1) it is not difficult to carry out an equilibrium growth approximation of the land price ($P_L^*$):

$$P_L^* = \frac{\Delta_A^D + \Delta_L^S - \Delta_L^D}{\eta_A^{S,I} + \eta_A^{S,E} + \eta_A^D} \qquad (2)$$

[8] The mathematical equation was formulated by Hertel W. T (2011), and the mathematical derivation of relations can be found in Hertel, W. T., Baldos, C. L. U. (2016).

The equations (1) and (2) serve as a relatively precise analytical instrumentation to quantify factors influencing the extent of agricultural land use. The paper length does not allow a detailed explanation, but it is sufficient to state that the equation provides the extent to which the growth of the land price affects the intensification of agricultural production by substituting land with variable inputs. From equation (2) it is obvious that the long-run equilibrium land price is equal to the net effect of exogenous factors divided by the sum of three key elasticities. Based on the elements presented in the FAO projections of the global agriculture development by 2050, the real price of agricultural land in the world will be growing at an average annual rate of 1.75%, with a slightly lower average land demand growth (1.25%). With the questions raised whether global agriculture will be able to feed an additional 2 billion inhabitants, meet the rising demand for biofuels, provide enough raw materials for industrial processing (textile industry), "absorb" the increased amounts of carbon, with retarded yield growth, degraded agricultural land and scarce water resources, it is evident that investors' demand for agricultural land will increase in the future. However, from the point of view of the above dilemmas, it is not questionable whether there will be enough land for the needs of agriculture, but how the price effect of increased demand for agricultural land will be manifested. As shown, the land market will primarily depend on the long-term elasticity of the supply and demand of agro-food products.

## Range of international agricultural land acquisitions

Historically, land is one of the most endangered resources in many parts of the world. Numerous factors define this indisputable fact. First, land is an important economic factor for the production of food and other primary products, it is irreplaceable and limited. In modern economic conditions and present economic stage, land has become an even more precious resource, manifested in an unprecedented appropriation of the resource. Second, unlike other resources, land has a multifunctional role for the population. On the one hand, it is a territory for cohabitation of human communities and a social insurance for rural households on the other, so its value cannot be assessed as a mere accounting category or only based on the commercial value of its products. In short, apart from its economic significance as a limited resource, land is an important element in the cultural, social and political values scale. Therefore, land, as a scarce natural resource, i.e. a scarce economic factor of production, often causes competing demands among different social groups.

Competitive land aspirations tend to escalate in conflicts, often violent, among and between different categories of people.

Data sources on agricultural land acquisition in international frameworks are basically unreliable, contradictory and incomplete. In an effort to make the phenomenon of international acquisitions pompous, a certain number of sources overestimate the scope of acquisitions. Therefore, the authors of this study used a relatively reliable source of information provided by GRAIN, an international non-profit organisation, which systematically records acquisitions of agricultural land. Reliability of the records has predisposed the time range of the presentation of agricultural land acquisitions. According to the latest report [Grain, 2016], from 2006 to 2016, in the international framework, the acquisitions of just over 30 million hectares of agricultural land were carried out (*Tables 1* and *2*).[9]

Contrary to the ingrained belief that the largest acquisitions have taken place in the underdeveloped countries of Africa, Asia and Latin America, and the countries of Central and Eastern Europe, it is evident that the largest areas were acquired in Australia (over 7 million hectares), and then in Brazil (2.7 million), Russia (2.5 million), Sudan (2.3 million hectares), etc. It is characteristic that the "old" EU member states (15 countries) are practically not subjected to the acquisition of agricultural land, primarily due to their restrictive regulations despite declarative commitment to the free market. They sold just over 10,000 hectares (5,600 ha in the UK and 5,050 ha in Spain). It is evident that the "new" members of the EU are considerably less restrictive about the ownership acquisition over land.

On the other hand, the largest investments in agricultural land have come from developed countries, oil producing and exporting countries (OPEC) and emerging economies with scarce agricultural resources (the aforementioned example of China, and India). British investors (with extensive state owned or parastatal funds) bought or leased the largest

[9] Borras M. S. and Franco C. J. (2010) estimate that as much as 100 million hectares of agricultural land were acquired in various regions of the world by 2010. And this data should be taken with a reserve, because it is their approximate assessment. Some other literary and media sources mention the data of 230 million hectares. However, when individual contracted leases and land sales are exposed to a detailed analysis, it is obvious that these are overestimates. For example, the information in this note also includes the intention of the Korean company Daewoo Logistics to rent a half of the total agricultural land in Madagascar. However, due to fierce public protests, the Lease Agreement was suspended, while the government of Madagascar resigned.

land area (6.6 million hectares).[10] The "old" members of the EU (15 countries) have totaled over 10 million hectares of agricultural land.

**Table 1.** *Destination countries of agricultural land acquisitions from 2006 to2016*

| Country | Area (ha) | Country | Area (ha) |
|---|---|---|---|
| Australia | 7.372.365 | Peru | 80.149 |
| Brazil | 2.721.102 | Malaysia | 77.000 |
| Russia | 2.469.046 | Mali | 76.275 |
| Sudan | 2.305.640 | Pakistan | 69.000 |
| Indonesia | 1.582.458 | Uganda | 66.800 |
| Papua New Guinea | 1.256.115 | South Africa | 62.500 |
| Ukraine | 1.107.800 | Venezuela | 60.000 |
| Mozambique | 1.015.294 | Bolivia | 57.845 |
| Congo | 965.000 | Namibia | 56.200 |
| Côte d'Ivoire | 673.170 | Burma | 50.000 |
| Liberia | 639.942 | Poland | 33.100 |
| Sierra Leone | 637.742 | Mauritania | 31.000 |
| Argentina | 513.116 | Jamaica | 30.000 |
| Ethiopia | 489.912 | Czech Republic | 24.400 |
| Guinea | 452.000 | Serbia | 24.000 |
| Cameroon | 435.105 | Slovakia | 20.167 |
| Gabon | 407.300 | Senegal | 20.000 |
| DR Congo | 331.580 | Madagascar | 18.558 |
| Nigeria | 330.991 | Morocco | 15.515 |
| Zambia | 314.369 | Hungary | 11.300 |
| South Sudan | 296.000 | Kenya | 11.000 |
| Romania | 224.235 | Zimbabwe | 10.813 |
| Tanzania | 219.370 | Kazakhstan | 10.000 |
| Paraguay | 208.549 | Lithuania | 8.900 |
| Gambia | 201.000 | Tajikistan | 6.300 |
| New Zealand | 188.578 | Guinea-Bissau | 6.000 |
| Cambodia | 168.000 | United Kingdom | 5.600 |
| Philippines | 158.550 | Spain | 5.050 |
| Colombia | 154.663 | Malawi | 4.991 |
| Algeria | 151.000 | São Tomé and Príncipe | 4.917 |
| USA | 150.173 | Benin | 4.800 |
| China | 145.300 | Mauritius | 2.500 |
| Uruguay | 144.178 | Latvia | 1.895 |
| Bulgaria | 128.199 | Belize | 1.600 |
| Egypt | 109.060 | Switzerland | 1.386 |
| Ghana | 108.215 | Fiji | 1.212 |
| East Timor | 100.000 | Rwanda | 1.000 |
| Angola | 98.500 | Turkey | 1.000 |
| Laos | 87.480 | Tunisia | 70 |

**Source:** *The author's calculations based on GRAIN, 2016, (Annexe 1. Land deals 2016).*

[10] The large-scale acquisitions of investors from the UK are motivated by defining the British targets for the share of biofuels in total energy consumption. The African Biodiversity Network has severely criticized the UK for sacrificing African soil, forests and foods to meet its energy needs due to its bioenergy targets.

**Table 2.** *Origin countries of investors in agricultural land acquisitions from 2006 to 2016*

| Country | Area (ha) | Country | Area(ha) |
|---|---|---|---|
| United Kingdom | 6.639.283 | Vietnam | 120.803 |
| USA | 3.064.570 | Czech Republic | 110.000 |
| Malaysia | 2.760.895 | Thailand | 100.100 |
| China | 2.685.043 | Lebanon | 96.200 |
| UA Emirates | 1.869.593 | Portugal | 97.161 |
| Singapore | 1.464.344 | Mauritius | 93.267 |
| India | 1.096.379 | Romania | 90.000 |
| France | 936.099 | Moldova | 54.000 |
| Turkey | 780.000 | Bangladesh | 45.000 |
| Canada | 586.882 | Libya | 35.000 |
| Kazakhstan | 550.000 | Zimbabwe | 30.000 |
| Germany | 529.645 | Australia | 23.691 |
| Qatar | 477.000 | Austria | 21.000 |
| Luxembourg | 422.841 | Brunei | 20.000 |
| Sweden | 399.556 | Iran | 20.000 |
| Indonesia | 380.000 | Estonia | 19.000 |
| South Korea | 380.867 | Ivory Coast | 16.000 |
| Spain | 286.070 | Israel | 14.650 |
| Egypt | 342.756 | Norway | 14.218 |
| Saudi Arabia | 332.983 | Djibouti | 14.200 |
| South Africa | 325.113 | Jordan | 12.700 |
| Japan | 315.000 | Lithuania | 10.000 |
| Russia | 307.000 | Bahrain | 10.000 |
| Algeria | 300.000 | UEMOA* | 10.000 |
| Argentina | 284.657 | Cayman Islands | 9.164 |
| Denmark | 240.942 | Cape Verde | 7.000 |
| Netherlands | 237.297 | Mexico | 5.420 |
| Italy | 232.624 | Unknown | 4.272 |
| Belgium | 225.286 | New Zealand | 1.150 |
| Switzerland | 189.612 | Kuwait | 1.000 |
| Sudan | 162.000 | North Korea | 1.000 |
| Brazil | 123.607 | | |

**Source:** *The author's calculations based on GRAIN, 2016, (Annexe 1. Land deals 2016).*

*UEMOA: West African Economic and Monetary Union of eight states: Benin, Guinea-Bissau, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo.

Particularly interesting is the case of the US, the largest net exporter of agro-food products, which has cultivate over 3 mil. ha abroad, despite its own abundant agrarian resources.[11]

Unfortunately, it was not possible to calculate the prices for which agricultural land was purchased or leased, since the contract reports state the

[11] It should be emphasized that the US states belonging to the so-called "corn belt" do not allow the penetration of corporate capital in agriculture.

planned or obligatory amount of investments, which, except the price of land, include investments in other forms of fixed assets (construction objects, processing capacities, livestock, etc.), and also often in working capital.

## Land acquisition implications for food security and rural poverty

Although food prices on the world market have been stabilized after the culmination of the 2006-2008 food crisis, it is difficult to deny the fact that food security is still one of the burning problems of the world. The food crisis has increased the number of hungry in the world for additional 40 million inhabitants, so the total of 900 million people suffers from hunger or permanent malnutrition. While the imbalance in the supply and demand of agricultural products is a historically normal phenomenon, some specific elements contributed to the recent crisis, such as: uncontrolled financial speculations, an excessive demand for the biofuel industry, an enormous pressure on the quality and quantity of available land and water resources, and an uncertainty of climate change impacts on the volume of agricultural production.

It is evident today with a high degree of consent, that the transfer of control over agricultural land and food resources from domestic to foreign owners or leaseholders represents a particular threat to local food security. Obviously, this transfer of control narrows the ability to achieve the food self-sufficiency of underdeveloped and poor countries. Moreover, many of these countries are net food importers or even emergency food aid recipients (e.g. Madagascar, Sudan, Kenya and Cambodia). These countries have experienced high levels of hunger and poverty followed by social unrest, and it is difficult to justify the transfer of fertile soil to the control of foreign companies and funds. It would be more logical to use the land to increase the domicile production volume. In addition, the import dependence of states (especially in Africa) has increased after privileged access of food corporations to agrarian resources. Numerous records indicate that land sale and lease contracts suffer from a lack of transparency and are a typical example of poor governance by the state. Namely, these countries do not incorporate mechanisms that would protect the rights of the local population into the contracts. Furthermore, local communities are usually not informed about land concessions to private companies (Cotula, 2013). Unsecured and unreliable land rights, inaccessibility of registration procedures and unclearly defined production requirements greatly endanger the position of the local population.

Promotion of massive estates represents a potential threat to the rural population.[12]Foremost, the production methods on a large estate discourage traditional production methods used by a large number of small farmers. This emphasizes the problem of "deagrarisation" of rural areas and they become territories more receptive to intensive accumulation of capital. However, numerous studies have convincingly shown that this method of agricultural development is in deep contradiction with the development of the rural economy and traditional agrarian forms as imperatives of economic development in underdeveloped countries. Cotula, L. (2013) has shown that extensive investments in agricultural land and long-term land purchase or lease agreements have never intended to support or contribute to integral rural development. Although it provides higher yields per unit area, monocultural, large-scale industrial production is less productive, less efficient and less conductive to overall economic development than small, multifunctional farms. It need not be specially proven, and the experience from the so-called "Green Revolution" has convincingly demonstrated that small holdings with integrated plant and animal production generate higher added value per unit area, and contribute to the reduction of rural poverty. Likewise, monocultural production is a potential threat to environmental degradation, soil salinization and loss of its production potential.

**The role of international institutions in aquisitions of agricultural land**

In response to the food crisis, the World Bank, as well as many other international financial institutions, advised developing countries to establish social security networks and eliminate customs duties on basic food products. While the World Bank (IBRD and IDA - International Development Agency) provides credit and non-credit assistance to governments, the third branch of this bank, the International Finance Corporation (IFC), provides loans and advisory and technical assistance to the private sector. The World Bank has set up a Global Food Crisis Response Program (GFRP) with a fund of US$1.2 billion intending to react quickly in the fight against hunger. In its report, the World Bank (Byerlee, D., Deninger, W. K., 2010) considers large-scale land

[12] The United Nations estimate that 60 million indigenous people in underdeveloped countries are at risk of displacement due to the production of agricultural crops for biofuels. A few hundred thousand small farmers were literally expelled by forming the so-called Soybean Republic, which covers an area of 50 million hectares in southern Brazil, northern Argentina, Paraguay and eastern Bolivia. The notorious fact that there are around 1.5 billion small farmers in the world with less than 2 hectares should not be neglected.

acquisition as a suitable means of poverty reduction through rural employment and the establishment of contracted agriculture.

On the other hand, Foreign Investment Advisory Service (FIAS) of the World Bank Group (a joint service of International Finance Corporation and the World Bank) encourages private investments in agribusiness and land markets in developing countries. in addition to encouraging private investors to buy or lease land, IFC and FIAS contribute to the construction of the infrastructure necessary to capitalize investments in the agribusiness sector. Also, these institutions are engaged in developing countries with advisory services aimed at eliminating prohibitive legislation in the land market and transferring profits abroad.

A special aspect is the role of international financial institutions in agriculture supporting based on genetically modified seed and other intensive technological inputs. Since 2009, the IFC and the Alliance for Green Revolution in Africa (AGRA)[13], in partnership with many other organizations and corporations, have been engaged in "the growth of agrarian productivity and income" of poor farmers in Africa. Their approach to the policy of supporting small farmers in Africa is conceived along the whole "value chain", including the land, water and genetically modified seed market. In the contracts with African countries, these institutions focus on privatisation of agricultural land by supporting "market solutions for food security" and certification of agricultural producers for the production of export crops. However, numerous studies indicate that the policy of these institutions in food security is more a part of the problem than its solution. These studies have come to a unanimous conclusion that, after philanthropic masks of these institutions are removed, multinational corporations competing for the control in the markets of genetically modified seed, food and chemical inputs can be revealed.

## Conclusions

Extensive international acquisitions of agricultural land are characterized by several evident contradictions. The first one is related to the role of the state and the market, ensuring adequate food security, primarily in developing countries. International institutions are proponents of the thesis that the development of agriculture in these countries must be based on

[13] AGRA has been continuously financially supported by Gates and Rockefeller foundations. AGRA General Director is the former UN Secretary-General Kofi Annan.

market solutions and land control by the private sector, with a lower share of state regulations. Solutions that offer a higher level of food security are based on the growth of agricultural productivity through voluminous large-scale investments. However, the experience of countries where extensive investment in land acquisition has been achieved shows that food security has not been significantly increased but considerably reduced in many. Moreover, the African and Asian countries in which the largest acquisitions are achieved are the emergency food aid recipients.

The second contradiction relates to the role of science and technology in agriculture. The attempt to alleviate poverty in rural areas by aggressive investments in agribusiness and capital-intensive investments has resulted in the displacement of the population which based its existence on small estates and deterioration of their already poor economic position, which worsened food security and degraded food sovereignty in many countries.

The third contradiction stems from the direct competition of acquisitions of agricultural land oriented to intensive, monocultural, export-oriented production and production for the domestic market. It has been shown that extensive acquisitions have increased food insecurity in most of the countries that were the "hosts" of acquisitions.

Finally, it should be emphasized that growth in food production does not automatically mean an increase in food security. For food security, it is more important that producers have access to modern scientific innovations and technology and the population which has the purchasing power to access food. In the countries with hunger and poverty epidemics, the urgent issue is not how to increase the productivity of agricultural land, but how domestic producers should increase the volume of food production with low production costs, available technology and inputs. It is evident that corporate agriculture does not provide a stable food production in developing countries either in short or long term. On the contrary, the volatility of the prices of agricultural and food products has increased with corporate control of production and trade, endangering the living standard of domestic producers. There is no doubt that the fundamental contradiction between the growth of agrarian investment and food security and rural well-being is only aggravated by commercial acquisitions of agricultural land.

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# CONNECTEDNESS TO NATURE AMONG STUDENTS OF AGRICULTURE AS A FACTOR OF SUSTAINABLE AGRICULTURAL DEVELOPMENT IN SERBIA[1]

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## Abstract

*The paper examinees the connectedness of students of agricultural sciences to nature. This was measured using a modified version of Inclusion of Nature in Self scale. The results of the survey conducted on a sample of 800 students from the Faculty of Agriculture (University of Novi Sad) indicate that 45.7% view themselves completely united with nature, while the rest see themselves more or less detached from nature. The results obtained suggest that additional efforts have to be made towards strengthening the students' sense of connectedness to nature. Therefore, future curricula reforms should pay more attention to practical work placement.*

**Key words:** *connectedness, students, agriculture, measuring, INS*

## Introduction

Connectedness to nature is a frequent research topic (Gosling and Williams, 2010; Liefländer et al., 2013; Zelenski and Nisbet, 2014), primarily in the area of environmental awareness. It is defined as the feeling of being the same with nature, being safe in nature, having positive emotions towards nature. Nature connectedness is interpreted as *"the extent to which an individual includes nature within his/her cognitive representation of self*" (Schultz, 2002, according to Mayer and Frantz, 2004) and it is very useful in understanding attitudes and predicting environmental concern and sustainable behavior as increasing research evidence confirms connectedness to nature to be a significant

[1] This work was supported by the Serbian Ministry of Education, Science and Technological Development under Grant No III46006 and OI 179028.

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factor which leads to pro-environmental behaviour and decision making (Lokhorst et al., 2014; Frantz and Mayer, 2014).

Kals et al. (1999) and Lokhorst et al. (2014) showed that the affinity to nature is directly related to the intentions and decisions regarding conservation behaviour. Müller et al. (2009) pointed out that emotional affinity towards nature is a powerful predictor of ecological behaviour and that the experience of responsibility towards nature represents a stronger motive for the long-term environmental commitment than is the case with situational appeals, which change the behaviour only temporarily. Hinds and Sparks (2008) emphasize that the experience of the natural environment is significantly correlated with pro-environmental behaviour, such as recycling, supporting petitions for protection of the environment and the use of public transport. Even with the control of social desirability and ecological worldview, a higher level of nature connectedness is a powerful predictor of ecological behaviour (Davis et al., 2009). These results suggest that the commitment to the environment is a new theoretical construct that can predict the environmental behaviour (Davis et al., 2009). Gosling and Williams (2010) showed that a higher degree of nature connectedness leads to a higher valuation of other living beings, thus leading to increased pro-environmental behaviour. Likewise, Srbinovski (2006) points out that "*one of the basic assumptions of environmental qualification is the satisfaction with the quality of one's environment, which is manifested through emotional relationship to it.*" Davis et al. (2009) argue that if an individual feels the closeness and connection with nature, he/she is in an interdependent relationship with nature, in the sense that the well-being of nature affects their personal well-being. In addition, connectedness to nature also influences the way of thinking and decision-making. Leong et al. (2014) suppose that individuals who are more closely connected to nature are more likely to approach the problems in a manner which is (more) holistic and (more) innovative. Namely, if a person felt completely connected with nature, its destruction would be perceived as a process of self-destruction (Suzuki et al., 2007).

It can, therefore, be concluded from the previous research in this area that, in order to effectively solve environmental problems, i.e. to act in an environmentally responsible manner, people need to feel part of nature. Based on that, Mayer and Frantz (2004) argue that the evaluation of individuals' environmental awareness requires among other things, determining the extent to which they see themselves as part of nature; that

is, determining whether they consider that they belongs to nature and how they relate their personal wealth to natural wealth.

Taking into account the specific characteristics of agricultural production in terms of connection with nature (inseparability from nature, significant influence of natural conditions on the results achieved and the necessity of working with and on living things - plants and animals), it is necessary to determine the degree of connectedness between students, as future decision-makers in the field of agribusiness, and nature. In addition, it should be noted that modern, intensive agricultural production is one of the prime causes of environmental pollution, the fact that additionally strengthens the need to examine the state of environmental awareness among students of agriculture as the degree of their awareness largely influences the future sustainability of agricultural production (Karapandžin et al., 2014).

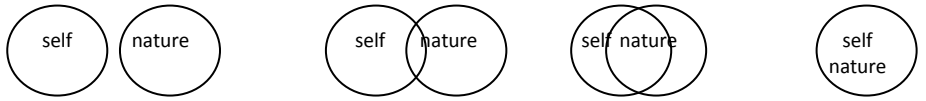
Given that Lokhorst et al. (2014) unambiguously determined that if farmers feel closer to nature their desire to protect the environment increases, this paper attempts to determine the degree of connectedness to nature among the students of the Faculty of Agriculture in Novi Sad, as future decision makers in this field. The starting hypothesis is that this connection is currently insufficient and that additional efforts have to be made towards strengthening the students' sense of connectedness to nature since their orientation towards protecting the environment is a prerequisite for (more) sustainable agricultural development in Serbia.

## Methodology and data collection

The connection of individuals to nature can be determined using various methods and measured using various scales. In this research, for determining the students of agriculture connectedness to nature we used the INS scale (Inclusion of Nature in Self Scale) developed by Schultz (2001). Schultz actually adapted Venn diagram (which consists of series of pairs of circles connected to different extent) which was conceived by Aron at al., 1992 (according to Davis et al., 2009) to measure the closeness of an individual to others (where one circle represents an individual ("I"), and other the individuals' with which to measure the closeness ("partner"). The circles in Schultz's INS scale represent the individual and nature. This scale has become a widely accepted instrument for measuring the connectedness of individual to nature.

The original scale offers seven pictures which show different degrees of overlapping between the two circles which represent a participant and nature. However, for the purpose of this research, the original scale was adapted to four pictures (pairs of circles) in order to improve the instrument's layout and clarity. The authors are of the opinion that this did not significantly affect the accuracy of measurement (Figure 1). This scale provides an easy and illustrative way of choosing the graphic representation which best reflects the participants' experience of connectedness to nature.

**Figure 1.** *Simplified version of Schultz's INS Scale*




**Source:** *Authors based on original INS (Schultz, 2001)*

Primary data for the research were collected during April 2013 from the students at the Faculty of Agriculture, University of Novi Sad (one of the three agriculture faculties in Serbia). The sample included 800 students, which is more than a third of the total number of students enrolled at the undergraduate academic studies in 2012/2013 school year. The survey covers all study programs and all years of study. In the sample, the most common group were first-year students (39.5%), which is consistent with their participation in the total number of students, while the second year students made 17.8%, the third year students 21.6% and the fourth year students 17.8% of the surveyed students. Since the Faculty of Agriculture in Novi Sad also offers an integrated five-year study programme of Veterinary Medicine, the sample also included fifth year students who make up 3.4% of the total number of respondents.

The students were explained the main purpose of the research and were asked to voluntarily and anonymously complete the questionnaire. The questionnaire was divided into several parts and consisted of a series of questions aimed at collecting data on various aspects of students' environmental awareness. The research results presented in this paper concern only the surveyed students' connectedness to nature.

The collected data were analysed using the software package for statistical analysis in the social sciences (SPSS). Indicators of descriptive statistics were used and the differences between respondents in terms of

particular characteristics and the impact of these characteristics on the respondents' connectedness to nature were determined using Mann-Whitney U test and Kruskal-Wallis test. With questions where the respondents were asked to express their views a four point Likert scale was used with 1 corresponding to the attitude "not at all important" and 4 meaning "extremely important to me." The standard five-point Likert scale was replaced with a four point scale to eliminate the problem of students' "avoidance" of response, which occurred in the previous survey (Karapandžin, 2015) mainly due to the students' lack of experience with participating in this kind of research.

## Results and discussion

### Basic data about the participants

In the research sample the female-male ratio was 52:48 (Table 1) which is close to the ratio in the students' population. There were slightly more students who stated that they lived in urban than in rural area (53.4:46.6). The data concerning the residence of all students are not available to the authors, but it can be assumed that there are no large discrepancies between the research sample and the students' population in this respect, although this assumption is based only on personal insight, not on actual data. This is indirectly confirmed by the results of the survey conducted at the Faculty of Agriculture in Novi Sad in 2011 and 2012, where the relationship between the urban and rural residents was 51: 49 (Janković and Novakov, 2012).

Due to the difficulty in obtaining accurate data on household income, and the importance of this variable i.e. the potential impact of the students' financial situation to their connectedness to nature, the students were asked to rate their family's financial position. Four out of five students evaluated their family situation as average, while others, in approximately equal proportions, assessed their situation as above or below the average.

With regard to the socio-economic situation in the country and low living standards of the majority of the population this finding does not mean that the sample was unrepresentative in this respect, but rather that it reflects the students' perceptions of their financial situation in comparison to those around them.

This should not be surprising given that university education in Serbia requires considerable funds on the part of families of students, and that significantly fewer students come from families of below average income, while many students who are better suited financially are educated abroad and at private colleges.

Because of the potential impact of parental education on the students' sense of connectedness to nature, the respondents were asked to indicate the level of education of their parents (guardians). As Table 1 shows, over two thirds of parents have secondary school education, and every fourth parent has a college or university degree.

**Table 1.** *Basic data about the participants*

| **Characteristic** | | **Sample composition (%)** |
|---|---|---|
| Sex | Male | 48.1 |
| | Female | 51.9 |
| Residence | Rural | 46.6 |
| | Urban | 53.4 |
| Student's rank of family financial position | Below average | 10.3 |
| | Average | 80.8 |
| | Above average | 8.9 |
| Father's level of education | Elementary | 4.8 |
| | Secondary | 68.0 |
| | College/ University | 27.2 |
| Mother's level of education | Elementary | 7.7 |
| | Secondary | 65.8 |
| | College/ University | 26.5 |

**Source:** *Authors*

This educational structure is more favourable than the educational structure in the province (where the majority of students come from) and the country as a whole[3].

[3] According to the 2011 census in the Republic of Serbia 48.93% of the population aged 15 and over had secondary school education and 16.24% had college or university education, while in Vojvodina province, the percentage was 50.91% and 14.08% respectively (Census, 2011).

## Students' connectedness to nature and the influence of specific variables

The results show that the vast majority of respondents feels connected to nature to a certain extent. The students who feel completely united with nature i.e. those who have chosen the picture number 4, with fully overlapping circles presenting the individual and nature as a complete unity, represented the largest group of respondents (45.7%). Picture 3 which shows significant overlap was chosen by about a third of respondents (32.4%). Picture number 2, which shows only some common areas between the individual and nature, was chosen by 19.7% of the students, while 2.2% of the respondents opted for the picture number 1 where no contact between the two circles represents that the respondent feels completely detached from nature.

Female students more often chose images representing a greater degree of connectedness to nature than their male colleagues (80.3% versus 75.7%). However, the Mann-Whitney U test did not reveal a statistically significant gender difference in the degree of nature connectedness (Table 2). The analysis did not find statistically significant differences in the responses between the respondents coming from rural and urban areas, although the initial hypothesis was that the students from rural areas would see themselves more closely connected to nature.

**Table 2.** *The results of the Mann-Whitney U test*

| Characteristic | Group | n | Md | Mr | U | p | z | r |
|---|---|---|---|---|---|---|---|---|
| Sex | male | 375 | 3 | 384.66 | 73749 | 0.289 | -1.061 | 0.04 |
| | female | 410 | 3 | 400.62 | | | | |
| Residence | rural | 365 | 4 | 407.95 | 71193 | 0.064 | -1.854 | 0.07 |
| | urban | 420 | 3 | 380.01 | | | | |
| Scientific and educational field | SH | 147 | 3 | 333.13 | 5046 | 0.000 | -3.890 | 0.25 |
| | M | 95 | 4 | 443.93 | | | | |
| n = sample size; Md = median; Mr = mean rank; U = Mann-Whitney U test; p = probability level; z = z value; r = effect size | | | | | | | | |

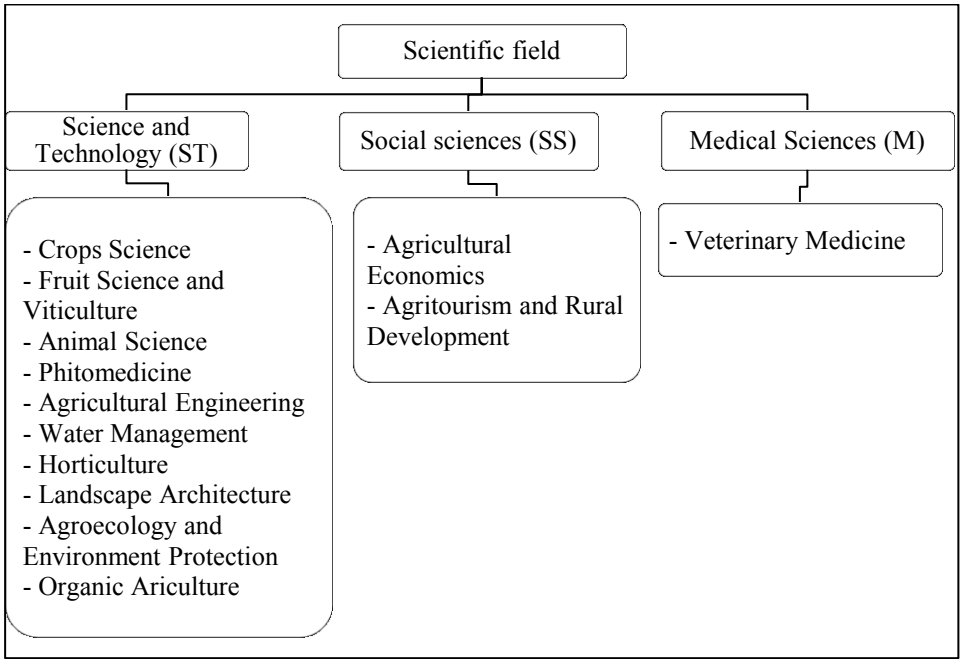
**Source:** *Authors*

In view of the fact that the Faculty of Agriculture in Novi Sad offers studies in three educational fields (Figure 2), one of the aims of the study was to determine whether a statistically significant difference can be found between the students studying different scientific areas. For that

reason the study programs offered by the Faculty were grouped according to the scientific field they belong to[4].

The field of science and technology (ST) includes the following majors: Crops Science, Fruit Science and Viticulture, Animal Science, Phytomedicine, Agricultural Engineering, Water Management, Horticulture, Landscape Architecture, Agroecology and Environment Protection and Organic Agriculture. The field of social sciences (SS) include the majors in: Agricultural Economics and Agritourism and Rural Development while Veterinary Medicine belongs to medical field (M).

**Figure 2.** *Scientific fields at the Faculty of Agriculture, University of Novi Sad*




**Source:** *Authors according to the Statute of the Faculty of Agriculture*

The results of the Kruskal-Wallis test (Table 3) showed that there were statistically significant differences in the connectedness to nature experienced by the students of different scientific fields. With the results pertaining to the students in the field of medical sciences the value of median was higher than the median results of both the students of science

[4] The Statute of the Faculty of Agriculture, Article 62, 1000/0102 Number: 255/5, March 11, 2011, available at www.polj.uns.ac.rs

and technology and the social sciences students. This can partly be explained by the veterinary students' love of animals (the reason for their choice of this highly competitive program) and closer contact with animals through their programs of practical work placement. A more detailed analysis using the Mann-Whitney U test showed that the most pronounced differences were those between the students of the social science programs on the one hand and veterinary medicine students on the other, as the students of veterinary medicine identified themselves with nature to a significantly higher degree (Table 2).

The Kruskal-Wallis test also showed a statistically significant difference in connectedness to nature in relation to particular study programs (Table 3). This is related to the study programs in Veterinary Medicine, Crops Science and Organic Agriculture where higher median (Md = 4) was obtained than with other study programmes (Md = 3).

Earlier studies of environmental awareness have shown that senior year students show a higher level of environmental awareness (Fernandez-Manzanal 2007; Bahaee et al., 2012; Zsóka et al., 2013). It was therefore expected that senior students participating in this study, given their higher education level, will see themselves closer to nature. The results of the Kruskal-Wallis test, however, showed no statistically significant difference in terms of connectedness to nature among students of different years of study.

Although Hasiloglu et al. (2011) and Tayci and Uysal (2012) found that the level of parental education had a statistically significant effect on the degree of students' connectedness to nature. In our study, however, no statistically significant effect was determined in relation to parents' education or family's financial situation (Table 3).

**Table 3.** *The results of the Kruskal-Wallis test*

| Variable | $\chi^2$ value (degrees of freedom, number of respondents) | p |
|---|---|---|
| Scientific field | $\chi^2(2, n=785) = 18.082$ | 0.000 |
| Study program | $\chi^2(12, n=785) = 26.435$ | 0.009 |
| Year of studies | $\chi^2(4, n=785) = 2.802$ | 0.592 |
| Father's level of education | $\chi^2(2, n=782) = 0.385$ | 0.825 |
| Mother's level of education | $\chi^2(2, n=780) = 2.253$ | 0.324 |
| Family's financial situation | $\chi^2(4, n=783) = 8.019$ | 0.091 |

**Source:** *Authors*

**Connectedness to nature and undertaking environmental activities/ environmental behaviour**

Part of the research focused on the difference in the degree of connectedness to nature found with the students who took specific actions in relation to the protection of the environment and those who did not. The results of the Mann-Whitney test showed that there was a statistically significant relationship between the feeling of connectedness to nature and the participation in pro-environmental activities in the past, or the willingness to undertake such activities in the future (Table 4).

**Table 4.** *The results of the Mann-Whitney U test*

| Characteristics | Groups | n | Md | Mr | U | p | z | r |
|---|---|---|---|---|---|---|---|---|
| Investing time/money in environmental organizations | yes | 367 | 3 | 409.46 | 67727.5 | 010 | -2.590 | 0.09 |
| | no | 410 | 3 | 370.69 | | | | |
| Voluntary presence at debates on environmental issues | yes | 320 | 4 | 411.63 | 65557.5 | 0.009 | -2.595 | 0.09 |
| | no | 456 | 3 | 372.27 | | | | |
| Drawing attention of the authorities to environmental problems | yes | 140 | 4 | 333.13 | 38152.5 | 0.005 | -2.802 | 0.10 |
| | no | 634 | 3 | 443.93 | | | | |
| Past change of behaviour because of environmental concerns | yes | 660 | 3 | 394.42 | 29092.5 | 0.001 | -3.300 | 0.12 |
| | no | 108 | 3 | 323.88 | | | | |
| Willingness to report to the authorities those who disturb the environment | yes | 544 | 3 | 395.73 | 54817 | 0.019 | -2.355 | 0.09 |
| | no | 224 | 3 | 357.22 | | | | |
| n = sample size; Md = median; Mr = mean rank; U = Mann-Whitney U test; p = probability level; z = z value; r = effect size | | | | | | | | |

**Source:** *Authors*

For example, the students who invested time or money in environmental organizations (47% of the respondents) showed a higher degree of nature connectedness than those who never undertook such actions. A significant difference was also observed in the level of nature connectedness between the students who voluntarily attended debates on environmental issues

and those who did not. Students who were present at such meetings (41.5% of the respondents) more often chose the pictures showing higher degrees of correlation with nature. Only 18.4% of the surveyed students contacted the authorities to report about the problems concerning the environment and there was a significant difference in the feeling of nature connectedness between those who have and those who still have not done that, although the significance is very small.

Almost 86% of the students of the Faculty of Agriculture in Novi Sad stated that they have changed their behaviour because of their concerns about the environment. These students saw themselves more connected to nature than those who did not change their behaviour in this respect. Although the real difference is here, again, of low significance, the presence of the difference between the two groups implies that connectedness to nature may be a predictor of undertaking environmental acts.

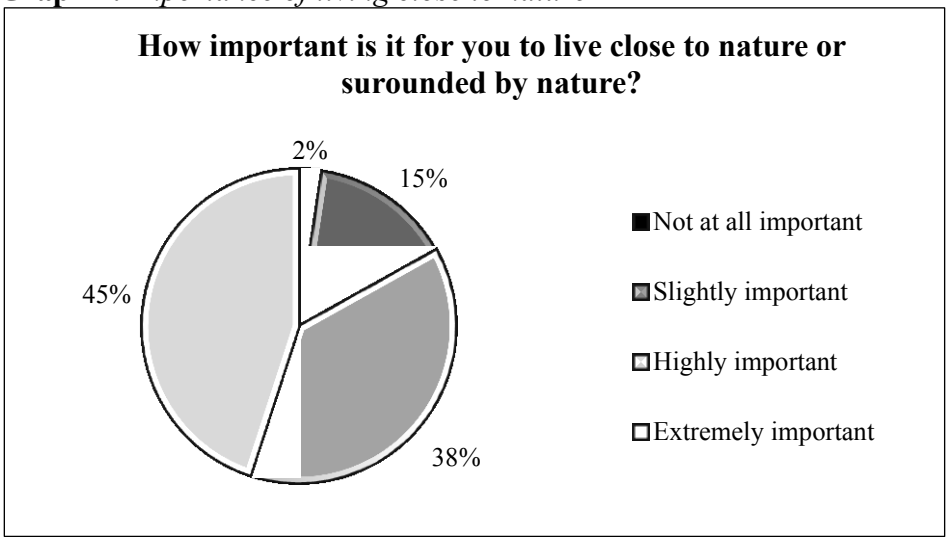
The above mentioned dependencies were also present when the participants were asked about future behaviour. Namely, 69.3% of the students in the survey said that in the future they would report to the authorities those who disturbed the environment and these students showed higher levels of nature connectedness than those who would not act in this way.

**Significance of life close to nature or surrounded by nature to nature connectedness**

The majority of respondents (83.1%) stated that for them it is extremely or highly important to live close to natural environment or surrounded by nature (Graph 1). Starting from the reasonable assumption that the respondents residing in the countryside are to a greater extent surrounded by nature, the logical question to be asked is whether they find living close to nature more important than the respondents residing in cities and towns. More respondents from the rural areas than from the urban areas (50% vs. 41%) stated that it is highly important for them to live close to nature. On the other hand, the answer: “It is not at all important to me to live close to nature” was also chosen more often by rural (4%) than by urban (1%) respondents. It can be assumed that these extreme views, which were more prominent in subjects residing in rural areas, may be associated with the (lack of) desire to return, after graduation, to the rural environment they come from. We may presume that this desire is largely

influenced by the students' environment i.e. the specific characteristics of a particular rural area (its development, future development perspectives, etc.) which would indicate the influence of external factors on the formation of pro-environmental attitude.

**Graph 1.** *Importance of living close to nature*




**Source:** *Authors*

The test of the differences in connectedness to nature has shown that there is a statistically significant difference between the students for whom living close to nature or being surrounded by nature is not at all or slightly important and those to whom it is highly important or utterly important (Table 5) (U = 25496.5, z = -7.881, p = 0.000, r = 0.281).

**Table 5.** *The results of the Kruskal-Wallis test*

| Variable | | Md | | n | |
|---|---|---|---|---|---|
| Importance of being surrounded by nature | not at all | 3 | 3 | 131 | 18 |
| | slightly | | 2 | | 113 |
| | highly | 4 | 3 | 654 | 303 |
| | completely | | 4 | | 351 |
| Desire to live in rural area because of closeness to nature | not at all | 3 | 3 | 270 | 68 |
| | slightly | | 3 | | 202 |
| | highly | 4 | 3 | 512 | 239 |
| | completely | | 4 | | 273 |
| n = sample size; Md = median | | | | | |

**Source:** *Authors*

A statistically significant difference of medium level of significance (r = 0.455) was observed between the participants for whom it is slightly important and those for whom it is completely important to live close to nature (U = 8821.5, z = -9.809, p = 0.000).

Two thirds (66%) of the students of the Faculty of Agriculture in Novi Sad participating in this study said that they would like to live in rural areas in the future, because of the proximity of nature. The Kruskal-Wallis test showed statistically significant differences in relation to nature connectedness between the students who find it not at all important, slightly important, highly important and completely important to live in rural areas in the future due to proximity of nature ($\chi 2$ (3, N = 782) = 48.012, p = 0.000). The greatest differences were observed between the students who do not find it at all important and those who think it is completely important to live close to nature (U = 5220, z = -6.117, p = 0.000) with an intermediate level of significance of 0.331.

## Conclusion

The results of the survey conducted on a sample of students at the Faculty of Agriculture, University of Novi Sad show that the vast majority of students feels some connectedness to nature. These results are encouraging because they could be an indication that in the future, when they engage in agriculture, these students will make decisions that will not endanger the environment and that they will act in an eco-friendly way. However, the fact that less than half of those surveyed felt completely united with nature indicates the need for future action aimed at creating stronger ties between the students and nature. These activities should be directed towards changing the curricula in a way which will ensure that students' practical work placement in the natural environment is given more significant role than it has now.

The variables which have most strongly influenced the differences in the participants' connectedness to nature were the study programme they followed i.e. the field of study, as well as whether, or not, they undertake environmental activities. Although some other studies demonstrated the influence of variables such as gender, place of residence, year of study, family's financial situation, and parents' education, in this study they have not proved to be significant for the degree of students' connectedness to nature.

Greater sense of nature connectedness was shown by the students who have undertaken some pro-environmental activities in the past, which confirms the findings of other authors that the degree of connectedness to nature can serve as a predictor of pro-environmental activities i.e. eco-friendly behavior. Also, pictures that show a greater degree of unity with nature were more often chosen by the students who have in some way changed their habits and behavior because of environmental concerns, those who find it important to live close to nature or those who have, because of their closeness to nature, expressed a wish to live in rural areas in the future. Most likely, their experience of connectedness to nature is at the same time both the cause and the consequence of the expressed attitudes/preferences/behavior.

Thanks to the biological nature of agricultural production, activities which include frequent stays in natural environment, work outdoors, in the fields and under the open sky, in close contact with animals are possible and desirable for those involved in it. This specific potential related to the characteristics of agricultural production should be exploited to the maximum in the higher education institutions, not only for the purpose of practical work placement and training students for field work, but also for the development of environmental awareness. Although there is no clear scientific evidence about the impact which emphasizing the importance of the natural world in the school curricula has on the students' sense of nature connectedness, it is nevertheless advisable to stress the importance of respecting nature and its beauty for the development of sustainable agriculture and the increased quality of life of an individual and society as a whole.

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# ELEMENTARY STRATEGIC AND LEGISLATIVE TREATMENT OF RURAL DEVELOPMENT POLICY

*Jelena Matijašević-Obradović*[1], *Sanja Škorić*[2]

## Abstract

*Rural development in its normative determination, practical realization, and continuous improvement is faced with the set of challenges which define it to a significant extent. The basic answer to the current challenges in the field of rural development is given by the stable, long-term and effective state policy. In this paper, after a shorter theoretical observation, the two significant documents in this field have been analyzed in more details: Strategy for Agricultural and Rural Development of Serbia for the period 2014-2024 and the Law on Agriculture, Food and Rural Development, but a brief overview of other relevant strategic documents on which the mentioned Strategy relies is also made. Rural development is a significant challenge both for the developed countries and for the developing ones, which is the additional motive for the modern and appropriate strategic and legislative treatment of rural development policy in Serbia. Among other things, the assessment of economic, social, as well as ecological situation, then identification of basic weaknesses, threats and problems, and finally, determining concrete goals and priorities are definitely the basic starting points in conceiving a strategic and normative framework in the consideration of the whole dimension of rural development.*

**Keywords:** *rural development, rural areas, Strategy for Agricultural and Rural Development of Serbia for the period 2014-2024, the Law on Agriculture, Food and Rural Development*

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## Introduction

Particularity and virtue of modern society is the attention focused on the sustainable development.[3] Rural development in its basis includes agrarian as well as non-agrarian sector in rural areas, thus encompassing every vital component regarding the development of rural areas (economic, ecological, social, cultural, demographic, etc.). [4]

As Ristić pointed out, sustainable development, as a contemporary development concept that includes the above mentioned vital components and interests of present and future generations, is very applicable in rural areas. [5]

Rural are those parts of a country's territory that have a relatively low population density, but can have/have certain characteristics in terms of natural, geographical, and climatic specificities, economics, society, etc.

Throughout history, rural society has evolved from a primitive rural community to a modern, highly developed, rural society. In the modern world, rural society is going through turbulent changes accompanied by great difficulties in joining the dominant trends of modern society. [6] The concept of sustainable rural development began with the application in 1980s. In its basis, it is interactively linked and conditioned by the poverty reduction trend of underdeveloped regions on the world level.

At the end of the last century, the concept of rural development has gained in importance in both developed and developing countries, including Serbia. As Đorđević and Milovanović point out, attention is focused on overcoming the differences between urban and rural

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[3] Šimkova, Eva (2007): Strategic approaches to rural tourism and sustainable development of rural areas, *Agricultural Economics*, Czech Academy of Agricultural Sciences, Czech Republic, 53 (6), 263–270, p. 236.

[4] Cvijanovič, Drago, Matijašević-Obradović, Jelena, Škorić, Sanja (2017): The Impact of Air Quality conditioned by emission of Poluttants to the Development of Rural Tourism and potentials of Rural Areas, *Economics of Agriculture*, Institute of Agricultural Economics, Belgrade, 64 (3), 871-885, p. 873.

[5] Ristić, Lela (2013): Strategijsko upravljanje održivim ruralnim razvojem u Republici Srbiji, *Ekonomski horizonti*, Ekonomski fakultet Univerziteta u Kragujevcu, Kragujevac, 15 (3), 229 – 243, p. 229.

[6] Todorović, Marina (2007): Ruralno društvo i ruralna geografija u prošlosti i budućnosti, *Collection of papers No 57*, Geographical Institute "Jovan Cvijic", Sasa, Belgrade, 45-53, p. 45.

development, as well as on the coordination of agriculture development and other activities and services in rural areas, in order to ensure a better quality of life and improve the population living standard through the rational use of resources and their preservation for future generations. [7]

According to Popescu, sustainable rural development sublimates four basic principles: environmental, social, cultural, and economic.[8] In its basis, environmental principles are based on recognition of the destination natural diversity. Social principles are based on the view that respect for cultural diversity and the local community should be ensured, and that sampling and contributing to social problems should be actively discouraged. Cultural principles promote the unique characteristics of the culture and heritage of the area, while economic principles insist on developing employment opportunities in order to prevent the outflow of the population, prevent the disappearance of traditional occupations, and promote the use and sale of local food products.

Rural development, in its normative determination, practical implementation, and continuous improvement, is going through a series of challenges that define it substantially. Thereby, the challenges can be both internal and external. The basic answer to the current challenges in the field of rural development is provided by stable, long-term, and efficient state policy. The main starting point in the substantive analysis of the existing challenges, frameworks, goals, and possibilities, as well as the advantages, weaknesses, opportunities, and threats of rural development in the national framework, are certainly the current legal texts and covering strategic documents with which the set of political and legal assumptions for the preparation of national programs for the development of agriculture and rural areas is practically fulfilled.

In accordance with this, after a brief observation of the most important aspects of rural development and rural areas, the paper will give more details on the Strategy for Agriculture and Rural Development of the

[7] Đorđević Milošević Suzana, Milovanović Jelena (2012): *Održivi turizam u funkciji ruralnog razvoja - Mala poljoprivredna gazdinstva i ruralni turizam u Srbiji*, Fakultet za primenjenu ekologiju Futura, Univerzitet Singidunum, Beograd Agroznanje, Vršac FAO, Budimpešta, p. 21.

[8] Popesku, Jovan (2011): *Održivi razvoj ruralnog turizma*, TAIEX, Privredna komora Beograda, ppt, p. 4-6.

Republic of Serbia for the period 2014-2024[9], the Law on Agriculture and Rural Development[10], and national programs which should define the ways of achieving strategic goals. The paper will also review briefly the other relevant strategic documents on which the Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024. year relies on.

## Rural development and the methodology for defining rural areas

As it is stated by some authors, in the promotion of sustainable agriculture and rural development, the emphasis is primarily placed on the environment, the organization of rural development, communication in development, education, local population, science, and technology.[11]

Each area considered as rural contains a number of specificities that may include certain characteristics in terms of natural, geographical and climatic specificities, economics, society, etc. At the beginning of the short observation of rural development, it is important first to determine clearly to which geographical areas the term rural is applied.

In accordance with this, it should be emphasized that "the defining of methodological and analytical frameworks for scientific study and the practical application of rural development basically comes down to several dimensions: regional (spatial), social, and economic. All three aspects of rural development are conceptually and essentially very complex, hence the definition of universal development models and policies, which would be acceptable for a number of regions or countries, is impossible to be found".[12]
One of the central problems is to define generally accepted and standardized indicators for monitoring the situation in rural areas. [13] Once

[9] Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024, Official Gazette of the Republic of Serbia, no. 85/2014.
[10] Law on Agriculture and Rural Development, Official Gazette of the Republic of Serbia, no. 41/09, 10/13 - other law and 101/16.
[11] Simonović, Danijela (2008): *Održiva poljoprivreda i ruralni razvoj*. Ruralni razvoj i ruralni turizam, Agromreža, 2-9, Novi Sad, p. 4.
[12] Bogdanov Natalija (2003): *Ruralni razvoj – politika EU, stanje i perspektive u Srbiji*. U: Zbornik radova "Poljoprivreda i ruralni razvoj u evropskim integracijama", Simpozijum agroekonomista povodom 40 godina agroekonomskog odseka, Poljoprivredni fakultet Univerziteta u Beogradu, Beograd, p. 82-92.
[13] Bogdanov Natalija, Stojanović Žaklina (2006): *Metodologija utvrđivanja ruralnosti i identifikacija ruralne Srbije*. U: "Poljoprivreda i ruralni razvoj Srbije u tranzicionom

the rural areas are defined, rural indicators give the image of their development in specific segments.[14] This actually means that the indicators of the rural areas development point to the most important aspects of development - the level of development, tendencies, varieties, etc.

As Bogdanov states further "in the understanding of the rural region from the initial to the present definitions, it is evident that there is a certain extension and deepening of the meaning of the term itself. Extremely simple understanding of rurality, in a territorial context only, has been overcome by accepting the thesis that the rural region represents a territorial entity with a coherent economic and social structure of diversified activities." [15]

It is interesting to look back at certain attitudes in contemporary theoretical thought in the definition of rural areas. Namely, some authors state that rural areas are characterized by numerous physical and socio-economic characteristics, including: low density of population and development, landscape defined by open greenery, economic activities concentrated mainly on agricultural functions, the population way of life predetermined by belonging to small social groups, and specific mentality rooted in recognizable peasant culture.[16] Rural areas in Serbia diverse in terms of natural resources, economic, social, and population characteristics.[17] The diversity of rural areas is reflected in the diversity of natural resources, cultural and historical heritage, as well as in economic, social, and demographic patterns. Rural areas are usually related to agricultural land and agricultural holdings, as well as to tourist and weekend destinations.[18] Today, the prevailing attitude is that the rural region represents a territorial unit with one or more small and medium-

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period", DAES i Poljoprivredni fakultet Univerziteta u Beogradu, Beograd, pg. 47-70, cit. prema: Bogdanov, Natalija (2007): *Mala ruralna domaćinstva u Srbiji i ruralna nepoljoprivredna ekonomija*, UNDP, Beograd, pg. 38.

[14] Stojiljković D., Bošković Olgica (2008): Metodološke napomene u vezi sa identifikacijom ruralnih područja i utvrdjivanjem indikatora za merenje stepena ruralnosti, *Agroekonomika*, Poljoprivredni fakultet, Novi Sad, 37-38, 48-56, pg. 51.

[15] Bogdanov, Natalija (2007), op. cit., pg. 38-39.

[16] Chmielinski, Pawel, Chmielewska, Barbara (2015): *Social changes in rural areas: incomes and expenditures of rural households*. Economics of Agriculture, Institute of Agricultural Economics, Belgrade, 62 (4), 907-920, p. 909.

[17] Papić, Ružica, Bogdanov, Natalija (2015): *Rural Development Policy – a perspective of local actors in Serbia*, Economics of Agriculture, Institute of Agricultural Economics, Belgrade, 62 (4), 1079-1093, p. 1080.

[18] Chmielinski, Pawel, Chmielewska, Barbara (2015), op. cit., pg. 909.

sized cities surrounded by large open space, with relatively low population density and regional economic structure, reflecting the situation of a particular labor market.[19] The OECD methodology provides the only internationally recognizable definition of rural areas. As Stojiljković and Bošković point out, "one should distinguish two hierarchical levels of geographic units: local communities and regions. Starting from these two hierarchical levels of geographical units, the term rural is defined in two steps. *Firstly*, local territorial units are defined as rural if their population density is below 150 inhabitants per square kilometer. *Secondly*, the regions are classified into one of the three types: a distinct (dominant) rural area (if more than 50% of the population lives in rural local communities), a partially rural (mixed) area (if 15% to 50% of the population lives in rural local communities) and a distinctly (dominant) urban area (if less than 15% of the population lives in rural local communities). Therefore, the criterion used for the creation of typology at the regional level is the share of the region population living in rural municipalities. This typology thus reflects the degree of rurality of the entire region".[20] The European Union accepts the OECD definition of rurality.

## Rural areas in Serbia

Analogous to the EU standards, rural areas in Serbia are also defined according to the OECD criteria, as those with the population density below 150 inhabitants per km2. According to this definition, 130 municipalities out of a total of 165 are characterized as rural, with 3,904 settlements. Furthermore, rural areas in Serbia cover 85% of the country's territory with more than half of the total population (55%) and the population density of 63 inhabitants per km2.[21]

Most of the country's natural resources are located in rural areas (agricultural land, forests, water) with rich ecosystems and biodiversity. Human resources employed in various economic activities represent a particularly significant potential. An important component of the rural sector is the natural, cultural, and historical heritage. [22] The neglect of

[19] Bogdanov Natalija, Stojanović, Žaklina (2006), op. cit., 47-70.
[20] Stojiljković D., Bošković Olgica (2008), op. cit, pg. 49.
[21] Mirković, Miroslav (2010): Integralni ruralni razvoj kao faktor smanjenja siromaštva, *Ekonomski pogledi*, Univerzitet u Prištini, Priština, 1, 45-54, pg. 45-46.
[22] Plan strategije ruralnog razvoja, 2009–2013, Republika Srbija Ministarstvo poljoprivrede, šumarstva i vodoprivrede, februar 2009., pg. 4.

rural regions in Serbia, poor infrastructure, economic and technological backwardness, the traditional presence of poverty (income less than $ 2 per day) cause the isolation of many villages, which results in the abandonment and extinction of certain villages. [23] A property of a Serbian village is that during the last few decades there have been some extremely negative demographic trends. Disadvantageous tendencies are evident when it comes to the aging population. According to the United Nations classification, our country is among the ten countries of the world with the oldest population. About 58% of the rural population is older than 50, and 22.4% is older than 65.[24]

Considering the fact that rural areas occupy about 85% of the territory of Serbia and that the rural population accounts for more than half of the total population, the need for further investment in these areas is evident in order to improve the social and economic conditions in isolated rural areas facing the depopulation tendency, as well as in suburban areas. Investing in the development of rural economies and local communities is a vital factor in improving the quality of life in rural areas through improved access to public services, building infrastructure, and a more favorable business environment.[25]

In the context of this, in the following sections, the Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024, the Law on Agriculture and Rural Development, national programs, that should define ways of realizing strategic goals, will be discussed in more detail, and a short overview of other relevant strategic documents, which the Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024. relies on, will be made. Defining covering legislative documents in the area of support and improvement of rural development is crucial. Namely, in the

[23] Mirković, Miroslav (2010), op. cit., pg. 46.
[24] Vujičić Milica (2008): *Turizam i agrobiznis*, DUNP, Novi Pazar, str . 219; cit. prema: Mirković, Miroslav (2010), op. cit., pg. 46.
[25] Kostić Stanković Milica (2013): *Marketing ... i ruralni razvoj ... i turizam*, Stalna konferencija gradova i opština – Savez gradova i opština Srbije, Beograd, pg. 6. O temi više videti i u: Matijašević-Obradović Jelena, Kovačević, Maja (2017): *The importance of the ICT for the purpose of increasing Competitiveness of Rural Areas.* In: Sustainable Agriculture and Rural Development in Terms of the Republic of Serbia Strategic Goals Realization Within the Danube Region – Development and Application of Clean Technologies in Agriculture (Eds: Jonel Subić, Boris Kuzman, Andrei Jean Vasile), Institute of Agricultural Economics, Belgrade.

Republic of Serbia, during the last few years, a large number of documents, strategies and laws, regulating important issues related to agriculture and rural areas have been adopted. With a more detailed elaboration of covering legal acts, a normative methodological framework that determines, defines and regulates all issues related to the advantages and disadvantages, then opportunities and threats which rural development in the Republic of Serbia faces, can be considered.

In this context, the key determinants are related to two current legal frameworks:

- Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024. - as the basic and long-term strategic document defines the goals, priorities and frameworks of political and institutional reforms in the field of agriculture and rural development. As stated in the Strategy itself, in addition to the above, this document defines the budget support framework, which unambiguously reflects the development orientation of the Strategy. This document will establish the foundations of the new agricultural policy, defined in accordance with the principles of modern public policy management and in line with the clear definition of the corresponding ministry for the gradual takeover of the European model for support to agriculture.
- The Law on Agriculture and Rural Development - as the basic current legislation regulates the goals of agricultural policy and rural development policy, as well as the way of their implementation, the Register of Agricultural Holdings, recording and reporting in agriculture, and other relevant issues important for the development of agriculture and for the rural development itself.

**Provisions of the law on agriculture and rural development in the context of achieving the goals of rural development policy**

The Law on Agriculture and Rural Development (hereinafter: the Law) regulates the objectives of agricultural and rural development policy, as well as the way they are implemented, then the Register of Agricultural Holdings, recording and reporting in agriculture, as well as the monitoring of legal provisions implementation. The law regulates the rules of the special procedure for implementation and control of IPARD programs, as well as other relevant issues of importance for the field of agriculture and rural development (Article 1).

For the purposes of the Article 2 provisions (paragraph 1, items 1, 4 and 10g) of the Act, agriculture is an economic activity that includes those activities that are legally classified as agriculture, agricultural household is a production unit where the business entity, agricultural cooperative, institution or other legal person, entrepreneur or farmer, carries out agricultural production, while the IPARD program represents the rural development program within the Instrument for Pre-Accession Assistance to Rural Development (IPARD), financed by the EU pre-accession assistance funds, as well as from the budget of the Republic of Serbia.

The provisions of the law particularly relevant for the subject of this paper are set out in Article 3, and then in Articles 4 - 7a of the Law. Specifically, the Law regulates the basic concept of agricultural policy and rural development policy. According to legal regulations, the agricultural and rural development policy of the Republic of Serbia includes measures and activities undertaken by the competent authorities responsible for that, in order to: 1) grow production and stabilize the producers' income; 2) grow the competitiveness while adapting to the domestic and foreign market requirements and technical and technological improvement of the agricultural sector; 3) manage sustainable resources and protect the environment; 4) improve the quality of life in rural areas and reduce poverty; 5) efficiently manage public policies and improve the institutional framework for the development of agriculture and rural areas. The law also provides that the agricultural and rural development policy of the Republic of Serbia is implemented through the realization of the Strategy for Agriculture and Rural Development of the Republic of Serbia, the National Program for Agriculture and the National Program for Rural Development, and the IPARD Program.

In terms of provisions 4 - 7a of the Law, the Strategy of Agriculture and Rural Development of the Republic of Serbia determines the long-term directions of agricultural development by: establishing market economy, increasing the profitability of agriculture in the Republic of Serbia, and caring for the development of rural areas. The Strategy of Agriculture and Rural Development of the Republic of Serbia is coordinated with the strategic documents of the Republic of Serbia, and it is adopted by the Government of the Republic of Serbia, upon the proposal of the Ministry, which monitors the implementation of the Strategy and proposes its coordination with the real needs in the field of agriculture and rural development.

The National Agricultural Program defines the medium and short term objectives of agricultural policy, the way, the order, and deadlines for achieving the stated goals, the expected results, as well as the form, type, purpose, and scope of particular incentives. The National Program, at the proposal of the Ministry, is adopted by the Government for a period that cannot be longer than seven years. The National Rural Development Program comprises of measures and other activities, as well as expected results, forms, types of purposes and scope of particular incentive measures. As with the National Program stated above, the National Rural Development Program, at the proposal of the Ministry, is adopted by the Government for a period that cannot be longer than seven years. The monitoring of the National Rural Development Program will be the responsibility of the Ministry responsible for rural development affairs. The IPARD program consists of general and specific objectives, measures and other activities, as well as of expected results, forms, types, purposes, intensity of assistance, and scope of individual measures of IPARD incentive. The IPARD program is adopted by the Government at the proposal of the Ministry, whereby the Minister prescribes the persons entitled to IPARD incentives, the amount of incentives, as well as the conditions, manner, and procedure for the implementation of the IPARD program more closely. The Minister also prescribes the methodology for determining the reference prices more precisely.

In addition to the aforementioned provisions, the Law also contains provisions relevant to the operations of the Administration for Agrarian Payments, as an administrative body within the relevant Ministry, the provisions relevant for the implementation of the IPARD program, and finally, the provisions particularly relevant to the matter of incentives. In the area of normative regulation of the incentives matter, it is especially important to put an emphasis on the following legal provisions. According to the provisions of Articles 9-12 of the Law, the types of incentives in the Republic of Serbia are: direct incentives, market incentives, and structural incentives. Direct incentives therefore include: 1) premiums; 2) incentives for production; 3) regressions and 4) support for non-commercial agricultural holdings. Market incentives include: 1) export incentives; 2) storage costs; 3) credit support. Finally, structural incentives include support for programs which relate to: 1) rural development measures; 2) improvement of the protection and quality of agricultural land; 3) institutional support measures.

In terms of the Article 12 provisions of the Law, rural development measures are the type of incentives that promote the improvement of competitiveness in agriculture and forestry (investment in agriculture and forestry and the introduction of new standards in the production and marketing of agricultural products), the improvement of environmental protection programs, the preservation of biodiversity and rural economy diversification programs and improvement of quality of life in rural areas (Paragraph 2). Measures for improving the protection and quality of agricultural land are the types of incentives which improve the physical, chemical, and biological properties of the soil (charcoal and soil extraction, acidity reduction, reduction of soil alkalinity, meliorative soil fertilization, etc.). Incentives focused on the land protection are counter-measures and measures of control and land testing, land consolidation, melioration, recultivation, and other measures for the protection of land (Paragraph 3). Institutional support measures are the type of incentive with which the research programs in agriculture, advisory services programs, agricultural promotion, market information system of agriculture in the Republic of Serbia, as well as another program, are encouraged (Paragraph 4). Structural incentives can be directed towards a specific user group, such as farmers mainly producing for the market, cooperatives, local self-government units, associations and other users engaged in agricultural production, processing, and placement of agricultural and food products (paragraph 5). In accordance with Article 4 of the Act, the strategic framework, particularly significant and relevant in all segments of rural policy, development and advancement, is the Agriculture and Rural Development Strategy, the provisions of which will be given more precisely in the next subheading.

## Strategic treatment of rural development policy

As determined by Article 3 of the Law on Agriculture and Rural Development, the agricultural and rural development policy of the Republic of Serbia is implemented through the realization of the Strategy for Agriculture and Rural Development of the Republic of Serbia (hereinafter referred to as the Strategy), the National Program for Agriculture and the National Program for Rural Development, as well as through the realization of IPARD programs. In the text of the Strategy it is stated that, by the preparation of the Strategy, a set of political and legal assumptions for the preparation of national programs for the development of agriculture and rural

areas and the IPARD program, are practically fulfilled.[26] Compared to the EU countries average (27 Member States), the Republic of Serbia has a significantly higher share of GDP of the agriculture sector in the total GDP, and significantly lower participation of service sector. High share of agriculture in the basic macroeconomic aggregates of the Republic of Serbia in relation to other countries can, on the one hand, be attributed to rich natural resources and favorable climate conditions for agricultural production, and on the other hand to slower process of structural reforming of the rest of the economy and delays in this process.[27] According to the Strategy text, it can be concluded that the policy of incentives in the agriculture of the Republic of Serbia during the last decade has been exposed to various and very complex factors such as: political and economic (non)stability of the country, dynamic changes in the volume and structure of production, global market disturbances,... Since 2004, significant changes in strategic policy have been made in the agricultural policy of the Republic of Serbia, compared to the previous period. In 2005, the Government adopted the Agricultural Development Strategy of Serbia defining the basic strategic goals, but after 2008, the period of great instability of agricultural policy and frequent changes in direction and incentive mechanisms has occurred.[28]

Nevertheless, the rural development policy in the observed period, especially at the beginning, was significantly more represented in the total budget expenditures for support of agriculture, and, by the number of measures and programs that were operationalized, considerably more diversified. In the context of the development of agro economy and rural areas, it is necessary to emphasize that rural areas, and in general the agricultural sector, "possess significant resources both in terms of volume and diversity, which provides significant opportunities for the growth of production, diversification of products and services and the creation of new, innovative products and practice". However, the development of rural areas besides numerous advantages, over the past several years, has been exposed to significant demographic, market, social, institutional, infrastructural pressures, as well as to pressures and weaknesses expressed in the area of insufficient utilization and understanding of the cultural heritage importance. Also, the development of rural areas, besides numerous occasions, abounds with significant threats, expressed in the vital segments

[26] Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024, op. cit., p. 4.
[27] Ibid., p. 8.
[28] Ibid., p. 40-42.

of the rural development process (e.g. insufficient recognition of rural specificities, poor investor interest, increase of rural poverty, etc.). According to the Strategy provisions[29], the rural areas of the Republic of Serbia are characterized by diversity of landscapes and biodiversity[30], the rich cultural heritage, and natural resources. On the other hand, they suffer the consequences of demographic abandonment. That is the reason for their stagnancy in development, the presence of all kinds of deprivation and the increase of poverty.

Further, their economy is reduced to the exploitation, draining, and further degradation of natural resources, based on agriculture and the activities that depend on it, with a small supply of quality jobs and modest opportunities for generating external revenues. The growth of the rural areas attractiveness as appealing places for young families to live in is closely linked to the improvement of physical infrastructure, better access to social services, improvement of the social structure, and support to the development of entrepreneurship. Finally, disregarding the specific needs of the village and its inhabitants, the lack of systematic and better coordinated activities of various actors poses a serious threat to the further growth of the developmental gap in relation to the city. The great chances for development of both agriculture and rural communities lay in the creation of an efficient system of knowledge transfer, technologies and information, as well as innovative ways of using the potentials of cultural heritage and biodiversity. In the context of this, in a separate chapter of the Strategy, the results of the SWOT analysis were presented, in which "knowledge of the advantages and possibilities of improving the situation in the domain of rural development is systematized, which also warns about the weaknesses and threats that rural areas can encounter in the future. This information is the basis for the systematization of objectives, measures, and activities of the Strategy and supporting documents".[31]

[29] Ibid., p. 56.

[30] According to the Strategy: „The area on which the Republic of Serbia is located is characterized by great genetic, special and ecosystem diversity. The highland and mountainous area of the Republic of Serbia represents one of the six centres of European biodiversity. In addition, the Republic of Serbia is potentially one of the global centers of plant diversity, according to the wealth of the flora. The heterogeneity of flora and fauna is highly expressed, as widespread species and endemic species (Balkan, local and stenochemistry) can be found. However, there is no centralized database in the Republic of Serbia or a coordinated system of biodiversity monitoring at the national level. Biodiversity monitoring is incomplete and fragmented. The quality and quantity of data are very diverse, not standardized and often not comparable with data in other European countries ". Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024, op. cit., p.18.

[31] Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024, op. cit., p. 51.

**Table 1.** *SWOT analysis of strengths and weaknesses, opportunities and threats in the field of rural development in Serbia*

| **Rural development STRENGTHS** | **Rural development WEAKNESSES** |
|---|---|
| Diversity and attractiveness of the rural environment; | Unfavorable demographic trends; |
| Rich cultural heritage; | Inactive labor market; |
| Preservation of traditional knowledge and technologies; | Unfavorable social structure; |
| Existence of successful examples of good practice in the field of rural tourism and accompanying activities; | Unused possibilities of diversification in the holding income; |
| Started initiatives on the formation of local social networks; | Insufficient utilization of cultural heritage; |
| Solid state of infrastructure in some rural areas. | Low infrastructure; |
| | Difficult acces to social services; |
| | Low level of social capital. |
| **Rural development OPPORTUNITIES** | **Rural development THREATS** |
| The possibility of creating new products and services; | Insufficient recognition of rural specificities in local and national policies; |
| Possibilities of private-public partnerships; | Poor interest of the investors; |
| Revitalization of resources and social structure in POURP; | Increase of rural poverty and regional poverty differences; |
| Possibilities for intensifying regional cross-border cooperation; | Insufficient recognition of the specificity of small farms in national policies, including agricultural policy; |
| Use of the pre-accession period for growth of competitiveness, application of standards with the use of EU funds (IPARD); | Stagnation in the EU integration process; |
| Possibilities for development all types of tourism related to rural areas, including HVNF areas. | Lack of capacity in POURP to withdraw budget support. |

**Source:** *The Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024. "Official Gazette of RS", no. 85/2014, p. 51-54.*

In the context of some important designations of the Strategy of Agriculture and Rural Development of the Republic of Serbia analysis, it is necessary to mention several important strategic documents on which the Strategy relies:[32]

- Serbian Agriculture Development Strategy ("Official Gazette of RS", No. 78/05), with the National Program for Agriculture of the Republic of Serbia from 2010 to 2013 ("Official Gazette of the Republic of Serbia", No. 83/10) and the National Program for Rural Development of 2011 to 2013 ("Official Gazette of the Republic of Serbia", No. 15/11);

- Strategy for the Development of Forestry of the Republic of Serbia ("Official Gazette of the Republic of Serbia", No. 59/06), whose provisions define the general development goals of the Republic of Serbia forestry sector and determining measures for achieving these goals;

- The Biodiversity Strategy of the Republic of Serbia for the period 2011-2018 ("Official Gazette of RS", No. 13/11) defining the correlation of biodiversity and agriculture. The Strategy identifies specific factors for endangering biodiversity in the field of agriculture and forestry and establishes concrete measures to mitigate them;

- National Strategy for the Sustainable Use of Natural Resources and Goods ("Official Gazette of the Republic of Serbia", No. 33/12), which defines the objectives: ensuring the conditions for sustainable use of resources through appropriate planning of each balance and resource consumption, reducing the impact of resource use on the economy and the environment, as well as establishing indicators for their monitoring.

## Conclusion

Bearing in mind the basic strategic treatment, expressed through the Strategy of Agriculture and Rural Development of the Republic of Serbia, as well as the legislative treatment of rural development policy in the Republic of Serbia, stated in the Law on Agriculture and Rural

[32] Ibid., pg. 5-6.

Development, it can be concluded that rural development represents a significant challenge for developed countries, as well as for the developing ones, with particular attention to addressing the long-term problems, weaknesses and threats that rural areas face. Assessing the economic, social and environmental situation, identifying basic weaknesses, threats and problems, and finally determining concrete goals and basic priorities are definitely the starting points in the design of the strategic framework in the consideration of the whole dimension of rural development, which are the basic starting points in the conceptualizing the basic, i.e. the primary legal framework in determining the elementary components of agricultural policy and rural development policy. In addition to this, activities related to the development and improvement of investment programs, monitoring, as well as evaluations, i.e. evaluations achieved in comparison with the planned, are also necessary, as a recommendation to further plans, goals, and affinities. However, in addition to planned, modern and European standards of customized strategic and legislative treatment, the implementation of rural development policy implies adequate harmonization of all activities and measures that policy implies and incorporates in its basic definition, harmonization of short-term and long-term development needs and plans, and no less significant is the function of management and the principle of transparency in terms of publicity and the availability of all relevant data in the process of implementing the rural development policy.

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# ECONOMIC-ENERGETIC PARAMETERS OF BIOMETHANE PRODUCTION FROM THE AGRICULTURAL PLANT BIOMASS[1]

*Jonel Subić[2], Marko Jeločnik[3]*

## Abstract

*At the beginning of 21st century, one of the biggest issues that Serbia is facing, as well as many other countries, among which are also EU member states, is a production of energy. Currently used resources (oil, fossil fuels and hydro-energy) are limited and most often non-renewable. Consequently, actual problem of energy deficiency could be solved by optimization and research of new energy sources (solar and wind energy, energy from biogas, geothermal and tidal energy, etc.), or renewable energy that is inexhaustible at the Earth. In EU countries, biogas production becomes so popular. According to that, there are established a conditions at the agricultural holdings, in order to increase their use of biomass residues for the production of heat and electricity. Also, organization of much more energy independent holdings is strongly supported. Economic parameters are very important for the use of certain procedures in practice. Here are considered, before all, price of methane, especially specific price compared to the primary energy unite, usually in kWh. Specific price is depending on costs of production of biogas, size of plant for methane production and applied technology. Costs of methane production are influenced by many factors, mostly by the used organic substrates (raw material) and plant size (capacity). In this research, organic substrate represents the waste from the agricultural plant production (straw and other harvest residues), as well as the use of energy plants parts (wheat, barley, corn, silage corn, millet and sunflower). Energetic parameters accentuate the obtained yield (per production unit, or 1 ha) of grown plant, as well as the volume of biogas that could be possibly abstracted from these crops, in other words the volume of energy which will be available for external*

[1] Paper is a part of the research at the project III-46006, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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*use (selling). Sales revenues gained from produced electrical energy are important part, both for the economic profit and ecological balance of the biogas plant. Optimization of economic results of production is based on the concept of economic effectiveness (gaining of maximal economic effects per unit of invested assets). Starting from the assumption that the production surfaces are divided into the four parcels (with included crop production), installed power of CHP unit will be 269,58 kWh, calculated yield of the bio-methane will be 14.671,05 $m^3$/ha, while the variable costs will be around 5.035,74 €/ha.*

**Key words:** *economic-energetic parameters, bio-methane, agricultural plant biomass.*

## Introduction

For the purposes of this article, there were analyzed a data collected by field research (by interview of agricultural holdings specialized in crop production) at the Braničevo District (South and East Serbia Region)[4]. Throughout the field visits it was done the detailed insight into the soil condition. Also, previous knowledge has been analyzed, as well as current technologies for crop production on sandy soils were reconsidered[5]. According to this, selection of crops that possess the energetic potential for bio-methane production was based on several crucial requirements:

- To enable the fastest possible respond in crop production as it could provide obtaining the large volume of plant biomass that could be used for bio-methane production;
- To determine the crop rotation that will ensure competitiveness of grown crops in relation to weed plants;
- To select and define potential crops, adequate mechanical operations of land and crops cultivation within the existing production frame

[4] According the fact that the achieved yields in crop production within the Region of South and East Serbia are much lower than the average yields achieved at the Republic level, authors intention was to direct the research in order to find the alternative solution for optimization of economic results of production.

[5] Agricultural land that was the object of analysis (total arable surface of 140 ha), had not been cultivated for a long time period, so it was in weedy condition, characterized by large deposit of weed seeds in surface layer. In order to decrease the production risks, as well as to intensify the production process, there are suggested the concept of crop rotation that implies the division of complete production surface into the four plots (size of each plot is around 35 ha).

characteristic for the Serbia, that will enable quit a economic production in given business conditions;
- To determine production technology in line to crops which are achieving a great biomass in conditions of irrigation, as well as to define the alternative crops that could endure relatively easy the conditions of rain fed crop production.

Considering the fact that in Serbia there are limited information about the production of energy from biogas, main goal of article is analysis of economic feasibility and energy balance of methane production from the energy crops and harvest residues. For the crop production purposes, all costs derived from the used production technology (throughout the costs of certain operations and used inputs) are taken. Compared to the full price calculation, which is based on the determination of costs emerged from all sources, in the calculation based on variable costs is determining the ability of obtained products to cover the incurred expenses. In presented case it does not derive from their market prices, than from their conversion into the price of energy that will be gained from the methane production per 1 ha of production surface under the certain crops. Based on the calculation upon the variable costs, it could be done the assessment of the economic effects of the production of same crop in regard to different levels of production intensity, as well as to calculate the production risks due to variable costs increase. In relatively simple way, it will be obtained the marginal values of the product price (in this case wheat, barley, corn, silage corn, millet and sunflower), that will provide profitability of its production, i.e. under which level of variable costs increase and current price of produced product, its production will be economically justified.

## Methodology

The production efficiency and orientation of agricultural holding towards the development continuity implies a positive difference between the obtained value of final products and total costs of production (Subić et al., 2010).

Analytical calculations based on variable costs covering (so called contribution margin) are considering the cutting down of totally achieved incomes for realized variable costs within a certain line of agricultural production. In plant (primarily crop) production they are usually expressed per the unit of production surface (hectare). It could be presented by following formula (Subić, Jeločnik, 2013; Jeločnik et al., 2016):

$CM = PV - VC$, where: $PV = (q \times p) + s$

Where:

CM - contribution margin;
PV - obtained production value (of primary and secondary products);
VC - achieved variable costs;
q - products' quantity per the unit of production surface;
p - price of product per the unit of measure;
s - subsidies per the unit of production surface.

Totally achieved contribution margin at the agricultural holding was expressed by the sum of individual contribution margins of present production lines, where achievement of total profit does not mean simple generating of profit within the each production line (method enables marking of the most profitable lines), (Jeločnik et al., 2015). Mentioned method makes much simpler insight into achieved business results at the farm during the one production cycle, as well as easier determining the size of the deviation of achieved results in the case of production volume oscillations (Subić et al., 2010).

Negligible impact of agricultural producers on the selling prices of their final products (they are created by the market), assigns to farm the possibility to find, by the mentioned method, more efficient way of costs analysis in line to potential changes in structure, volume and way of production (Subić et al., 2015).

Use of method leads to the optimal structure of the production and contributes the assessment of production risks that affect the holding (Ivanović, Jeločnik, 2016). Besides the evaluation of economic effects of production of certain crop under the different levels of intensity, method could compare economic efficiency of different production lines under the identical fixed costs (Jeločnik et al., 2013).

Expressed correlation between the production results and production uncertainty, implies the need of their assessment. As simple, but very efficient method for the holding could be the determination of critical (breakeven points) production levels (critical price, yield and variable costs), points in which the contribution margin equals the zero (Nastić et al., 2014).

On the other side, by the focus on the energy balance of biogas that could be gained from agricultural plant mass, it should be mentioned that natural gas is consisted by almost the 99% of methane, why its concentration is something smaller within the biogas. In this research, assumption was that the biogas could be used in the production of electric energy by its use as the driving fuel for the motor that runs the generator of electric power. For this is usually used the classical internal combustion engine (ICE) with small modifications for mentioned purpose.

Electric efficiency of such a this systems is around 30%, where for the systems larger than 50 kW that percentage could be increased, while for the systems smaller than 30 kW that percentage could be decreased (Babić et al., 2010).

Having in mind the fact that operational time of work of the system mostly depends on the biogas availability during the whole year, in case that the biogas production is provided during the complete year, operational time of work will be around 8.000 hours at the year level.

Currently, worldwide is popular the technology of combined heat and power production (CHP systems). As the efficiency of mentioned system is between the 85-95%, CHP system capacity could be defined by the next formula (Hiliborn, 2006): CHP system capacity (in kWh) = [volume of biogas (in $m^3$/year) x heat power of biogas (in MJ/$Nm^3$) / 3,6] / [operational time of work (in h/year) x electric efficiency].

In this case, CHP system capacity was determined by the following formula: CHP system capacity (in kWh) = methane production (in $m^3$) x $10^6$ kWh/$m^3$ x system efficiency[7] (in %) x operational time of work (in h/year).

## Research results with discussion

According to data of the Statistical office of the Republic of Serbia (SORS), in the period 2007-2016, in the Region of South and East Serbia were gained much lower yields than those one achieved at the level of entire Republic. Yields are referring to the selected crops grown in the system of rain fed agricultural production (without application of irrigation), (Table 1.).

[6] Each $m^3$ of methane contains 10 kWh of energy.

[7] According to used system type, system efficiency in obtaining the electric energy ranges from 30 to 42% (in this case all calculations were based on system efficiency of 42%).

**Table 1.** *Review of achieved yields during the period 2007-2016.*

| Year | Wheat[2] yield (t/ha) | Barley yield (t/ha) | Corn yield (t/ha) | Sunflower yield (t/ha) | Silage corn yield (t/ha) |
|---|---|---|---|---|---|
| Republic of Serbia[1] | | | | | |
| 2007 | 3,70 | 2,80 | 3,90 | 1,90 | 17,50 |
| 2008 | 4,30 | 3,70 | 5,90 | 2,40 | 18,10 |
| 2009 | 4,10 | 3,20 | 6,40 | 2,40 | 21,90 |
| 2010 | 3,40 | 2,90 | 7,10 | 2,20 | 22,90 |
| 2011 | 4,20 | 3,60 | 6,20 | 2,50 | 21,10 |
| 2012 | 4,00 | 3,40 | 3,60 | 2,00 | 14,90 |
| 2013 | 4,30 | 4,00 | 6,00 | 2,70 | 20,70 |
| 2014 | 3,90 | 3,60 | 7,50 | 2,90 | 19,20 |
| 2015 | 4,10 | 3,80 | 5,40 | 2,60 | 17,30 |
| 2016 | 4,80 | 4,30 | 7,30 | 3,10 | 21,30 |
| Lowest yield | 3,40 | 2,80 | 3,60 | 1,90 | 14,90 |
| Average yield | 4,08 | 3,53 | 5,93 | 2,47 | 19,49 |
| Highest yield | 4,80 | 4,30 | 7,50 | 3,10 | 22,90 |
| Region of South and East Serbia | | | | | |
| 2007 | 2,60 | 1,90 | 2,20 | 1,70 | 8,70 |
| 2008 | 3,70 | 2,90 | 4,40 | 2,10 | 10,80 |
| 2009 | 3,50 | 2,50 | 4,90 | 2,60 | 12,10 |
| 2010 | 2,90 | 2,40 | 5,30 | 2,20 | 12,10 |
| 2011 | 3,40 | 2,80 | 4,20 | 1,50 | 12,30 |
| 2012 | 3,30 | 2,60 | 3,10 | 1,50 | 10,40 |
| 2013 | 3,40 | 3,00 | 4,10 | 2,20 | 14,50 |
| 2014 | 3,10 | 2,70 | 5,20 | 2,20 | 13,00 |
| 2015 | 3,40 | 3,00 | 4,40 | 2,00 | 10,80 |
| 2016 | 3,80 | 3,70 | 5,50 | 2,30 | 13,80 |
| Lowest yield | 2,60 | 1,90 | 2,20 | 1,50 | 8,70 |
| Average yield | 3,31 | 2,75 | 4,33 | 2,03 | 11,85 |
| Highest yield | 3,80 | 3,70 | 5,50 | 2,60 | 14,50 |

**Source:** *Authors calculations based on the SORS data - Crop production, data set for the period 2007-2016 (http://www.stat.gov.rs/WebSite/public/ReportView.aspx).*

[1] From 1999 without the data for Kosovo and Metohija.

[2] SORS does not register the data for the millet.

In upcoming period, by the use of irrigation, it could be possible to achieve much larger yields (Table 2.).

**Table 2.** *Planned yields of selected crops in the production system that includes irrigation*

| Year | Wheat | Barley | Corn | Sunflower | Silage corn |
|---|---|---|---|---|---|
| | yield (t/ha) | yield (t/ha) | yield (t/ha) | yield (t/ha) | yield (t/ha) |
| Region of South and East Serbia | | | | | |
| Lowest yield | 3,43 | 2,46 | 3,15 | 2,15 | 13,40 |
| Average yield | 4,26 | 3,46 | 6,04 | 2,83 | 17,82 |
| Highest yield | 4,76 | 4,54 | 7,48 | 3,54 | 21,30 |
| **Primary product** | **4,8** | **4,5** | **7,5** | 3,5 | **21,3** |
| **Secondary product** | **2,4** | **2,0** | **11,2** | 4,4 | **-** |
| **Total** | **7,2** | **6,5** | **18,7** | **7,9** | **21,3** |

**Source:** *Authors calculations based on the SORS data - Crop production, data set for the period 2007-2016 (http://www.stat.gov.rs/WebSite/public/ReportView.aspx) and field research in the period 2007-2016 (IAE, 2017).*

## *Calculation of wheat production*

**Table 3.** *Starting parameters in wheat production*

| Line of production | **Wheat** | | District: | Braničevo District |
|---|---|---|---|---|
| Type of production | Crop production | | NUTS level: | Serbia - South (South and East Serbia) |
| Unit of production capacity: | 1 | ha | Production year | Growing average for the period 2018-2020 |
| Production technology | With irrigation | | Average rate: EUR 1 = 118,83 RSD | |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 4.** *Contribution margin in wheat production*

| Element | Volume | UM | Price (RSD/ UM) | Total RSD/ha | Total EUR/ha | Total RSD/35 ha | Total EUR/35 ha |
|---|---|---|---|---|---|---|---|
| **A. Incomes** | | | | | | | |
| Wheat (grain) | 4.800,00 | kg | 18,80 | 90.240,00 | 759,43 | | |
| Straw | 2.400,00 | kg | 4,80 | 11.520,00 | 96,95 | | |
| Complete plant | 7.200,00 | kg | | | | | |
| Subsidies | | | | 4.000,00 | 33,66 | | |
| **Production value (total A)** | | | | **105.760,00** | **890,05** | **3.701.600,00** | **31.151,62** |
| **B. Variable costs** | | | | | | | |
| Seed | 250,00 | kg | 37,00 | 9.250,00 | 77,85 | | |
| Fertilizers | | | | 19.300,00 | 162,42 | | |
| Pesticides | | | | 6.569,92 | 55,29 | | |
| Mechanization | | | | 36.249,70 | 305,07 | | |
| Irrigation | | | | 28.180,00 | 237,15 | | |
| **Variable costs (total B)** | | | | **99.549,62** | **837,78** | **3.484.236,68** | **29.322,35** |
| **C. Contribution margin (A-B)** | | | | **6.210,38** | **52,26** | **217.363,32** | **1.829,27** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 5.** *Critical values in wheat production*

| Description | RSD (kg/ha) | EUR (kg/ha) |
|---|---|---|
| Expected yield (EY) | 4.800,00 | 40,40 |
| Expected price (EP) | 18,80 | 0,16 |
| Subsidies (S) | 4.000,00 | 33,66 |
| Variable costs (VC) | 99.549,62 | 837,78 |
| **Critical price: CP = (VC – S) / EY** | **19,91** | **0,17** |
| **Critical yield: CY = (VC – S) / EP** | **5.082,43** | **5.082,43** |
| **Critical variable costs: CVC = (EY x EP) + S** | **94.240,00** | **793,10** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

According to the analytical calculations based on variable costs in wheat production (with irrigation), it could be concluded:

- Gained yield of grains amounts 4,8 t/ha (straw 2,4 t/ha, or complete plant 7,2 t/ha);
- Gained income amounts 890,05 EUR/ha (or 31.151,62 EUR/35ha);
- Gained variable costs amount 837,78 EUR/ha (or 29,322,35 EUR/35 ha);
- Positive contribution margin was obtained in amount of 52,26 EUR/ha (or 1.829,27 EUR/35 ha);
- In the structure of variable costs, costs of mechanization and irrigation are dominating (with the share of 37%, or 28%).

Based on previous preview of achieved contribution margin in wheat production, with certain dose of safety it could be claimed that it leaves little space for covering of all fixed costs and obtaining of profit after all variable costs are covered.

*Calculation of barley production*

**Table 6.** *Starting parameters in barley production*

| Line of production | **Barley** | | District: | Braničevo District |
|---|---|---|---|---|
| Type of production | Crop production | | NUTS level: | Serbia - South (South and East Serbia) |
| Unit of production capacity: | 1 | ha | Production year | Growing average for the period 2018-2020 |
| Production technology | With irrigation | | Average rate: EUR 1 = 118,83 RSD | |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 7.** *Contribution margin in barley production*

| Element | Volume | UM | Price (RSD/ UM) | Total RSD/ha | Total EUR/ha | Total RSD/35 ha | Total EUR/35 ha |
|---|---|---|---|---|---|---|---|
| **A. Incomes** | | | | | | | |
| Barley (grain) | 4.500,00 | kg | 18,50 | 83.250,00 | 700,61 | | |
| Straw | 2.035,00 | kg | 4,80 | 9.768,00 | 82,20 | | |
| Complete plant | 6.535,00 | kg | | | | | |
| Subsidies | | | | 4.000,00 | 33,66 | | |
| **Production value (total A)** | | | | **97.018,00** | **816,48** | **3.395.629,85** | **28.576,66** |
| **B. Variable costs** | | | | | | | |
| Seed | 200,00 | kg | 37,00 | 7.400,00 | 62,28 | | |
| Fertilizers | | | | 14.393,00 | 121,13 | | |
| Pesticides | | | | 6.569,92 | 55,29 | | |
| Mechanization | | | | 37.669,30 | 317,01 | | |
| Irrigation | | | | 22.544,00 | 189,72 | | |
| **Variable costs (total B)** | | | | **88.576,22** | **745,43** | **3.100.167,59** | **26.090,13** |
| **C. Contribution margin (A-B)** | | | | **8.441,78** | **71,04** | **295.462,26** | **2.486,53** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 8.** *Critical values in barley production*

| Description | RSD (kg/ha) | EUR (kg/ha) |
|---|---|---|
| Expected yield (EY) | 4.500,00 | 37,87 |
| Expected price (EP) | 18,50 | 0,16 |
| Subsidies (S) | 4.000,00 | 33,66 |
| Variable costs (VC) | 88.576,22 | 745,43 |
| **Critical price: CP = (VC – S) / EY** | **18,79** | **0,16** |
| **Critical yield: CY = (VC – S) / EP** | **4.571,69** | **4.571,69** |
| **Critical variable costs: CVC = (EY x EP) + S** | **87.250,00** | **734,27** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

Based on analytical calculations of contribution margin in barley production (with irrigation), following could be concluded:

- Achieved yield of grains amounts 4,5 t/ha (straw 2,0 t/ha, or complete plant 6,5 t/ha);
- Obtained income is in value of 816,48 EUR/ha (or 28.576,66 EUR/35ha);
- Gained variable costs are 745,43 EUR/ha (or 26,090,13 EUR/35 ha);
- Positive contribution margin was achieved in amount of 71,04 EUR/ha (or 2.486,53 EUR/35 ha);
- Within the structure of variable costs, costs of mechanization and irrigation are dominating (with the share of 43%, or 26%).

According to afore-presented contribution margin in barley production, it is obvious that it leaves, after covering variable costs, not enough space for covering of all fixed costs and obtaining the profit.

*Calculation of corn production*

**Table 9.** *Starting parameters in corn production*

| Line of production | **Corn** | | District: | Braničevo District |
|---|---|---|---|---|
| Type of production | Crop production | | NUTS level: | Serbia - South (South and East Serbia) |
| Unit of production capacity: | 1 | ha | Production year: | Growing average for the period 2018-2020 |
| Production technology | With irrigation | | Average rate: EUR 1 = 118,83 RSD | |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 10.** *Contribution margin in corn production*

| **Element** | **Volume** | **UM** | **Price (RSD/ UM)** | **Total RSD/ha** | **Total EUR/ha** | **Total RSD/35 ha** | **Total EUR/35 ha** |
|---|---|---|---|---|---|---|---|
| **A. Incomes** | | | | | | | |
| Corn (grain) | 7.500,00 | kg | 17,00 | 127.500,00 | 1073,00 | | |
| Corn stalk | 11.250,00 | kg | 1,50 | 16.875,00 | 142,02 | | |
| Complete plant | 18.750,00 | kg | | | | | |
| Subsidies | | | | 4.000,00 | 33,66 | | |
| **Production value (total A)** | | | | **148.375,00** | **1.248,68** | **5.193.125,00** | **43.703,87** |
| **B. Variable costs** | | | | | | | |
| Seed | 2,40 | s.u. | 3.700,00 | 8.880,00 | 74,73 | | |
| Fertilizers | | | | 24.420,00 | 205,51 | | |
| Pesticides | | | | 12.000,00 | 100,99 | | |
| Mechanization | | | | 31.558,80 | 265,59 | | |
| Irrigation | | | | 39.452,00 | 332,02 | | |
| **Variable costs (total B)** | | | | **116.310,80** | **978,84** | **4.070.878,00** | **34.259,35** |
| **C. Contribution margin (A-B)** | | | | **32.064,20** | **269,84** | **1.122.247,00** | **9.444,51** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 11.** *Critical values in corn production*

| **Description** | **RSD (kg/ha)** | **EUR (kg/ha)** |
|---|---|---|
| Expected yield (EY) | 7.500,00 | 63,12 |
| Expected price (EP) | 17,00 | 0,14 |
| Subsidies (S) | 4.000,00 | 33,66 |
| Variable costs (VC) | 116.310,80 | 978,84 |
| **Critical price: CP = (VC – S) / EY** | **14,97** | **0,13** |
| **Critical yield: CY = (VC – S) / EP** | **6.606,52** | **6.606,52** |
| **Critical variable costs: CVC = (EY x EP) + S** | **131.500,00** | **1.106,67** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

According to analytical calculations based on variable costs related to corn production (with irrigation), next conclusion could be made:

- Achieved yield of grains amounts 7,5 t/ha (corn stalk 11,2 t/ha, or complete plant 18,7 t/ha);
- Gained income amounts 1.248,68 EUR/ha (or 43.703,87 EUR/35ha);
- Obtained variable costs are 978,48 EUR/ha (or 34.259,35 EUR/35 ha);
- Positive contribution margin was achieved in amount of 269,84 EUR/ha (or 9.444,51 EUR/35 ha);
- Within the structure of variable costs dominant are the costs of irrigation and mechanization (with the share of 34%, or 27%).

According to gained contribution margin in corn production, it is obvious that it leaves enough space for covering of all fixed costs and obtaining the profit, after all variable costs are covered.

*Calculation of silage corn production*

**Table 12.** *Starting parameters in silage corn production*

| Line of production | **Silage corn** | | District: | Braničevo District |
|---|---|---|---|---|
| Type of production | Crop production | | NUTS level: | Serbia - South (South and East Serbia) |
| Unit of production capacity: | 1 | ha | Production year: | Growing average for the period 2018-2020 |
| Production technology | With irrigation | | Average rate: EUR 1 = 118,83 RSD | |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 13.** *Contribution margin in silage corn production*

| **Element** | **Volume** | **UM** | **Price (RSD/ UM)** | **Total RSD/ha** | **Total EUR/ha** | **Total RSD/35 ha** | **Total EUR/35 ha** |
|---|---|---|---|---|---|---|---|
| **A. Incomes** | | | | | | | |
| Silage corn (whole plant) | 21.300,00 | kg | 5,00 | 106.500,00 | 896,27 | | |
| Subsidies | | | | 4.000,00 | 33,66 | | |
| **Production value (total A)** | | | | **110.500,00** | **929,94** | **3.867.500,00** | **32.547,78** |
| **B. Variable costs** | | | | | | | |
| Seed | 2,64 | s.u. | 3.700,00 | 9.768,00 | 82,20 | | |
| Fertilizers | | | | 26.862,00 | 226,06 | | |
| Pesticides | | | | 12.000,00 | 100,99 | | |
| Mechanization | | | | 29.198,20 | 245,72 | | |
| Irrigation | | | | 22.544,00 | 189,72 | | |
| **Variable costs (total B)** | | | | **100.372,20** | **844,70** | **3.513.027,00** | **29.564,64** |
| **C. Contribution margin (A-B)** | | | | **10.127,80** | **85,23** | **354.473,00** | **2.983,14** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 14.** *Critical values in silage corn production*

| Description | RSD (kg/ha) | EUR (kg/ha) |
|---|---|---|
| Expected yield (EY) | 21.300,00 | 179,25 |
| Expected price (EP) | 5,00 | 0,04 |
| Subsidies (S) | 4.000,00 | 33,66 |
| Variable costs (VC) | 100.372,20 | 844,70 |
| **Critical price: CP = (VC – S) / EY** | **4,52** | **0,04** |
| **Critical yield: CY = (VC – S) / EP** | **19.274,44** | **19.274,44** |
| **Critical variable costs: CVC = (EY x EP) + S** | **110.500,00** | **929,94** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

Based on analytical calculations of contribution margin in silage corn production (with irrigation), next conclusion could be made:

- Achieved yield of whole plant is 21,3 t/ha;
- Obtained income amounts 929,94 EUR/ha (or 32.547,78 EUR/35ha);
- Obtained variable costs are 844,70 EUR/ha (or 29.564,64 EUR/35 ha);
- Positive contribution margin was achieved, with value of 85,23 EUR/ha (or 2.983,14 EUR/35 ha);
- Within the structure of variable costs dominant are the costs of mechanization and irrigation (with the share of 29%, or 22%).

Based on achieved contribution margin in silage corn production, it could be concluded that it leaves limited space for covering all fixed costs and profit obtaining.

*Calculation of millet production*

**Table 15.** *Starting parameters in millet production*

| Line of production | **Millet** | | District: | Braničevo District |
|---|---|---|---|---|
| Type of production | Crop production | | NUTS level: | Serbia - South (South and East Serbia) |
| Unit of production capacity: | 1 | ha | Production year: | Growing average for the period 2018-2020 |
| Production technology | With irrigation | | Average rate: EUR 1 = 118,83 RSD | |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 16.** *Contribution margin in millet production*

| Element | Volume | UM | Price (RSD/ UM) | Total RSD/ha | Total EUR/ha | Total RSD/35 ha | Total EUR/35 ha |
|---|---|---|---|---|---|---|---|
| **A. Incomes** | | | | | | | |
| Millet (grain) | 5.130,00 | kg | 20,00 | 102.600,00 | 863,45 | | |
| Harvesting residues | 12.825,00 | kg | | | | | |
| Whole plant | **17.955,00** | kg | | | | | |
| Subsidies | | | | 4.000,00 | 33,66 | | |
| **Production value (total A)** | | | | **106.600,00** | **897,12** | **3.731.000,00** | **31.399,04** |
| **B. Variable costs** | | | | | | | |
| Seed | 2,00 | s.u. | 4.500,00 | 9.000,00 | 75,74 | | |
| Fertilizers | | | | 12.210,00 | 102,76 | | |
| Pesticides | | | | 12.000,00 | 100,99 | | |
| Mechanization | | | | 29.198,20 | 245,72 | | |
| Irrigation | | | | 16.908,00 | 142,29 | | |
| **Variable costs (total B)** | | | | **79.316,20** | **667,50** | **2.776.067,00** | **23.362,59** |
| **C. Contribution margin (A-B)** | | | | **27.283,80** | **229,61** | **954.933,00** | **8.036,45** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 17.** *Critical values in millet production*

| Description | RSD (kg/ha) | EUR (kg/ha) |
|---|---|---|
| Expected yield (EY) | 5.130,00 | 43,17 |
| Expected price (EP) | 20,00 | 0,17 |
| Subsidies (S) | 4.000,00 | 33,66 |
| Variable costs (VC) | 79.316,20 | 667,50 |
| **Critical price: CP = (VC – S) / EY** | **14,68** | **0,12** |
| **Critical yield: CY = (VC – S) / EP** | **3.765,81** | **3.765,81** |
| **Critical variable costs: CVC = (EY x EP) + S** | **106.600,00** | **897,12** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

Based on analytical calculations of contribution margin in millet production (with irrigation), it can be concluded:

- A grain yield of 5,1 t/ha has been realized (12,8 t/ha of harvest residues, or 17,9 t/ha of whole plant);
- Gained income amounts 897,12 EUR/ha (or 31.399,04 EUR/35 ha);
- Obtained variable costs are 667,50 EUR/ha (or 23.362,59 EUR/35 ha);
- Positive contribution margin has been achieved in amount of 229,61 EUR/ha (or 8.036,45 EUR/35 ha);
- In the structure of variable costs, the mechanization and irrigation costs are dominant with a share of 37%, or 21%.

Based on previous data for contribution margin in millet production, with some certainty, it can be claimed that contribution margin leaves enough space to cover fixed costs and to achieve positive financial result, after covering all variable costs.

*Calculation of sunflower production*

**Table 18.** *Starting parameters in sunflower production*

| Line of production | **Sunflower** | | District: | Braničevo District |
|---|---|---|---|---|
| Type of production | Crop production | | NUTS level: | Serbia - South (South and East Serbia) |
| Unit of production capacity: | 1 | ha | Production year: | Growing average for the period 2018-2020 |
| Production technology | With irrigation | | Average rate: EUR 1 = 118,83 RSD | |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 19.** *Contribution margin in sunflower production*

| **Element** | **Volume** | **UM** | **Price (RSD/ UM)** | **Total RSD/ha** | **Total EUR/ha** | **Total RSD/35 ha** | **Total EUR/35 ha** |
|---|---|---|---|---|---|---|---|
| **A. Incomes** | | | | | | | |
| Sunflower (grain) | 3.500 | kg | 35,65 | 124.775,00 | 1.050,07 | | |
| Harvest residues | 4.375 | kg | | 0,00 | 0,00 | | |
| Whole plant | 7.875 | kg | | 0,00 | 0,00 | | |
| Subsidies | | | | 4.000,00 | 33,66 | | |
| **Production values (total A)** | | | | **128.775,00** | **1.083,73** | **4.507.125** | **37.930,68** |
| **B. Variable costs** | | | | | | | |
| Seed | 2,00 | s.u. | 6.600,00 | 13.200,00 | 111,09 | | |
| Fertilizers | | | | 22.200,00 | 186,83 | | |
| Pesticides | | | | 12.000,00 | 100,99 | | |
| Mechanization | | | | 33.031,95 | 277,99 | | |
| Irrigation | | | | 33.816,00 | 284,59 | | |
| **Variable costs (total B)** | | | | **114.247,95** | **961,48** | **3.998.678,25** | **33.651,74** |
| **C. Contribution margin (A-B)** | | | | **14.527,05** | **122,26** | **508.446,75** | **4.278,94** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Table 20.** *Critical values in sunflower production*

| **Description** | **RSD (kg/ha)** | **EUR (kg/ha)** |
|---|---|---|
| Expected yield (EY) | 3.500,00 | 29,46 |
| Expected price (EP) | 35,65 | 0,30 |
| Subsidies (S) | 4.000,00 | 33,66 |
| Variable costs (VC) | 114.247,95 | 961,48 |
| **Critical price: CP = (VC – S) / EY** | **31,50** | **0,27** |
| **Critical yield: CY = (VC – S) / EP** | **3.092,51** | **3.092,51** |
| **Critical variable costs: CVC = (EY x EP) + S** | **128.775,00** | **1.083,73** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

Based on analytical calculations of contribution margin in sunflower production (with irrigation), the following conclusions could be made:

- A grain yield of 3,5 t/ha has been achieved (as well as 4,4 t/ha of harvest residues, or 7,9 t/ha of whole plant);
- Obtained income amounts 1.083,73 EUR/ha (or 37.930,68 EUR/35 ha);
- Realized variable costs are 961,48 EUR/ha (or 33.651,74 EUR/35 ha);

- It has been gained a positive contribution margin cover in amount of 122,26 EUR/ha (or 4.278,94 EUR/35 ha);
- Within the structure of variable costs dominate the costs of irrigation and mechanization (with a share of 30%, or 29%).

Based on previous results for contribution margin in sunflower production, after covering of all variable costs there are left relatively small space to cover the fixed costs and to achieve the profit.

*Energy potential (average for growing crops, for the period 2018-2018)*

**Table 21.** *Energy potential of selected crops (with review of variable costs per each crop or production parcel)*

| Parcel | Crop | | Yield (t/ha) | Yield of biogas ($m^3$/t of mass) | Share of methane (%) | Yield of methane ($m^3$/t of mass) | Calculated yield of methane ($m^3$/ha) | Surface of the parcel (ha) | Daily input (t/day) | Total yield of methane ($m^3$/35 ha) | Total variable costs (EUR/35ha) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | Barley | Grain | 4,50 | 630,00 | 53,00% | 333,90 | 1.502,55 | 35,00 | 0,43 | 52.589,25 | 26.090,13 |
| | | Straw | 2,03 | 450,00 | 53,00% | 238,50 | 485,35 | 35,00 | 0,20 | 16.987,15 | |
| | Silage corn | | 21,30 | 220,00 | 52,00% | 114,40 | 2.436,72 | 35,00 | 2,04 | 85.285,20 | 29.564,64 |
| | **Total (parcel I)** | | | | | | | | 2,67 | **154.861,60** | **55.654,77** |
| II | Wheat | Grain | 4,80 | 610,00 | 53,00% | 323,30 | 1.551,84 | 35,00 | 0,46 | 54.314,40 | 29.322,35 |
| | | Straw | 2,40 | 450,00 | 53,00% | 238,50 | 572,40 | 35,00 | 0,23 | 20.034,00 | |
| | Millet | | 17,96 | 135,00 | 52,00% | 70,20 | 1.260,44 | 35,00 | 1,72 | 44.115,44 | 23.362,59 |
| | **Total (parcel II)** | | | | | | | | 2,41 | **118.463,84** | **52.684,94** |
| III | Corn | Grain | 7,50 | 600,00 | 53,00% | 318,00 | 2.385,00 | 35,00 | 0,72 | 83.475,00 | 34.259,35 |
| | | Corn stalk | 11,25 | 400,00 | 52,00% | 208,00 | 2.340,00 | 35,00 | 1,08 | 81.900,00 | |
| | **Total (parcel III)** | | | | | | | | 1,80 | **165.375,00** | **34.259,35** |
| IV | Sunflower | Grain | 3,50 | 600,00 | 53,00% | 318,00 | 1.113,00 | 35,00 | 0,34 | 38.955,00 | 33.651,74 |
| | | Stalk | 4,38 | 450,00 | 52,00% | 234,00 | 1.023,75 | 35,00 | 0,42 | 35.831,25 | |
| | **Total (parcel IV)** | | | | | | | | 0,76 | **74.786,25** | **33.651,74** |
| **Total (I+II+III+IV)** | | | | | | | | | 7,63 | **513.486,69** | **176.250,80** |
| **Suggestion for installed power of CHP unit (kWh)** | | | | | | | | | | **269,58** | |

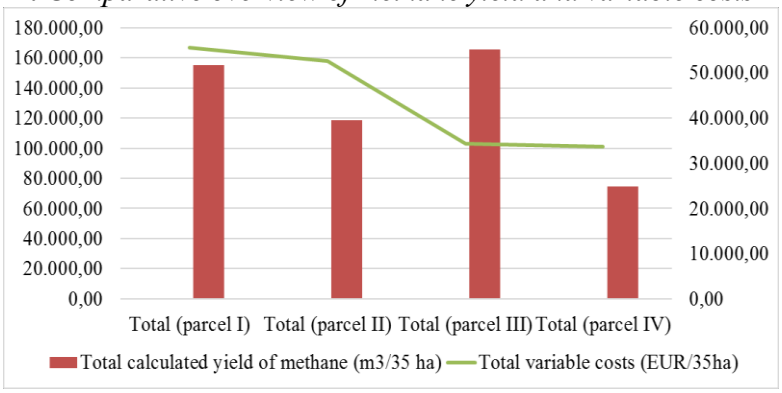
**Source:** *Authors calculations based on field research in the period 2007-2016 (L4E, 2017); Assessment of the biogas yield that could be gained from the certain crop, in $m^3$/t of mass (GMI, 2017).*

**Table 22.** *Comparative overview of methane yield and variable costs*

| Parcel | Total calculated yield of methane ($m^3$/35 ha) | Total variable costs (EUR/35ha) |
|---|---|---|
| Total (parcel I) | 154.861,60 | 55.654,77 |
| Total (parcel II) | 118.463,84 | 52.684,94 |
| Total (parcel III) | 165.375,00 | 34.259,35 |
| Total (parcel IV) | 74.786,25 | 33.651,74 |
| **Total** | **513.486,69** | **176.250,80** |

**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

**Graph 1.** *Comparative overview of methane yield and variable costs*




**Source:** *Authors calculations based on field research in the period 2007-2016 (IAE, 2017).*

Based on comparative overview of energy potential and realized variable costs in selected crops production (with irrigation), following conclusions could be made:

- Observed by individual culture:
  - The highest calculated yield of methane was registered at corn (at whole plant could be generated 165.375,00 m³/35 ha, i.e. at grain 83.475,00 m³/35 ha; or at corn stalk 81.900,00 m³/35 ha), where the total recorded variable costs amount 34.259,35 EUR/35 ha;
  - The lowest calculated yield of methane was registered at millet (at whole plant could be generated 44.115,44 m³/35 ha), where the total recorded variable costs amount 23.632,59 EUR/35 ha.
- Observed by parcels:
  - The highest calculated yield of methane was registered at the parcel no. III (163.375,00 m³/35 ha), where the total recorded variable costs amount 34.259,35 EUR/35 ha);
  - The lowest calculated yield of methane was registered at the parcel no. IV (74.786,25 m³/35 ha), where the total recorded variable costs amount 33.651,74 EUR/35 ha.

The proposal for installed power of CHP unit is 269,58 kWh.

## Conclusion

Analysis of methane obtaining from the enery crops (growing under the system of irrigation), indicates the next results:

- Expected yields are under the average for the crops that are grown under the system of irrigation;
- Contribution margines are usually modest, but they allow covering of fixed costs and achieving of positive financial results;
- Within the structure of variable costs dominate the costs of mechanization (paid machine operation services) and irrigation, what imposes a need of consideration of possibility for investment in own mechanization and cheaper energy alternatives, or use of cheaper production technology and possibility to purchase the needed agricultural plant mass on the market;
- Calculated yield of methane is much under the planned expectations.

This case also includes certain crops whose growing is not usual for the biogas production, as their specific profitability per ton or unit of production surface is much lower than the use of the most common crops (such is the silage corn). According to that, yield of silage corn of 21,30 t/ha shows that it's possible to build the plant with the capacity of 300 kWh. On the other side, in line to the fact that the realized calculations are quite a conservative, it can be built the production facility with the total capacity of up to 350 kWh.

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# CHALLENGES OF USING THE IPARD PROGRAM IN FINANCING AGRICULTURE AND RURAL DEVELOPMENT

*Katarina Đuric*[1], *Anton Puškarić*[2]

## Abstract

*Aimed to more successful integration into the Common Agricultural Policy, the European Union provides funds to candidate countries for membership in the form of pre-accession funds. One of these forms of financial support is the IPARD program. The aim of the paper is to review the limitations, which can occur in the process of financing the agriculture and rural development from the pre-accession funds of the European Union. By method of descriptive and historical analysis in this paper, the experiences of countries are analyzed, which were users of resources from this fund in the period 2007-2013, as well as the dispersion of IPARD funds for the period from 2014-2024. With aim of as much as possible utilization of funds from the IPARD program, above all, establishing the adequate institutional capacity needed for this form of financing is recommended. Also, it is necessary to provide informing and training the potential users of IPARD funds through appropriate advisory services. Relying on experiences of other countries, it can be concluded that the best way for efficient use of this pre-accession fund is to identify a small number of real priorities in financing the agriculture and rural development.*

**Key words:** *the European Union, IPARD, agriculture, rural development*

## Introduction

The common agricultural policy presents one of the most significant sectoral policies of the European Union. Its complex system of rules, principles, mechanisms and instruments is directed to regulation of

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process of primary production, the food industry and achieving sustainable development of rural areas in twenty eight member countries. The Republic of Serbia is a candidate for membership in the European Union. As a candidate country, it has obligation of adoption and implementation of Common agricultural policy. Taking into account the complexity of the system of this policy, the European Union supports candidate countries for membership in process of adaptation of agricultural sector and rural areas, as well as in the initial steps of implementation of measures of its agricultural policy.

The Instrument for Pre-Accession Assistance (IPA) presents a program for countries in process of accession to the European Union. Part of the IPA instrument is the Instrument for Pre-Accession Assistance- Rural development (IPARD), and it is intended to candidate countries for membership, aimed to preparation of implementation and management of the Common Agricultural Policy of the European Union. IPARD funds are primarily intended to establish the institutional structures and their preparation for using much more significant funds from the European Agricultural Fund for Rural Development, as well as introducing the stricter rules, which potential users of funds must comply with. On this path, candidate countries are faced with numerous challenges. This paper is aimed to indicate some of the potential problems, which accompany the use of funds from IPARD program.

## Method and the Aim of the Research

In this paper, the subject and aim of the research have determined the application of qualitative methods of research, inherent in social sciences. The greatest application in the paper have methods of descriptive and historical analysis, based on the study of the impact of the IPARD program on the development of agriculture and rural areas in countries that are candidates for membership in the European Union in the period 2007-2013. Significant application in the paper has method of comparative analysis, considering the necessity of perceiving and comparing positive and negative experiences during the use of pre-accession funds. The aim of research is analysis of key problems with which the candidate countries for membership in the European Union have been already faced during withdrawal of resources from IPARD fund.

Based on perception of the dispersion of subsidies for individual purposes for the period from 2014-2020, in this paper, available possibilities to the Republic of Serbia are assessed, in order to prepare as efficiently as possible for the integration of its agricultural sector into the European agricultural model.

## The EU Pre-accession Assistance to Candidate Countries

The common agricultural policy (CAP) presents one of the most significant sectoral policies of the EU. Its significance is indicated by the fact that about 30% of the Union's legal regulations refer precisely to this policy, and also that 40% of the budget funds are directed to agriculture and rural development (Markovic et al., 2012).

Considering the number of members of the European Union, the distinct heterogeneity of their agricultural structure and level of achieved economic development, CAP is designed as a complex system of principles, rules and instruments directed to development of agriculture and village, environmental protection and conservation of biodiversity. Form its revival in 1962 to the present, CAP is constantly being reforming and adapting to new intern and extern conditions. Continuous reforming, as well as the complexity of this policy largely complicate adaptation of national agricultural policies of candidate countries to the EU regulations. For this reason, over time, the European Union has developed numerous programs of external help. The biggest enlargement of the Union, realized through the accession of ten countries of Central and Eastern Europe, was accompanied by four financial instruments. Namely, in the period of 2000 to 2006, the programs, which were intended to countries in the process of accession to the European Union, are PHARE, ISPA, SAPARD, CARDS, as well as the pre-accession instrument for Turkey.

In the next program period, which lasted from 2007 to 2013, by the Council Europe Regulation, all existing funds were replaced by one instrument for pre-accession assistance. It was IPA I 2007-2013 system of support, which was divided into five components for the purpose of greater efficiency (EC, 2006):

1. Assistance to transition and establishing the institutions;
2. Cross-border cooperation;
3. Regional development;

4. Human resources development;
5. Rural development.

For countries, which were candidates for membership in the mentioned period, all five components of IPA program were available, while for potential candidate countries, including Serbia, only the first two components of help were available. Out of total of 11.5 billion euros, that IPA I budget amounted for period 2007-2013, about 1.4 billion euros were intended for the Republic of Serbia. Beside the first two components, within the foreseen fund, Serbia has possibilities to use part of funds for realization of project, which presented the basis for using the fifth IPA component, IPARD, respectively. The projects were mainly referred to the establishment of institutional capacities for agricultural payments.

The current program period, which has started in 2014 and will last until 2020, has brought certain changes when it comes to the system of pre-accession assistance for countries in the European integration process. Unique instrument for pre-accession assistance to countries in the European integration process for the budget period 2014-2020, has not been established by documents, adopted by EU institutions. Instead five components, which constituted the IPA I program, in the IPA II program exist so called policy area (European Parliament and the Council, 2014):

1. Reforms as a part of changes for the EU membership and establishing the institutions and capacities;
2. Socioeconomic and regional development;
3. Employment;
4. Social policies;
5. Education;
6. Improvement of gender equality and human resources development;
7. Agriculture and rural development;
8. Regional and territorial cooperation.

News that accompany IPA II program in relation to the previous accounting period, also refer to the establishment of higher degree of responsibility for candidate countries in asset management process, as

well as their application in certain sectors. Also, unlike the IPA I program, unique system of rewarding the successful users of funds is planned, as well as the cooperation with international financial institutions. The total fund of IPA II in the period 201-2020 amounts 11.7 million euros. Users are: Albania, Bosnia and Herzegovina, Macedonia, Kosovo[3], Montenegro, Serbia, Turkey. About 1.5 billion euros of total support is allocated for Serbia, while 175 million euros are allocated for area of agriculture and rural development.

**Institutional Framework and Programming of IPARD programs**

IPARD, a component of the IPA program, which is intended for rural development, it greatly differs from other components. First of all, decentralized management without ex-ante control is required for this component. This difference causes the different structure of institutions, which administer the IPARD.

The basic condition for fund use from the IPARD fund has political character, and refers to the achievement of the candidate status for membership in the European Union. Then, the next is establishing institutions, adopting and approval of the IPARD program by the European Commission, the conclusion of all relevant agreements and the successful completion of the accreditation process.

The structure of the IPARD program consists of appropriate institutions and subjects. Two key subjects are the National IPA Coordinator and the National Accreditation Board. A part of control and management system is also the National Fund.

The IPARD operational structure consists of the Managing Authority and the IPARD Agency. The most important role in the process of money transfer has National Fund. This authority is in charge of providing undisturbed transfer of funds approved by the European Union to the national account and to the IPARD agency. In addition, the National Fund is in charge of timely submission of reports to the European Commission about realized payments. The Managing Authority, which is the most frequently responsible ministry, is responsible for the following tasks:

1. Development of IPARD programs;

[3] According to United Nations Security Council Resolution 1244 of 10 June 1999

2. Supervision over the implementation of the program;
3. Evaluation;
4. Reporting.

The Managing Authority forms the Monitoring Authority, responsible for monitoring the implementation and assessment of the efficiency of the IPARD program. Timely informing potential users is also in the domain of the activities of the Managing Authority, which is engaged in operations related to rural development.

The IPARD agency, the Administration for Agricultural Payments, respectively, is responsible for approval and control of payment obligations, payment of funds to users and accounting services.

Relevant institutions in the Republic of Serbia, which are responsible for implementation of the IPARD program, are the Ministry of Finance, in the function of the National Fund and the National Approval Officer; Sector for Rural Development of the Ministry of Agriculture, Forestry and Water Management, in the role of the Managing Authority and the Administration of Agricultural Payments as part within the Ministry of Agriculture, which the work of the IPARD Agency are delegated.

Key Problems that accompany candidate countries in the process of using the IPARD considering the experience of the candidate countries, the European Commission highlights the existence of a number of factors that limit effective use of support funds from pre-accession funds.

When it comes to the IPARD, the European Commission states in its reports that the most candidate countries do not dispose with appropriate capacities for the preparation of quality documentation for the implementation of infrastructure projects, as well as for realization of public procurement procedures (European Commission, 2014).

Since rural development policy is maintained at the state level and operatively is conducted at the level of local communities, as one of the reasons for insufficient utilization of the IPARD funds is the unpreparedness of local self-government, both in infrastructure and in personnel potential. Regarding that agriculture development, as well ass rural development present the areas which require multisectoral approach, the problem, which is frequent companion of candidate countries in the

process of using the IPARD, are administrative obstacles and insufficient coordination of the Ministry of Agriculture with the Ministries of other departments.

The age and educational structure of the rural population in the most of the candidate countries for membership in the European Union is less or more unfavorable. Namely, due to low living standards and poor living conditions for life and work, young and working population leaves rural areas, which directly affects declining birth rate and aggravation of the age structure. As the experience of certain countries from our direct environment confirms, which members of the European Union became, older population of low education is less willing to accept any kind of innovation. In addition, it is more prone to mistrust the institutions, and, as rule, it is unprepared to meet the requirements of complex administrative procedures that are an integral part of the IPARD program.

Regarding the purpose of the pre-accession funds in the area of agriculture and rural development, it seems as necessary to raise the level of informing and awareness of rural population about the significance of the utilization of available funds. In this regard, every candidate state, including the Republic of Serbia, should make efforts in order to improve possibilities for resource withdrawal from European pre-accession funds through education of local population, as potential end users of support. There are various options for that purpose, from field work of agricultural advisors, through organizing the seminars, workshops and similar forms of informal education and information. Adequate training for the drafting of projects and business plans is crucial for the efficient use of resources from pre-accession funds, given that poor initial experiences, in terms of projects that do not meet the prescribed standards, can further discourage potential users.

Also, one of the challenges, which are in the way of successful implementation of projects and the withdrawal of funds from the IPARD fund, is the existence of national measures, which are competitive with the European Union funds. As rule, such national level measures are less demanding in terms of administrative procedures and documentation, and consequently result in significantly higher user response. In order to avoid such ‘overlap’ in the purpose of available funds and thus improve the use of the IPARD fund, it is important that structure and purpose of the agricultural budget is planned in coordination with the European Union plan on granting pre-accession support funds.

Beside mentioned factors, the coordination between all relevant participants in the IPARD program affects the absorption of funds. The national administration has a key role in the process of fund absorption, primarily the agency or the administration for agricultural payments. As far as it is determined by external factors, the work of administration must be technically and personally trained for the extensive work of applying, allocating resources and controlling their intended use. Additionally, the successful work of the administration depends on level of achieved cooperation with other subjects such as users, financial institutions, consultants and the European Commission. Unresolved property relations, extensive documentation, and lack of confidence of potential users have been identified as key challenges in using funds from the IPARD funds, in the case of individual countries in our environment. According to data from 2013, Croatia used 130, FYR Macedonia 65, and Turkey 650 million euros in the period from 2007 to 2012, which is only one fifth of the total allocated funds intended for rural development (Zekic et al., 2016). The thing that is often not taken into account is the fact that investment projects and development plans should not be made solely regard to the purpose of the funds approved by the European Union, but that such development projects are result of long-term view of development based on own needs.

The consulting sector in charge of education, information and providing of legal and administrative support should have key role in resolving such potential challenges and limitations. The most common problems that accompany this part of work, indicated by users countries of the IPARD, are insufficient information the consultants, whether it is agricultural advisory services or other institutions under the authority of the Ministry of Agriculture. Given that the IPARD program is primarily aimed to establishing institutions and their training to manage much greater funds of the European Union after becoming a full member, it is necessary to understand seriously this possibility and to invest all available, above all, human capacities, in order to bring the work of the relevant institutions to a higher level of efficiency.

Beside all mentioned challenges, using of the IPARD program in financing agriculture and rural development can be limited by extremely weak economic performances of the largest part of agricultural producers in our country. Namely, finance system from the European Unions funds includes that the applicants dispose with the total amount of funds necessary for the realization of the investment, in order to refund a certain

amount of funds, after realization of the same. If it comes from the fact that the income of most agricultural holdings in Serbia is extremely low, it is not necessary to exclude the possibility of excluding a large number of farms from the system of the IPARD support.

## Institutional Framework for the Use of the IPARD Fund in the Republic of Serbia

The chronic lack of budget for financing the agriculture and rural development is one of the key problems of our agricultural sector. The need for increasing the resources, which are directed to these purposes, is enhanced, which can be achieved by accrediting the relevant institutions for the use of the IPARD funds (Vasiljevic et al., 2016). In the framework of reform activities and preparations for the process of negotiations of the EU membership, the Republic of Serbia conducted certain steps in the creation of institutions for the use of pre-accession funds in 2007. Within the Ministry of Finance, the authorities are established for conducting performances of the management and control system, the National Approval Officer and the National Fund, respectively. Law on Agriculture and Rural Development of 2009, the Agency for Agricultural Payments was established, as institution within the Ministry of Agriculture, while during 2010, within the same ministry, the Managing Authority was established, Sector for Rural Development, respectively (Official Gazette of the Republic of Serbia, 2009).

At the beginning of 2011, the Government of the Republic of Serbia adopted the National Program for Rural Development for the period 2011-2013. Within this program, among other things, two pilot the IPARD measures have been defined, whose purpose was reflected in certain preparation of potential users to the standards and requirements that the European Union sets in the process of financial support to rural development (Official gazette of the Republic of Serbia, 2011).

By obtaining the status of the candidate country in March 2012, the Republic of Serbia formally met the first condition for the use of the fifth component of the IIPAD Fund for rural development. However, difficulties in accessing these funds are current, considering that the Administration for Agricultural Payments, respectively, the IPARD Agency has not yet been accredited by the European Commission. Namely, although the dedicated funds for support to development of rural areas were ready and available, institutional support to the IPARD

program in our country did not meet European standards. Agency for Agricultural Payment form that time, based in Sabac, was not ready for national accreditation, nor for the accreditation procedure by the European Commission. By the end of 2012, Serbia gave up the accreditation of the current IPARD program, because the date for the start of the new finance cycle was approaching, new IPARD program 2014-2020, respectively.

The European Commission approved the IPARD program of the Republic of Serbia for the period 2014-2020, however, problems related to accreditation of the Administration for Agricultural payments still do not allow the announcing the first open competitions and withdrawal funds dedicated to recovery and agriculture development and development of rural areas.

## The IPARD II 2014-2020 Program – Financial Framework for the Republic of Serbia

Bringing the Common Agricultural Policy for the period 2014-2020, the European Union defined the measures, activities and essence of the IPARD II program. Compared with IPARD I program, which was actual in the period from 2007-2013, IPARD II provides opportunity of financing a number of measures. In the current period, there are eleven measures by which the support is provided to different targeted areas of agriculture and rural development, through various forms of help to end users.

By the Regulation of the European Parliament and Council NO 231/2014, the following measures of the IPARD program are defined:

1. Investment in the physical property of agricultural holdings;
2. Support for the establishment of producer groups;
3. Investments in the physical property related to the processing and marketing of agricultural products and fishery products;
4. Measures in the field of agriculture, environmental protection, climate and organic production;
5. Raising and protection of forests;
6. Investing in rural public infrastructure;
7. Farm diversification and business development;

8. Preparation and implementation of local development strategies (LEADER approach);
9. Education and training;
10. Technical assistance;
11. Advisory services.

Every country determines the choice of measures on the basis of previously conducted SWOT analysis of the agriculture and rural sector, but due to limited resources it is necessary to create a list of development priorities. When it comes to the Republic of Serbia, it is planned to complement the IPARD measures with measures from the National Program for Agriculture and Rural Development for period 2015-2020. Thereby, it is necessary completely to respect the principle of complementarity between national and the IPARD measures, in order to cover as bigger as possible number of potential users of support.

At the end of 2014, the European Union Directorate for Agriculture (DGAGRI), approved a support program through the IPARD Fund for the Republic of Serbia. It is intended that the realization of measures within the program for the period 2014-2020 will occur in two phases (Table 1).

**Table 1.** *Measures within the IPARD II program for the Republic of Serbia*

| **The first phase – the period until 2015** | **The second phase – the period after 2017** |
|---|---|
| Investments in the physical property of agricultural holdings | Implementing the local rural development strategies (LEADER approach) |
| Investments in the processing and marketing of agricultural products and fishery products | Agro-ecological-climate measures and organic production |
| Diversification of agricultural holdings and business development | |
| Technical assistance | |

**Source:** *Pejovic et al., 2014*

Identically to the previous program period, total investment aid for the user of funds amounts between 50% and 80% of total investment value. Thus, the volume of help through the IPARD program is limited to the appropriate percentage of co-financing, while the rest of the fund, user

provides from their own or other sources. In addition, public expenditures in financing the IPARD II program can not exceed the amount of 50% of the total of eligible expenses of investments, except in the following cases:

- 60% for investments in physical property of agricultural holdings, and 65% if the holders of the holdings are young farmers, as well as for measures of diversification of economic activities in the farms;
- - 70% for investments in physical property of agricultural holdings in mountainous areas, and
- 100% for support to the construction of rural infrastructure, which does not generate significant income, then activities, which are financed within the measure of technical help, measures for raising and protecting forests, LEADER approach, measures of foundation of producer groups, measure in the field of environmental protection, climate and organic production, training measures and advisory services.

On the other hand, the participation of the IPA funds in public expenditures is maximum 75%, except in the case of the following measures:

- 85% for measures in the area of agriculture, environmental protection, climate and organic production, promotion and training measures, advisory services, measures for raising and protection of forests and investment projects, which are conducted in areas where occurred special natural disasters, and
- 100% for preparation and implementation of local development strategy – LEADER approach.
- For the period from 2014-2020, total public help, which includes resources from the IPARD fund and national budget, for the Republic of Serbia, amounts 229.970.588 dinars. The amounts of support resources are increasing from year to year, and the largest part is determined for investing in physical property of agricultural holdings (Table 2).

For each of the measures within the IPARD program, potential users are defined, as well as the general eligibility criteria for the projects. In addition, specific criteria for certain sectors are defined, harmonized with

the size of the holding and the type of the production, or the type of activity that the holding wants to perform next to agriculture.

**Table 2.** *Total resources of public support for agriculture and rural development of the Republic of Serbia in the period from 2015-2020 (in thousands of euros)*

| Measure | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2014-2020. |
|---|---|---|---|---|---|---|---|
| Investments in the physical property of agricultural holdings | 10.046 | 13.200 | 14.162 | 14.932 | 22.669 | 26.373 | 101.386 |
| Investments in the physical property relating to the processing and marketing of agricultural products and fishery products | 8.219 | 10.799 | 11.587 | 12.217 | 18.546 | 21.576 | 82.946 |
| Agro-ecological-climate measures and organic production measures | - | - | 2.573 | 2.573 | 2.573 | 2.573 | 10.294 |
| Implementation of local rural development strategies – LEADER approach | - | - | 555 | 1.111 | 2.111 | 2.055 | 5.833 |
| Diversification of agricultural holdings and business development | 1.333 | 2.000 | 2.666 | 6.666 | 5.333 | 5.333 | 23.333 |
| Technical support | 352 | 588 | 1.176 | 1.705 | 1.176 | 1.176 | 6.176 |

**Source:** *Ministry of Agriculture and Environmental Protection of the Republic of Serbia, 2014*

The total resources of the IPARD fund for the Republic of Serbia in the period 2015-2020 amount 175 million euros. The European Union allocated the largest part of the funds for projects for the construction of the physical property of agricultural holdings, their modernization, respectively (Table 3).

**Table 3.** *The amount of the IPARD funds by individual measures for the Republic of Serbia for the period 2014-2020 (in thousand of euros)*

| Measure | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2014-2020. |
|---|---|---|---|---|---|---|---|
| Investments in the physical property of agricultural holdings | 7.535 | 9.900 | 10.622 | 11.199 | 17.002 | 19.780 | 76.040 |
| Investments in the physical property relating to the processing and marketing of agricultural products and fishery products | 6.164 | 8.099 | 8.690 | 9.162 | 13.910 | 16.182 | 62.210 |
| Agro-ecological-climate measures and organic production measures | - | - | 2.187 | 2.187 | 2.187 | 2.187 | 8.750 |
| Implementation of local rural development strategies – LEADER approach | - | - | 500 | 1.000 | 1.090 | 1.850 | 5.250 |
| Diversification of agricultural holdings and business development | 1.000 | 1.500 | 2.000 | 5.000 | 4.000 | 4.000 | 17.500 |
| Technical assistance | 300 | 500 | 1.000 | 1.450 | 1.000 | 1.000 | 5.250 |
| **TOTAL** | 15.000 | 20.000 | 25.000 | 30.000 | 40.000 | 45.000 | 175.000 |

**Source:** *Ministry of Agriculture and Environmental Protection of the Republic of Serbia, 2014*

Consequently to experiences with other candidate countries, the European Union has planned the biggest amounts of financial support for the last years of program period, and the lowest amounts in the early years, where the candidate country adapts to the new funding system, as a rule. All the challenges, which stand in the way of efficient fund use of the IPARD program, whether it is about personnel potential, administrative procedures or mistrust of farmers, during the first few years are mitigated or overcome.

## Conclusion

Since that SAPARD presents the predecessor of the IPARD program, whose user is our country, too, it is important to consider all advantages and limitations of this type of support that the European Union offers.

In order to provide the most efficient use of the pre-accession assistance, it is necessary, above all, to form appropriate institutional capacities. Efficient institutions, as well as operational subjects are entities that can only provide that national-level plans and projects, relating to the use of the European funds, are realistic and consistent with specific developmental needs, and therefore feasible. Also, well-organized institutions and their quality staff will enable full information of all potential users of resources from funds,

which the European Union provides. This is considered as a very important segment of the work of advisory institutions, regarding that insufficient information, as well as mistrust of rural population were limitations to the successful withdrawal of the SAPARD funds in almost all Central and Eastern European countries. On the other hand, it is wrong to cherish illusions that pre-accession funds will solve all problems of agriculture and villages. On the contrary, National agricultural policy, in the period while country still has the status of candidate for membership in the European Union, should be maximally affirmative to all members of the 'agricultural community', both agricultural producers and the rural population in general. Since that the European funds function according the principle of co-financing and reimbursement of funds, it is essential to increase significantly the national budget for agriculture.

What we can also learn from the experience of other countries, and related to the use of pre-accession fund, refers to the list of national development priorities. Although, the fact that agriculture and rural areas are faced with numerous problems, it is very important, especially in the first years of using pre-accession support, to select the lower number of real priorities. In this way, higher degree of efficiency and the utilization of funds, which the European Union made available to candidate countries, are provided.

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# THE ANALYSIS OF ROMANIAN WINE CHAIN COMPETITIVENESS IN THE PERIOD 2007-2016

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## Abstract

*The purpose of this paper is to analyze the evolution of the Romanian wine chain between 2007 and 2016. In order to conduct this study, significant elements were highlighted to understand the current situation and indicators were analyzed such as: total cultivated area, total production, average production per hectare of grapes, wine production, import value and quantity, export value and quantity, average import and export price and trade balance. Romania has an area of approximately 170000 ha a year cultivated with grapes, mostly grown are wine grapes, but an important share of this area is still represented by hybrid vines. Romania's wine production had a decreasing trend during the analyzed period, and within the trade balance there was a trade deficit, the average of the period recording values of -19270 euros.*

**Key words:** w*ine market, import, export, wine production.*

## Introduction

Romania is one of the world's leading wine producers, in 2016 being the 13th largest producer of wine in the world and the 6th in Europe. In Romania, wine has an old tradition and it is recognized as a natural and fortifying drink and enjoys special appreciation (Popa, 2016). In a market economy, especially emergent as Romanian's, marked by permanents changes, analysing the wine sector represents a sine qua non condition for the existance of a lasting activity in this domain (Stoian et al. 2013). The wine market in Romania is influenced by the improvement of investments in this sector, by the climate change and also by the behavior of the

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consumer. An opportunity to capitalize domestic production could be the increased demand for wine in China, which proves to be an emerging market (Andersona & Wittwer, 2013). In Romania, vines can be found in most areas of the country, especially in hilly areas, because, on sunny hillsides sheltered from cold drafts (altitudes of up to 450-500 m), this plant finds the most favorable macro - and microclimates for obtaining quality wines (Chiran et al., 2015). Regarding the competitiveness of Romanian wine sector, it needs to be related with measures that are able to increase the attractiveness of Romanian wines, both on domestic and external markets (Lădaru et al., 2014).

The wine sector in Romania was also influenced by European policies. Starting with 2009, Romania's National Support Program 2009-2013 was set up in the wine sector, with financial support of 42.1 million euro. It is the only domain in which 100% of the funds have been absorbed. This program targets 5 measures: promotion of wines through the sub-measure of promoting wines produced in the European Union consisting in information measures in the Member States with the scope of informing consumers about moderate wine consumption and the scheme of designations of origin and geographical indications and also the sub-measure of promotion in third party countries, in order to improve the competitiveness of wines with a geographical indication or wines for which the vine variety is indicated, restructuring and conversion of vineyards; harvest insurance; investment; distillation of by-products. Of all these measures, the emphasis was on restructuring and conversion of vineyards, because it is desirable to increase the areas cultivated with noble vine.

As a result of the 100% absorption rate in the first 4 years (2009-2013) of this project where the farmers benefited from 42.1 mil euro, for the next program (2014-2018) were allocated 47.7 mil euro. This program helps beneficiaries (farmers) to comply with market requirements to provide them competitiveness on the external markets. Romanian wine producers should go to multiple European funds to promote their products outside (Matei, 2014).

The Romanian wine sector has been affected in the last years by decrease of areas under vineyards, but the loss in terms of quantities was offset in quality terms through increase of noble vineyard (Ladaru & Beciu, 2015). In 2016, the area under vines is declining compared to 2007, but increases

in areas under cultivation with noble vines are expected in the coming years due to the support provided by this program.

## Material and method

In order to have a proper insight at the wine chain, a study was conducted for the period 2007-2016. The study is based on the data provided by web statistics such as the International Trade Center (ITC), the National Institute of Statistics (INSSE), the Ministry of Agriculture and Rural Development (MADR) and the International Organization of Vine and Wine (OIV). The indicators of this study were: total area with vines (ha), average production per hectare (kg/ha grapes), wine production (thousands hl), average import and export price (t/euro) import value and quantity (thousands euro and t), export value and (thousands euro and t) as well as trade balance. To build the dynamic series, the average of the period was also calculated. The indicators are analyzed and interpreted to observe production oscillations as well as exports and imports of vines to identify the possible causes that lead to these fluctuations. The methods used in the study were the documentation, the comparison, the percentage method. The time comparison was performed using the mobile base indices calculated with the formula: $Ib = (x_n/x_{n-1}) \times 100$, where: x - the level of the indicator for the term to be compared; x - indicator level for the reference term. The average import price was calculated as the ratio between import value and quantity.

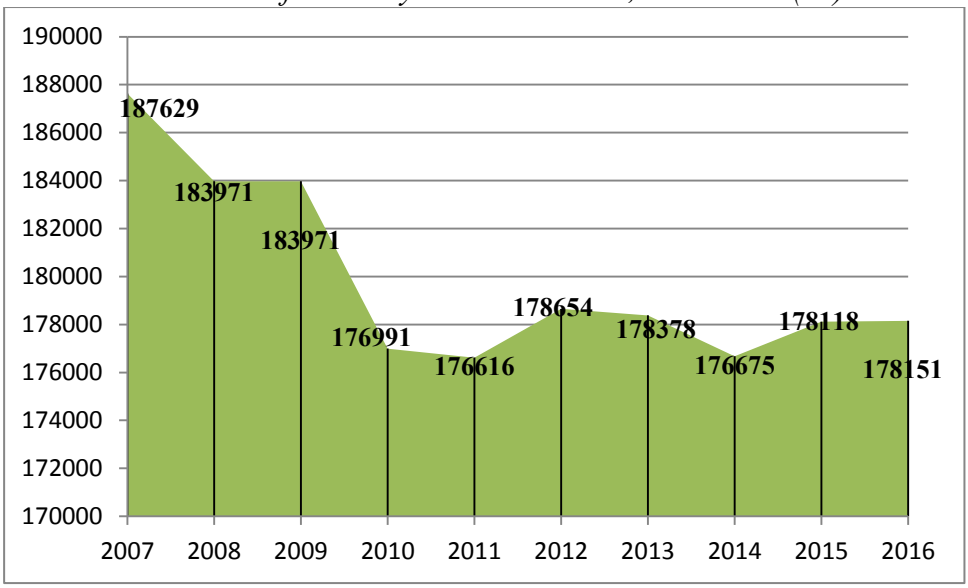
## Results and discussions

Worldwide, according to OIV reports, in the year 2016, 7.5 million ha were cultivated. The latest available data indicates a trend towards stabilization of the total vine area in some European countries, but also in the world. The main cultivating countries are Spain (975 thousand ha), China (847 thousand ha), France (785 thousand ha), Italy and Turkey. Together, these countries accounted for 50% of the total area cultivated (OIV, 2017).

Regarding the surface area of the vineyards in Romania, a decreasing trend is observed during the analyzed period (Chart 1). The area cultivated with vines decreased from 187629 ha in 2007 to 178151 in 2016, 5.32% in percentage. This reduction was due to the restructuring and conversion of vineyards surfaces, starting with 2009, through the National Programme Support 2009-2013**,** (Ladaru & Beciu 2014).

Nevertheless, there can be observed an increase in quality to support the competitiveness of Romanian producers on the foreign market. These programs bring benefits for both the consumer and the producer.

**Chart 1.** *Total area of the vineyards in Romania, 2007-2016 (ha)*




**Source:** *Author's calculation based on the data available at www.insse.ro*

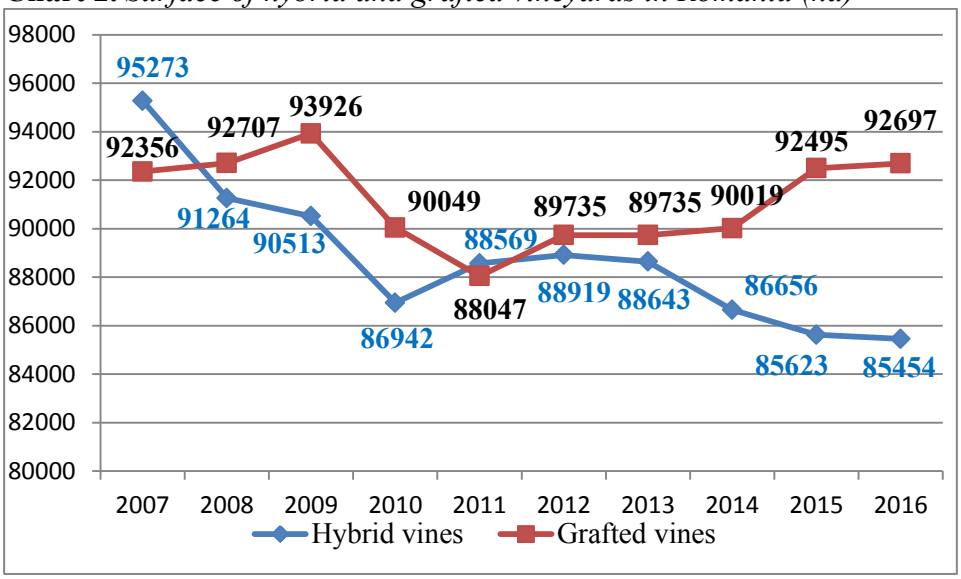
Regarding the structure of the vineyard area cultivated according to the type of vine - grafted or hybrid, it is observed that in 2016, out of the total of 178 151 ha, 52.03% is occupied by grafted vines and the rest of the area by hybrid vines (Chart 2).

Wine producers try to raise the image of Romania and Romanian wines by making high-quality wines using native grapes or noble grapes, while promoting the relief of Romania as ideal for the cultivation of wine grapes (Nakata & Antalis, 2013).

Generally, in households and small family farms hybrid vine is grown, and the production of wine obtained is either to be sold on the domestic market or for family consumption. There is a decrease in the area planted with grafted grapevine from 2009 to 2011 due to the reconversion of the surfaces by the destruction of the hybrid vines and the establishment on the same surface of the grafted grapevines. Starting with 2012, grafted vineyards increased from 89 735 ha to 92 697 ha in 2016. This situation is

due to the introduction of the National Support Program of Romania in the wine sector 2009-2013 and the Program for the period 2014-2018.
Grafted vine is mainly grown by large farms that also have processing units. There are few such units in Romania that can compete on the foreign market. If we refer to the destination of grapes, wine or table use, it is found that in Romania predominantly wine grapes are cultivated, which occupy on average an area of approximately 170 000 ha per year, while table grapes occupy areas of 8000 - 9000 ha per year, the trend for this type of grapes being declining.

**Chart 2.** *Surface of hybrid and grafted vineyards in Romania (ha)*

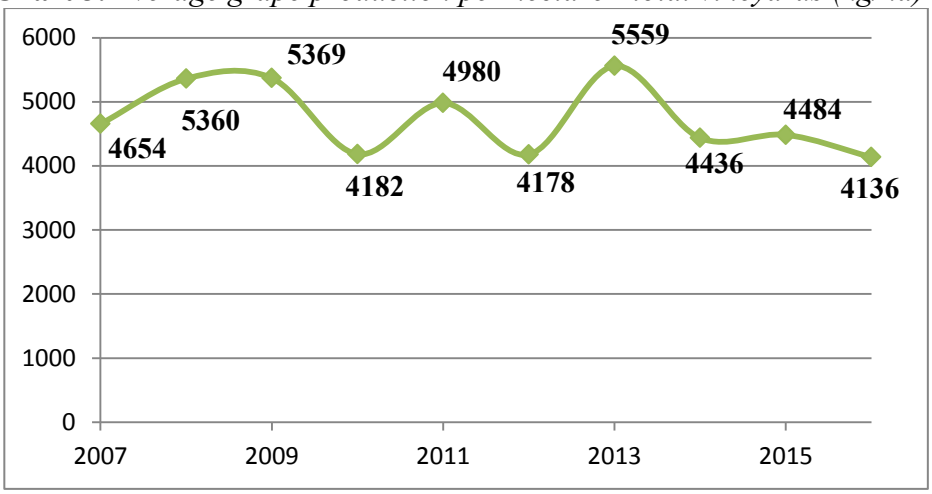



**Source:** *Author's calculation based on the data available at www.insse.ro*

Regarding the total area of the vineyards according to the region of cultivation, a larger concentration of cultivated vine is found in the macro-region two (comprising the North-East and South-East part of Romania) with an area of 105 000 ha. The largest cultivated areas are located in the Vrancea area, Buzau, Dobrogea and North-East counties of Romania, there also being the most wine consumers in Romania. The large surfaces cultivated in these areas is also due to the fact that there is the best land for the vineyard culture and the appropriate microclimate. In the ranking of the regions, after the macro-region two, the macro-region 4 (South-West Oltenia Region) is found with 38 612 ha and then the third macro-region (South-Muntenia region) with 30 868 ha. In macro-region 1 (Northwest region) is cultivated the least - 12 183 ha.

In the period 2007-2016, the average yield per hectare was 4136 kg/ha in 2016 being the lowest production, and in 2013 it was recorded the maximum production of 5559 kg/ha (Chart 3). The level of production is closely related to the climate conditions in Romania, the applied technology, the cultivated varieties, these factors determining the production oscillations. Compared to the beginning of the studied period (2007), in 2016 there was a decrease in production of 518 kg/ha, a percentage of 11.13%.

**Chart 3.** *Average grape production per hectare - total vineyards (kg/ha)*

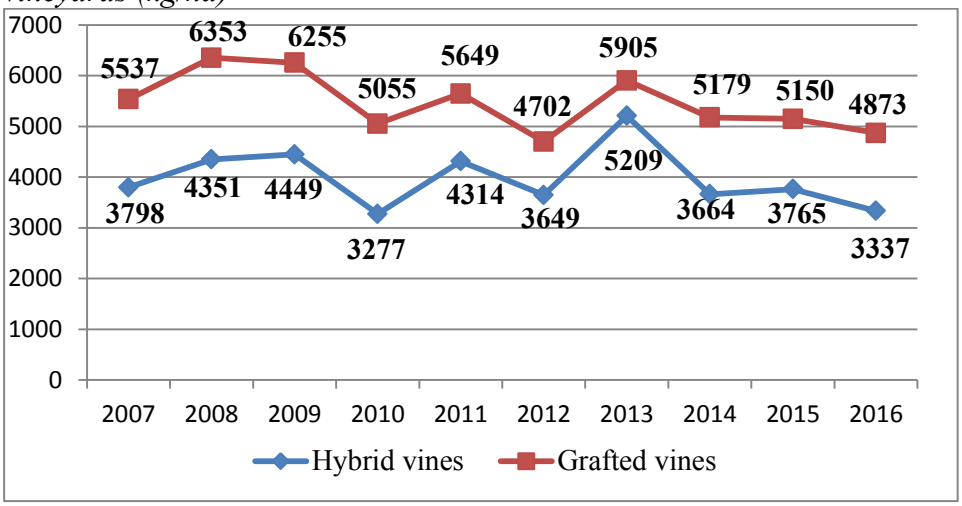



**Source:** *Author's calculation based on the data available at www.insse.ro*

Regarding the average production per hectare for grafted vineyards it is observed that it is higher than the average production for the total vines, during the studied period. The best yield at graft vines was 6353 kg/ha in 2008 and the lowest was in the years 2010 of 5055 kg/ha and in 2012 of 4702 kg/ha, also in 2016 the average yield for grafted vines was 4873 kg/ha (Chart 4). Low production is noticed since 2014, along with the new financial support program, the vineyards still being reconverted.

In comparison, the hybrid vines had the weakest production of the categories grown in Romania. Average production limits for hybrid vineyards were between 3277 kg/ha in 2010 and 5209 kg/ha in 2013. In 2016, the decreasing trend of total grape production is observed, and recording in this case a drop of 461 kg/ha (12.13%) (Chart 4).

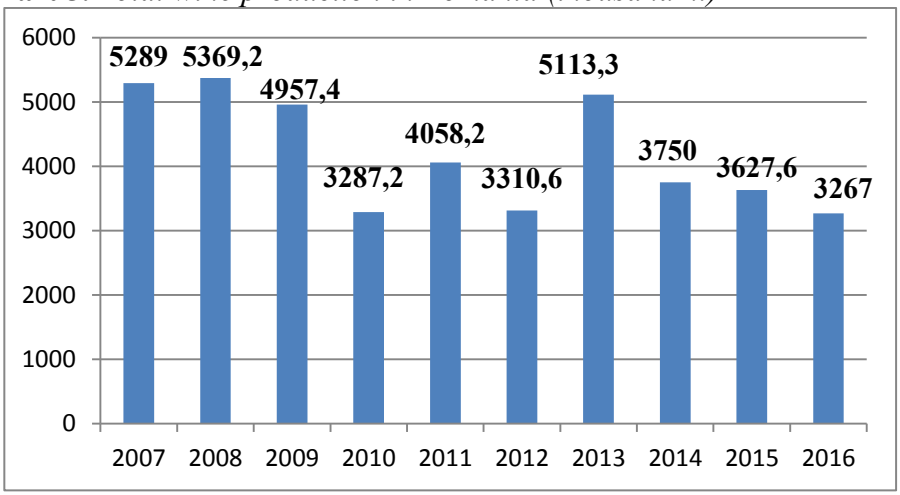
**Chart 4.** *Average production of grapes per hectare at hybrid and grafted vineyards (kg/ha)*




**Source:** *Author's calculation based on the data available at www.insse.ro*

According to OIV (2017), total wine production in 2016 in the world was 267 million hl. Half of the total quantity was produced by three countries: Italy, producing 50.9 million hl, France - 43.5 million hl and Spain with 39.3 million hl. According to the same source, in 2016, Romania produced 3.3 million hl of wine, decreasing 8% from the previous year. Production in Romania represents only 1.23% of total wine production in the world.

**Chart 5.** *Total wine production in Romania (thousand hl)*




**Source:** *Author's calculation based on the data available at www.madr.ro*

Total wine production in Romania during 2007-2016 recorded higher values in 2007, 2009 and 2013 of more than 5.0 million hl, and in 2010 and 2016 recorded the lowest values of up to 3267 thousand hl (Chart. 5).
In terms of wine consumption in Romania, it decreased in 2016 by 0.2 million hl (-4.5%), to an estimated level of about 3.8 million hl. Romania recorded in 2015 a decrease in wine consumption (-17.3%) to 3.9 million hl from 4.7 million hl in 2014, according to the annual report of the International Organization of Vine and Wine (OIV).

From the OIV reports, we see that the wine consumption trend in the world in the analyzed period is downward, but starting with 2015 consumption increased annually by 1 mil of hl. In 2007, 250 million hl were consumed worldwide, this being the maximum amount consumed. At the opposite end, in 2014, only 239 million hl were consumed. The main wine-consuming countries in 2016 are the United States of America, France, Italy, Germany and China, those consuming 49% of total world consumption. Low consumption is recorded in countries like Hungary, Denmark, Croatia, Poland and Bulgaria, the total consumed in 2016 in the five countries being 6.8 million hl, representing 2.82% of total consumption.

Worldwide consumption declined by 1.1% in variation in 2016 compared to 2012. In 2016, 241 million hl were consumed and in 2012 the consumption was 244 million hl.

According to OIV reports, Romania ranks 14th in the world in 2016 with a wine consumption of 3.8 mil hl, compared with 2012, the variation was -13.5%. The maximum consumption of wine in Romania was recorded in 2014, when the world's lowest amount was consumed.

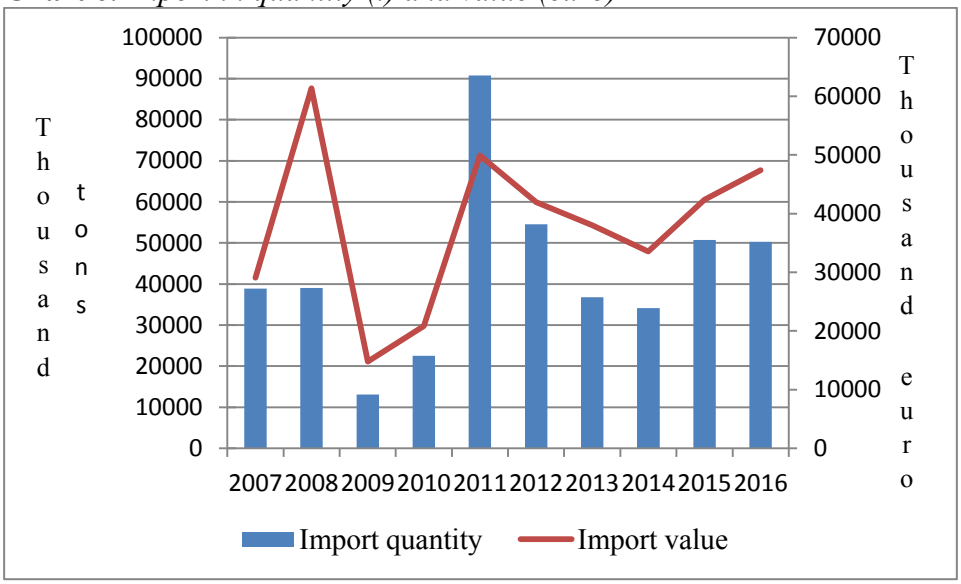
According to INSSE data, the average consumption is 18.6 l/capita in 2015. According to the same sources, the average monthly consumption per capita in Romania is below 1 l/capita, both in 2016 and in 2015. The profile of the Romanian consumer is segmented according to the type of wine consumed, but also by the categories of consumers. The main wine consumers in Romania are farmers with an average monthly consumption of 1.6 l, and the largest quantities are also consumed by rural residents.
To have an overview of the Romanian wine market, it is important to analyze the foreign trade component.

The situation of wine imports presented in Chart 6, indicates a high fluctuation in the first part of the analyzed period, with a minimum of about 13 thousand t in 2009 and a maximum of 90 thousand t in 2011.

Smaller quantities were imported in the years of the 2009 and 2010 during the international financial crisis, followed by a spectacular leap in 2011 and then 2012, after which the level decreased and stabilized around 50 000 t in 2015 and 2016. In terms of value, there is a high fluctuation in the values from year to year.

Thus, if in 2007 the value of the imports was 29 060 euro, for a quantity of about 39 thousand tons, in 2008 the same amount doubled in value to 61 350 euro, most probably because of the international wine price increase.

**Chart 6.** *Import in quantity (t) and value (euro)*




**Source:** *Author's calculation based on the data available at www.intracen.org*

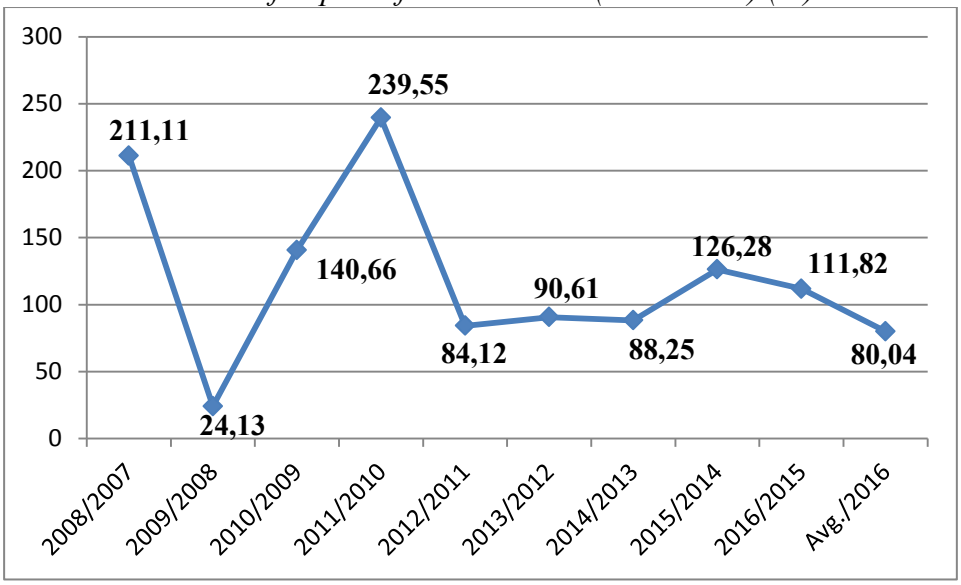
Regarding the dynamics of wine imports, the indicator records supraunitary values for the years 2008, 2010, 2011, 2015 and 2016 and subunit values for the rest of the years studied and for the average of the period (Chart 7). In 2016 there was an increase of 11.82% and the average was of 80.06 € (-19.96% in dynamics).

This situation is determined by the oscillating trend and the sequential levels, sometimes positive in dynamics, sometimes negative. The level at the beginning of the studied period and the end of it is approximately constant at 11%.

Poor harvests in the years 2010, 2012, 2014 led to an increase in imports from Spain and Italy and France. This highlights the highest import value of 11920 euro from Spain and 9421 € from Italy followed by France with imports of 8233 euro according to ITC.

Moldavian Republic is an exporter for more than 2 million (on Romanian market), although its wine producing potential is significantly reduced. (Stoian et al., 2013).

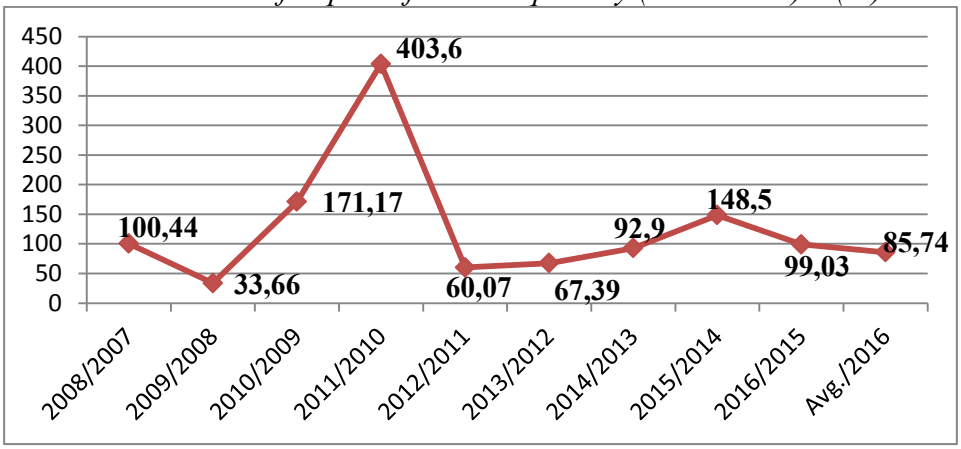
**Chart 7.** *Dinamics of import of wine in value (2007–2016) (%)*




**Source:** *Author's calculation based on the data available at www.intracen.org*

From the point of view of the imported quantities, Romania has an average of 85.74 t (-14.26% in dynamics), which is based on annual sequential values ranging from 33.66 t (-66.34% in dynamics) in 2009 and 403.6 (303.6% in dynamics) in 2011. The chart mainly shows sub-unitary values, ie decreases in dynamics, with exceptions in 2010, 2011 and 2015, which recorded values of 71.17%, 303.6% and 48.5% in dynamics (Chart 8).

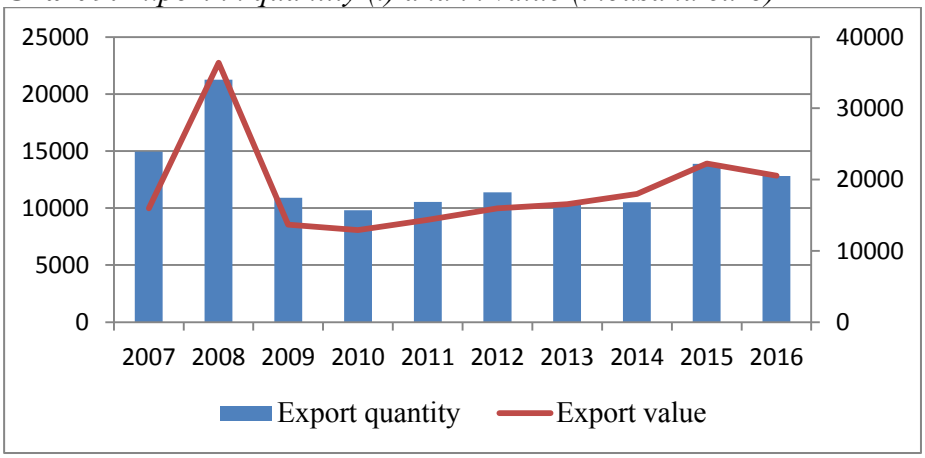
**Chart 8.** *Dinamics of import of wine in quantity (2007–2016) – (%)*




**Source:** *Author's calculation based on the data available at www.intracen.org*

Regarding the export situation presented in Chart 9, the largest quantities were exported in 2007 (15 thousand t) and 2008 (21.2 thousand t), after which the level decreased around 10 thousand tons annually, with a slight increase in 2015 and 2016 to 13 thousand t. The amount of wine exports has close levels, around 15000 euros, except 2008 when the value was at the maximum level of 36378 euros. Over the past two years there has been a slight increase in the value of exports, reaching more than 20000 euros.

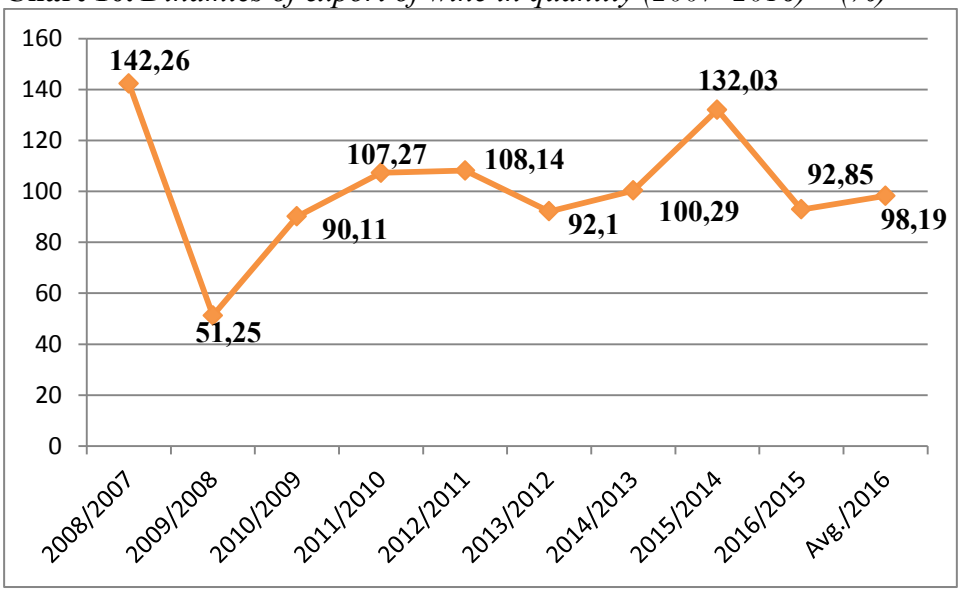
**Chart 9.** *Export in quantity (t) and in value (thousand euro)*




**Source:** *Author's calculation based on the data available at www.intracen.org*

Chart 10, through the information presented, relates to the export trade operations carried out by Romania for the wine production. Referring to the dynamics of the Romanian wine exports, the variation limits are 142.26% for 2008 and respectively 51.25% for 2009. The dynamics of the indicator includes four sub-unitary levels of component indices (51.25%, 90.11%, 92.1%, 92.85% in 2009, 2010, 2012, 2016) and supra-unitary levels for 2008, 2011, 2012, 2014 and 2015 (142.26%, 107%, 108.14% and 132.03%, respectively). The average for this period also had a sub-unitary value of 98.19%.

**Chart 10.** *Dinamics of export of wine in quantity (2007–2016) – (%)*

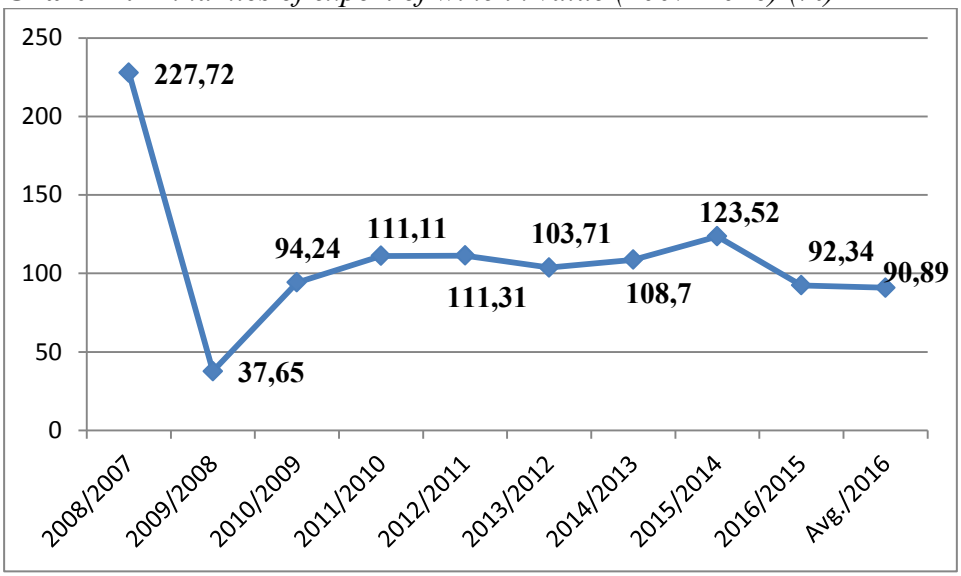



**Source:** *Author's calculation based on the data available at www.intracen.org*

From the point of view of the value of exports, Romania has an average of - 9.11% in the dynamics, which is based on values between 127.72% in the dynamics for the beginning of the studied period and 62.35% in the dynamics compared to the previous term of the dynamic series in 2009. In 2016, it is noticed that the value of exports was - 7.66% in the dynamics (Chart 11). Wine tariffs, depending on importing countries, may be expressed as: ad valorem, with a different rate or rates depending on the price level of the product; specific volume (per liter); specific alcohol (alcoholic strength); an ad valorem and specific mixture. In addition, tariffs may differ depending on the different types of wine (bottled or in bulk, sparkling wines). Specific volume-based tariffs are the most popular

in Europe and North America, while ad valorem tariffs are used in the Asia-Pacific region (Mariani et al., 2012).

**Chart 11.** *Dinamics of export of wine in value (2007–2016) (%)*



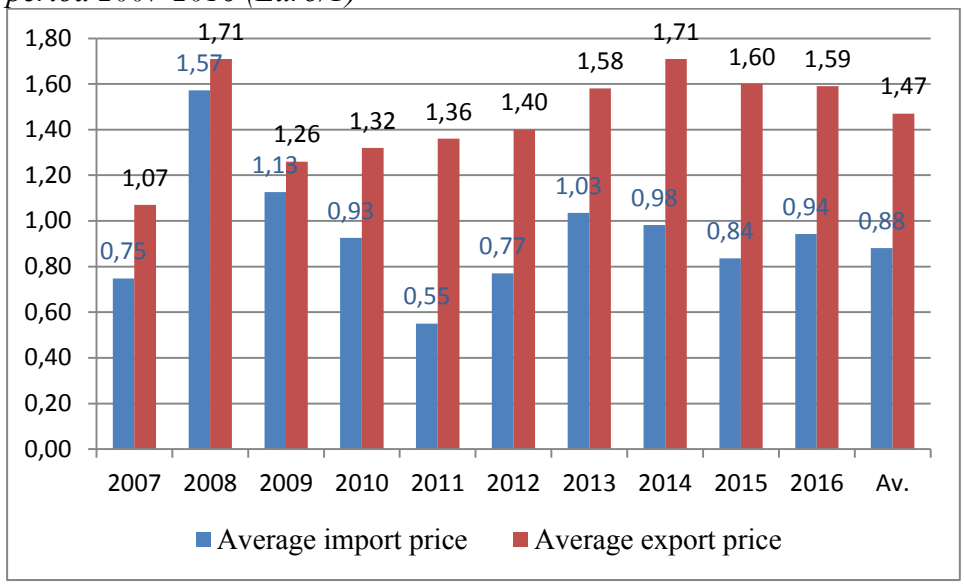

**Source:** *Author's calculation based on the data available at www.intracen.org*

Analyzing the price evolution for the studied period (Chart 12), there is a greater fluctuation in the first part of the interval, both on import and export. Thus, the import price in 2007 was 0.76 euro/l, and in the following year it practically doubled, reaching 1.57 euro/l in 2008, after which it fell to a minimum of 0.56 euro/l in 2011.

After that, the price showed lower variations and stabilized in the range 0.84-0.98 euro/l. Export prices were more stable and constantly higher than for imports, ranging between 1.07 euro/l in 2007 and 1.17 euro/l in the years 2008 and 2014, with an average of 1.47 euro/l. On the basis of these values it can be appreciated that cheaper wines are imported and high quality wines are exported, investments in viticulture having a beneficial effect on this aspect.

In a study conducted by Jiao (2017) between 1996 and 2015 to identify the macroeconomic determinants of fine wine prices and to estimate their impact, it was shown that demand in emerging markets plays a key role in setting wine prices.

**Chart 12.** *The evolution of average import and export prices during the period 2007-2016 (Euro/T)*




**Source:** *Author's calculation based on the survey data available at www.intracen.org*

In addition, Romania imports larger quantities of wine at a low price and exports less at a higher price. The level of competitiveness of the Romanian viniculture sector can be measured by means of commercial balance. The trade balance situation for wine is presented in Table 1 and Chart 13.

**Table 1.** *Balance of foreign trade in wine - thousands euro (2007–2016)*

| Year | Export | Import | ± |
|---|---|---|---|
| 2007 | 15,975 | 29,063 | -13,088 |
| 2008 | 36,378 | 61,356 | -24,978 |
| 2009 | 13,695 | 14,805 | -1,110 |
| 2010 | 12,906 | 20,824 | -7,918 |
| 2011 | 14,340 | 49,884 | -35,544 |
| 2012 | 15,962 | 41,960 | -25,998 |
| 2013 | 16,554 | 38,021 | -21,467 |
| 2014 | 17,994 | 33,554 | -15,560 |
| 2015 | 22,227 | 42,373 | -20,146 |
| 2016 | 20,525 | 47,380 | -26,855 |
| Average | 18,650 | 37,920 | -19,270 |

**Source:** *Authors' calculations based on the data available at www.intracen.org*

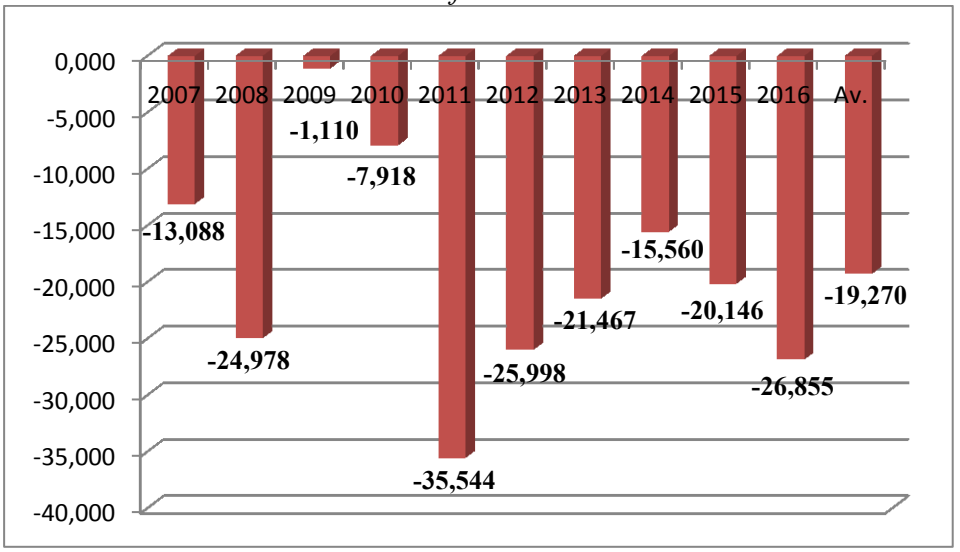
Within the trade balance, as can be seen from Chart 13, Romania recorded a trade deficit of -13088 euro, and for 2016 Romania had a budget deficit of -26855 euro. Also, the average of the period recorded deficient values of -19270 euro.

Even if the Romanian wine are well appreciated on the internal and international markets, and the wine assortments have prices well accepted, at least by the Romanian consumers, the negative balance of wine trade in terms of values indicates low level of competitiveness of this sector (Lădaru & Beciu, 2014).

Although the wine trade in the last years has had a positive trend, the year 2016 has a downward trend. Even if wine trade has increased, the trade balance is still negative (Chart 13, Chart 14).

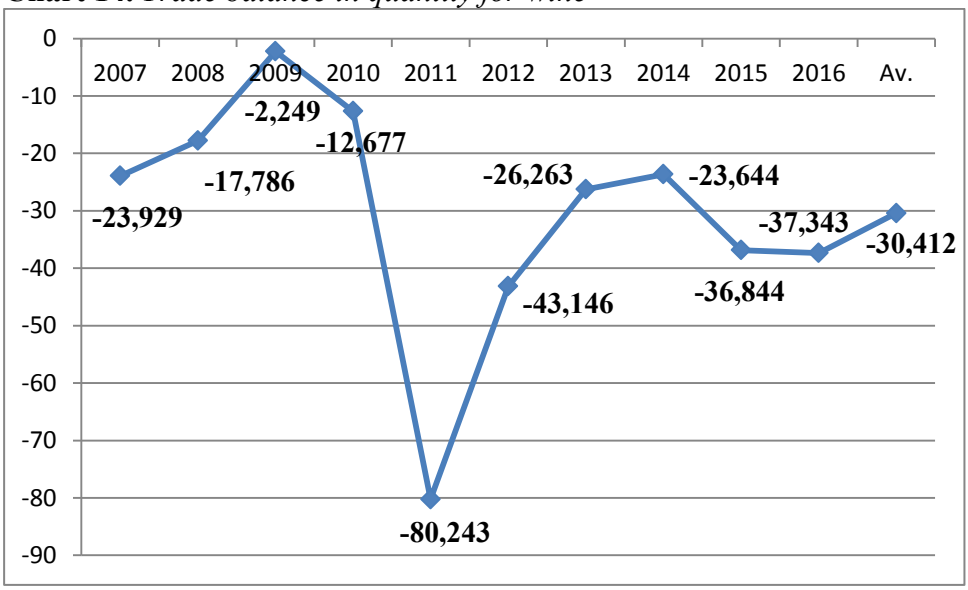
For example, in 2007, Romania exported wine worth 15975 euro and imported 29063 euro. For the year 2016, the value of exports amounted to 20525 euro and the value of the imports was 47380 euro, thus achieving a deficit of -26855 euro.

**Chart 13.** *Trade balance in value for wine*




**Source:** *Authors' calculations based on the data available at www.intracen.org*

**Chart 14.** *Trade balance in quantity for wine*




**Source:** *Author's calculation based on the survey data available at www.intracen.org*

There are several studies on how wine production has a cross-border focus, and the wine industry becomes more competitive and export-oriented. This helps regions that have the climate and soil favorable to the production of certain grapes to become truly global both in terms of production and branding (Vasileios, 2017), and Romania has a good perspective in this respect and the measures must support this work.

## Conclusions

Romania has relatively large areas of cultivated vineyards and is a country with potential in this field. In terms of structure, just over 50% are grafted and the rest are living hybrids. Throughout the studied period, the downward trend in almost every area, characterizes the wine market. Romania's wine production declined by 8% in 2016 to around 3.3 million hectoliters. The wine trade in Romania, in the last years has a positive trend, the year 2016 having a slightly decreasing trend. From the point of view of the trade balance, both in value and in quantity, in all the analyzed years, Romania has a deficit between import and export. Therefore, measures are needed to support Romanian wine production on foreign markets.

The trade balance is negative, but Romania imports large quantities at a lower prince and exports lower quantities but more qualitative at a higher price. It is considered that the market is mature and this will also lead to a change in the behavior of producers and consumers. In conclusion, Romania has large cultivated vineyards and is therefore a potential country. Also, the National Support Program 2014-2018 sustained the competitiveness of the wine sector by providing funds for the reconversion of grapevines with noble vines and implicitly led to increased competitiveness.

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# LEASE OF AGRICULTURAL LAND IN STATE OWNERSHIP - POSSIBLE ECONOMIC EFFECTS[1]

*Ljiljana Rajnović[2], Vlado Kovačević[3]*

## Abstract

*Agriculture is a significant factor in the economy of the Republic of Serbia, first of all taking into account the size and quality of agricultural land, and considering the fact that investments by tenants in state-owned agricultural land are at a very low level. Therefore, there have been amendments to the law that regulate the matter of agricultural land, in order to create opportunities for improving agriculture, by increasing investments in agricultural land owned by the Republic of Serbia, introducing new technologies, increasing the income, increasing productivity and efficiency in agriculture, and recruit additional labor. In order for an investment to achieve the goal for investors and the state in a sociological sense, the law regulated long-term lease of land for thirty years, in a way that ensures the economic efficiency of tenants interested in land cultivation, prevailed the elimination of deficiencies and barriers that prevent the efficiency of agricultural land management, and more efficient use of land, prescribing sanctions for unfounded use of agricultural land, the possibility of using land free of charge when legal requrimenets arise. In order to further motivate the potential tenant, the Law regulated the active identity in the case of the right to lease the lease and the right of priority lease agricultural land, and in the process of transparency of the procedure, it was prescribed that the procedure for determining the right of priority lease is realized through a public call and procedure conducted by a local government unit in whose territory the land is located.*

**Keywords:** *land lease, good of general interest, investments in agriculture, lease right, lease agreement, long-term lease price.*

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[1] The work is part of the research on project no. 46006: "Sustainable agriculture and rural development in the function of achieving the goals of the Republic of Serbia within the Danube Region", financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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## Introduction

Since agriculture undoubtedly is a very important activity in the Republic of Serbia, which as a branch of activity is given priority in the strategic development plans of the Republic of Serbia, the amendments to the Law on Agricultural Land define the concept of agricultural land as a natural resource and a good of general interest for the Republic of Serbia.

Agricultural land is used for agricultural production and can not be used for other purposes, except in cases and under the conditions specified by the law, which is a *lex specialis* for this matter, is otherwise regulated[4]. The aim of the law is to provide a more rational, more economical and efficient use of agricultural land in public ownership.

Throughout the world, for over a century, there is a permanent tendency to research and define the best solutions for regulating the management and use of agricultural land and adopting numerous rules on the best agroeconomic practices and the principles on which the activity in this sector should be based. These regulations mostly focus on the role of policy makers in the country and the majority of existing rules have a national reach. Legal solutions should in fact encourage and encourage active cooperation between the state as owner of agricultural land and other persons interested in leasing agricultural land in creating wealth, employment and sustainability of financially healthy participants in agricultural production.

In 2004 and 2007, ten and two countries respectively acceded to the EU in its enlargement with countries in Eastern and Central Europe. Until 1989, the agricultural sector in these countries was regulated by the state and dominated by large-scale state farms that cultivated state-owned land or by collective farms that typically used land that was still in private ownership on paper but over which the landowners did not have any decision rights as to its use or allocation. There were only two exceptions, Poland and the former Yugoslavian countries, where collectivisation largely failed, such that a considerable share of agricultural land was already being used by individual farmers during the communist era. After 1989, land reforms were introduced and land was restituted to the former owners or distributed among the workers at the state farms. In addition, farm restructuring

[4] Law on Agricultural Land ("Official Gazette of the Republic of Serbia" No. 62/2006, 65/2008 - other Law, 41/2009, 112/2015 and 80/2017)

resulted in the introduction of hard budget constraints. The implementation of farm restructuring and land reform processes was difficult, and in some countries land reforms are still not yet fully completed[5].

In general, the sale of agricultural land is considered superior to land rental because 1) land sales transfer full ownership rights to the new users, 2) sales are more likely to increase access to credit, since owned land can be used as collateral, and 3) sales provide optimal incentives for investment by entailing the permanent security of rights. In most EU member states, however, the rental market seems to be more important than the sales market and a large share of the agricultural area is rented, although there are substantial variations in the shares of rented land[6]. In the old member of European Union, the share of rented land ranges between 18% in Ireland and 74% in France, while in the new member of European Union it ranges from 17% in Romania to 89% in Slovakia[7].

There are several reasons for the high degree of importance of the rental market and the differences among member states:

First, the differences in the importance of the rental market are based on historical grounds. For example, variations in inheritance laws (e.g. adoption of the Napoleonic Code with respect to inheritance in France and other Western European countries) have led to assorted farm structures (e.g. in France more fragmented ownership, because each child receives an equal amount of land, while in the UK for instance, the first son has traditionally inherited the farm estate). This has affected the farm structure and the share of rented land. In the new member of European of Union, the share of rented land is also based on historical factors.

Second, imperfections in input, product, credit and insurance markets affect the functioning of land markets. Credit and capital markets play a crucial role, especially for land sales in the new member of European of Union and Serbia.

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[5] Ciaian, P. and J.F.M. Swinnen (2006) ,,Land Market Imperfections and Agricultural Policy Impact in the New EU Member States: A Partial Equilibrium Analysis,, American Journal of Agriculrural Economics, Vol.88, No 4, pp. 799-815.

[6] Ciaian, P. D. Kancs, J. Swinnen, K. Van Herck and I.Vranken (2012) ,,Key Issues and Developments of Farmland Rental Market,, Factor Markets Working PaperNo 14, CEPS, Brussels.

[7] http://ec.europa.eu/eurostat

Third, transaction costs can be high in the case of land sales. The transaction costs include the traditional costs, such as notary fees and registration costs. But in the new member of European of Union, individuals who want to sell their agricultural land are also confronted by additional transaction costs, such as high withdrawal costs, insecure property rights and imperfect competition on the land market.

In such an environment, land rental may have certain advantages over land sales transactions, since they allow more flexible adjustments in the land used with relatively low transaction costs; and have a limited cost, which allows the farmer to invest more in other productive assets.

Yet this does not mean that rental markets work perfectly in the EU. There are still problems with 1) a lack of investment incentives owing to a lack of long-term security (e.g. Romania, Bulgeria); 2) overregulation, such as the stipulation of minimum durations, which prevents flexibility (e.g. Belgium), and 3) access to credit, since rental contracts cannot be used as collateral.

## The existing situation in the Republic of Serbia

The legal framework of the Republic of Serbia regulating the matter of agricultural land provides the appropriate level of publicity to the management and disposal of state-owned agricultural land, and is in favor of fully truthful and timely disclosure of information on all essential issues concerning the disposal procedure, conditions of acquisition, effective control in the enforcement of rights and the obligation of the holder of the lend and the responsibility of the participants in these jobs.

Lack of investments in agriculture, leads to a decline in agricultural production, which all reflects on the overall economic balance of business entities, including the Republic of Serbia. Due to the predominantly small agricultural holdings, the lack of necessary financial resources and the introduction of new technologies, the investments in agriculture in the Republic of Serbia are still very small compared with other developing countries, and too below the developed European countries.

Due to the aforementioned, as one of the possible segments of better management of agricultural land in public ownership, new laws were introduced by law through the normative regulation of relations that previously did not exist, which are related to securing the security of

investment in leasing agricultural land in public ownership, giving the possibility of long - term lease of agricultural land in a transparent manner under equal conditions for all participants, conditions that ensure safety of the investment invested in lease of agricultural land, the possibility of long-term lease, introduction of the book keeping obligation and establishment of the agricultural land, introduction of free use of agricultural land and sanctioning illegal use agricultural land.

**Solving the barrier with more efficient use of agricultural land in state ownership**

Based on previous experiences in the development of agriculture in the Republic of Serbia, it was realized that the investments made by tenants of agricultural land in public property, legal and natural persons, were on a very low, almost negligible level. The lack of interest of tenants for investing in agricultural land was reflected in the fact that the earlier law did not give the possibility of long-term land lease, but in the same way treated leaseholders who only process the land and those who invest long-term "patient" capital in the development of infrastructure facilities , perennial seedlings, irrigation and drainage systems, agricultural facilities, etc.

For this reason, the law has regulated the matter of agricultural land in a fair manner regarding the long-term lease in a way that satisfies the interests of tenants interested in the cultivation of agricultural land, as well as those interested in investing in publicly owned land, primarily to realize their own ineters - the return of invested funds and earnings, and at the same time the achievement of the positive effect of the Republic of Serbia through higher employment of the population, the possibility of increasing public revenues, the prod productivity and efficiency in the field of agriculture.

In order to control investments by the state, the law states, on an imperative norm, that a tenant of publicly owned land, without the approval of the lessor, can carry out investment works that go beyond the reach of normal land use or may change the way of using state-owned agricultural land. It can also not perform jobs that are not in compliance with environmental protection regulations or actions that may have a negative impact on the natural wealth or state of the natural environment. The law stipulates that the tenant shall not be entitled to return the value of investment investments on state-owned agricultural land, but this

provision makes it possible to regulate this provision by lease agreement in a different way, in accordance with the interests of both parties.

Counting obviously, the supposed higher economic potential of a legal person as a tenant of state-owned agricultural land, the law prescribed his obligation to hire unemployed persons if he obtained land leased. It could be said that this provision puts a legal person in a more unfavorable position than a natural person as a tenant, especially when considering that a legal entity can be a small legal entity whose agriculture is the only activity.

As a guarantee of the duration of the contracted lease, the legislator prescribed that the change of owner of the leased land does not affect the duration of the lease. Changing the owner comes to a legal substitution, whereby the new owner of the land takes the place of the lessor and transfers the rights and obligations from the lease to him. The amendment of the lease agreement for agricultural land has only a declarative character.

Extention of the long-term lease period from twenty to thirtieth years, and for fish farm and vineyards up to forty years, is an economically justified solution that provides security, on the one hand, to the tenants in terms of the cost-effectiveness of the investment that would invest in infrastructure facilities over the long-term and multi-year planting, on the other hand to the state, as a civil person in terms of economic effects. Similar solutions are also envisaged in other countries in the environment, e.g. in the Republic of Croatia, farmland and fishponds owned by the state can be leased for a period of up to fifty years[8].

Extension of the lease period affects the appearance of more than one persons interested in the long-term use of agricultural land in order to provide production programs with an adequate period of return of invested funds and earnings on the invested funds, which will also increase the lease income. At the same time, the long-term lease motivates tenants to maintain the optimal quality of the land they use, while at the same time guarantees the preservation of the quality of agricultural land in state ownership as a significant natural resource.

The law stipulates that agricultural land can be leased if the annual program of protection, improvement and use of agricultural land is envisaged for leasing. The state-owned agricultural land that has been

[8] Law on Agricultural Land ("Official Gazette of the Republic of Croatia" No. 39/2013)

leased can't be placed in the sub-fund, thus eliminating uncontrolled disposal of land. The law also specifies the active legitimacy of the tenant of agricultural land in public ownership and states that these are legal and natural persons.

The law in a negative manner prescribes the conditions that the tenant must fulfill in order to acquire the right to lease agricultural land, stating that the right to lease does not have the following persons that are registered in the Register of Agricultural Holdings:

- persons who are in a passive state,
- that have not fulfilled all contractual and legally stipulated obligations from previous or current contracts for leasing agricultural land in state ownership,
- which, contrary to the law, have disturbed the possession of agricultural land in state ownership,
- bothered the implementation of the public tender procedure or part of the public bidding procedure when leasing agricultural land,
- which were without foundation used state-owned agricultural land,
- which were inconsistent and gave the agricultural land a sub-bucket[9].

The obligation to keep books in the field with regulated control of crops by a graduated agricultural engineer who is a member of the commission formed in accordance with the provisions of the law is considered extremely important for the crop, vegetable and fruit production of all economic entities engaged in agricultural production. At the same time, it is considered very important for the proper use and restoration of agricultural land, as well as the preservation of this property from the general interest for the life and health of people and economic entities on the territory of the Republic of Serbia. It is considered that due to the provisions of the law relating to the obligation to keep books and fields, as well as to control and check the field books, the holders of agricultural land, that is, tenants of publicly owned agricultural land, will not have any additional obligations due to the implementation of the aforementioned obligations, because it's about institutes that are familiar with agricultural practice, but will have a duty regular and in accordance with the rules of good practice, cultivation of agricultural land.

[9] Law on Agricultural Land ("Official Gazette of the Republic of Serbia" No. 62/2006, 65/2008 - other Law, 41/2009, 112/2015 and 80/2017)

The option of using agricultural land free of charge, which has not been leased for the last three or more years, is considered as another possibility for mutual economic interest, the land user, who has free use of motive for investing in production, but also as a landlord, which can has significant economic effects: the controlled establishment of agricultural production on that land, the exploitation of agricultural land, the increase in the area of arable land and the protection against possible usurpation of agriculture of land.

The imposition of monetary sanctions on the unfounded use of agricultural land could significantly reduce the illegal use of state-owned land and the ungrounded enrichment of the usurper. If any economic entity uses state-owned agricultural land without a legal basis or contrary to the provisions of the law, it is obliged to pay to the lessor a triple amount of the highest average rent per hectare for the use of land occupied in the district of which the agricultural land that is unfounded is used. The law prescribes the obligation of a local self-government unit to take out crops from usurped land on the basis of an appropriate act of its competent authority, if the usurper voluntarily does not pay the aforementioned amount of the lease[10].

If the agricultural inspector determines in the control procedure, that the agricultural land is in state ownership usurped by an unknown person, the competent body of the local self-government unit shall decide on the removal of land from the land. The funds generated from the sale of the crops removed, after deduction of the costs of the removal, are transferred for purposes determined by the Law on Agricultural Land, ie the budgets of the Republic of Serbia, the local government unit and the Autonomous Province of Vojvodina if the usurped land is located on the territory of the autonomous province.

For the purpose of efficient management of state-owned agricultural land, the elimination of problems that arose as a result of non-compliance and non-compliance with the deadlines for the adoption of the annual program of protection, arrangement and use of agricultural land, advertisement, public invitation and other actions necessary for the adoption and realization of this very of the important act, the law introduced the mandatory payment of fines for responsible persons in this proceeding

[10] Law on Agricultural Land ("Official Gazette of the Republic of Serbia" No. 62/2006, 65/2008 - other Law, 41/2009, 112/2015 and 80/2017)

and the suspension of the transfer of funds to local self-government units in case of failure to submit an annual program with arranging, arranging and using agricultural land.

## Objectives that can be achieved by efficient use of lease of agricultural land

The solutions that the Law on Agricultural Land prescribes, if they are respected in practice, can lead to numerous positive effects on the development of agriculture and all other economic entities, including the state, as follows:

- a more regulated policy in the field of agriculture, and thus the preservation of agricultural land as a good of general interest, through a system of checks provided for by law,
- increasing productivity and efficiency in agriculture and improving competitiveness on the market,
- higher employment of the population, increase in the income of employees in the agricultural sector,
- increase of public revenues of the state, increase of income of other economic entities. The funds generated from renting agricultural land or a state-owned agricultural plant in the amount of 60% represent the income of the budget of the Republic of Serbia, and in the amount of 40%, the revenue of the budget of the local self-government unit on whose territory the state-owned agricultural land is used and used for realization of the annual program of protection, arrangement and use of agricultural land, which is adopted by the competent body of the local self-government unit.
- In the autonomous province of Vojvodina, funds generated from renting agricultural land or a state-owned agricultural plant in the amount of 30% represent the income of the budget of the Republic of Serbia, in the amount of 30% of the budget revenues of the autonomous province, and 40% of the budget revenues of the local self-government unit whose territory is state-owned agricultural land,
- improvement of agricultural production, small and medium-sized agricultural holdings, that is, natural persons engaged in agricultural production as a basic occupation, efficient monitoring of the use of agricultural land by IT support
- when it comes to leasing agricultural land, it is possible to achieve the improvement of the procedure of issuing or giving for the use

of agricultural land, providing long-term lease with all positive consequences, increasing safety and stability of investments, attracting permanent capital, safety of leasing investments, new technologies, different types of agricultural production,

- enabling equitable representation of users of agricultural land under the right of cross-lease, attracting investments in agricultural production, creating significant export potential, income growth, etc.
- the possibility of acquiring the right to pre-empt the lease and to allow the right to cross-lease state-owned agricultural land under the conditions laid down by the law will enable not only an increase in the number of employees but also, in particular, livestock development in Serbia, since, according to official data, livestock production has a significant decline in production in the last few years,
- it can be expected that there will be an increase in the number of legal and natural persons interested in leasing agricultural land, increasing the property that will be used by economic entities through the lease or purchase of state-owned agricultural land, the possibility of association and joint appearance on the market, and as a reaction of this higher market power current and future agricultural producers.

It is considered that the solutions envisaged by the law will have an effective impact on the development of agriculture in the territory of local self-government units and a significant impact on the increase in the budget of the Republic of Serbia. According to the research, the right to lease agricultural land in state ownership will be able to achieve more than 150,000 registered farms in the first round, and in the second round more than 450,000 agricultural farms. With the leasing of the leased land, in addition to the revenues that the state will acquire from the renting of state-owned agricultural land, more land is expected to be used as a good of general interest, an increase in agricultural production due to higher investments by tenants, a higher export potential and the possibility of opening new jobs.

The law gives the possibility of leasing priority to legal entities, due to the need for more complex investment investments, which can relate to significant investments in production capacities, job creation, research funding, the application of new technologies, experiments, due to the assumption of the market power of legal entities and at the same time

believing that the physical person can not carry on the venture independently. In addition, the law allows for the possibility that all persons, legal and physical, who lease agricultural land, have the possibility of investing in land with the approval of the competent ministry.

In some new members of EU, corporate farms use the large majority of all agricultural land, almost all of which is rented. In the Czech Republic and Slovakia, more than 70% of the total agricultural land area is used by corporate farms. Also in Hungary, Estonia and Bulgaria, corporate farms still use around half of all agricultural land. A large share of agricultural land is continues to be rented to the large-scale successor organizations of the former cooperatives and state farms[11]. Indeed, there is a striking correlation between the prevalence of land rental at the country level and the proportion of corporate farms in total land use. This can be attributed to the land reform process that was implemented at the start of transition. Land was restituted to former owners, among whom the majority are not (or are no longer) active in agriculture. They may be retired or living in urban areas and are more likely to rent it out, particularly to large-scale corporate farms, for several reasons. First, because of limited information about the sales price and the expected increase in land prices upon accession to the EU, most of these new landowners have been unwilling to sell their newly acquired assets and have preferred to rent out the land instead. Second, since identifying potential tenants involves search and negotiation costs, it has been easier for the new landowners to rent out their land to corporate farms, which were the historical users of the land. Third, the corporate management has been closely involved in the land reform process, and their search and negotiating costs in identifying and contracting with these new landowners have been significantly lower than the costs faced by newly emerging structures (particularly family farms and de novo companies[12]). In combination, these factors have resulted in a higher demand for rented land by corporate farms than by family farms and an increased supply of rented land to corporate farms than to family farms. Consequently, restitution has contributed to a consolidation of the large-scale farming structures (collective and state farms in the past, now corporate farms) through the land rental market.

[11] Swinnen, J.F.M, I, Vranken and V.Stanley (2006), „Emerging Challenges of Land Rental Markets: A Rewiew of Available Evidence for Europe and Central AsiaRegion,, World Bank, Washington D.C.

[12] Ciaian, P. and J.F.M. Swinnen (2010), EU Land Marketsand the Common Agricultural Economics, Vol.91, No 4. Pp. 1124-1139.

## Agreement on leasing agricultural land in state ownership - security of investment

The general rules of the world's courts in the field of contract law are reduced to the principle of consensus and, above all, allowing the parties to regulate their relations in the most appropriate way.

Therefore, over a century and more, a permanent tendency of research and definition of the best solutions for contractual relations in all spheres of contracting and in the situation when the subject of the contract is a genuine resource, the adoption of numerous rules on best agroeconomic practices and principles of land management which would replace hard legal rules. The largest number of these regulations focus on the role of state relations as a civil legal entity and tenant of agricultural land. The largest number of existing rules has a national scope[13].

Regulations relating to agricultural land vary in countries depending on the circumstances, history, culture, tradition, degree of development of a country, etc. Given that in each country the circumstances are the subject of constant changes, the rules related to the management and disposal of agricultural land are adapted to the changes. The legal and practical framework of land management and disposal contains elements regulated by law, regulation, regulation and the most widely accepted principles and guidelines, depending on the circumstances of the country in which they are introduced, including the obligatory treatments of the treaties that the law prescribes as essential.

When considering the regulatory framework, the question arises as to how to regulate the substance of these, above all commercial relations, which includes the leasing of agricultural land. On the one hand, the greatest number of relationships is of such nature, that the two sides with their autonomy of will, can completely regulate, establish, abolish or change them. On the other hand, laws are by their very nature, such that they are characterized by imperative, binding norms that create the basis for unfavorable business relations.

Therefore, modern business regulation, in line with the principles of autonomy of will in contractual law, changes its nature to a great extent,

[13] Code de commerce, Dalloz 2007, art. 225-17225-56; Loi federale completant le Code civil suisse - Codedes obligations, 2008, art. 707-726.

and from the imperative it increasingly moves into an arbitrary, which leaves the contracting parties to settle their contractual relations as they please, certainly with the general restrictions that apply to them to protect the general interest of the country in which they are applied.

Research has shown that the intentions of economic entities for regulating their own relations on an autonomous basis (through usurps, customs, business customs, business morality, commonly known and by self-regulation of committed business conditions) resulted in regulation of the lease of agricultural land, thus containing the elements of legislation and First of all, it is formulated in an arbitrary manner, regulation, self-regulation, voluntarily accepted obligations and business practice that is the result of the circumstances, history and traditions of each specific country. It is therefore logical to conclude that a desirable combination of legislation, regulation, self-regulation, voluntary standards, etc. in this area vary from country to country. Since continually accumulating new experiences and changing business circumstances, it is necessary to adjust the content and structure of this framework to new circumstances.

It is necessary that science and companies regularly monitor such adaptations carefully and update their agricultural land management systems accordingly, and when fluctuates between the legislation regulating relations between contracting parties or regulations that instead of uniformed, attempts to provide instructions, recommendations, instructions for frameworks behaviors (model laws, codes, guides to apply rules) - "soft law" - the determination of each country should be - soft law.

The amended regulation in terms of the application of soft law, in the manner described, is put into the service of the logic of economic life, which stimulates the effects of creativity, initiative, specialty, so that the entire commercial right is the support of the possibility of affirming the interests of each economic entity giving him the opportunity to do his business edit offices in the way that suits to the economic entities the most.

In several EU member states, governments impose price restrictions on the rental markets for agricultural land. These price restrictions may take the form of a maximum or a minimum rental price. For example in Belgium and the Netherlands, there is a maximum rent. In France, there is a combination of a minimum and a maximum rent. In the other old members of EU, Finland, Germany, Greece, Ireland, Italy, Spain, Sweden and the UK, there are no rental price restrictions. Likewise in the new members of

EU, there are no price restrictions on agricultural land, but in some countries the transaction costs for land rental strongly affect rental prices[14].

In addition to legal price regulations, there are social norms for rental payments in all countries, for example, with respect to the type of payment (in cash or in kind) or the timing of the payment (at the end or the beginning of the season). While in most old members of EU rental payments are made in cash, rental payments in kind are more common in the new members of EU. For example, in Poland, more than 20% of the contracts involving private rentals in 2005 were paid in kind (goods and services) rather than in cash. This was notably the case in regions with a high degree of land fragmentation and where agriculture is only an additional source of income. In Slovakia, only half of the farms reported paying rent exclusively in cash, while the other half of the farmers reported paying part of the rent in cash and part in kind[15].

In the new members of EU, it is mainly corporate farms that pay in kind. Furthermore, there is some evidence that corporate farms reduce payments by paying in kind instead of in cash and that these in-kind payments by corporate farms are less transparent. The in-kind payments often depend on yields, which are difficult for land owners to control and may result in lower effective rent payments, with a negative impact on the welfare of the landowners. In several countries, experts indicate that less productive corporate farms often do not pay rents as contractually agreed. For instance, in Bulgaria, only a small share of the payments (33%) made by the cooperatives are in cash. For the remaining transactions, rental payments are in kind or as a combination of an in-kind and cash payment.

The timing of the payment differs among countries and even within countries there are substantial variations depending on what is agreed in the contract. Traditionally, payments take place at the end of the season in Belgium (December), France (September), Finland and Sweden (December). In other countries, such as Greece and Italy, the tenant pays the rent in advance at the beginning of the season, which is not affected by the economic outcome of the year.

[14] http://ec.europa.eu/eurostat

[15] Ciaian, P. D. Kancs, J. Swinnen, K. Van Herck and I.Vranken (2012) „Key Issues and Developments of Farmland Rental Market„ Factor Markets Working Paper No 14, CEPS, Brussels.

It also raises the question, in this sphere, of how much the regulation of agricultural land management should be harmonized at the level of the entire European Union, and how much should it remain at the national level[16]. Based on the research it turned out that it is necessary to harmonize the regulations in this area, which has its advantages and disadvantages. However, once a harmonized company regulation, especially in the field of agricultural land management as good of general interest, remains difficult to change, and it is undeniable that there is a need for continuous changes in this field. Research in this matter has given effects, which has led to the development and application of alternative regulations that are most widely used in developed European countries, while in our country it is still largely based on imperative legal norms in the field of agricultural land management and leasing, while deregulation in the law on obligatory relations is represented much more.
In this connection, beside the basic elements stipulated by the system law regulating the matter of contract law, the Law on Agricultural Land introduces the established procedure and prerequisites for concluding the contract and additional elements of the contract.

In order to conclude a contract for the lease of state-owned agricultural land between the competent ministry and the tenant, the fulfillment of the previous conditions is necessary:

- the decision of the competent authority to lease agricultural land in state ownership, the previous payment of the rent that was achieved on the public auction, ie per the right to lease priority and the right to lease rent,
- delivery of adequate security means for multi-year contracts.

In addition to the general elements envisaged by the law that regulates the substance of the contract systematically, the Law on Agricultural Land stipulates that the contract for leasing state-owned agricultural land, in particular, includes:

- information on the subject of the contract, the name of the cadastral municipality, the number and sub-category of the cadastral plot, the name of the pot, the cadastral map number, the existing mode of use and the land cadastre class,
- lease duration, the amount and the deadline for paying the rent, the depreciation time of perennial plantations,

[16] Marie – Christine Monsallier, Lamenagement contractual du fonctionnement de la societe anonyme, Paris, 1998

- rights and obligations of the tenant from the contract,
- reasons for the cancellation of the contract,
- type and duration of the means of securing the obligation to pay the tenant under a multi-annual lease contract,
- reasons for termination of the contract[17].

The Law on Agricultural Land regulates the termination of the contract for lease of state-owned land, and states as reasons:

- the expiration of time to which it is completed or
- by agreement of the Contracting Parties.

The termination of the contract for the lease of state-owned agricultural land is under to the regulations governing the contractual relations governing the contractual matter.

In the case of a lease agreement or the use of state-owned agricultural land that has been completed for a period longer than ten years, the rent may be increased if the average rental price is increased in the territory of the local self-government unit in which the land is located.

The tasks of introducing the ownership of agricultural land in state ownership that are leased or used for use by the municipal or city administration in cooperation with the competent agricultural inspection and the authority competent for the affairs of keeping the public records of the real estate or the geodetic organization, on which a record is drawn up[18].

## Conclusion

Bearing in mind the importance of agricultural activity for the Republic of Serbia, the importance of good management and use of agricultural land as a good of general interest and one of the most important resources of the Republic of Serbia, the obvious lack of investments in agricultural land, the effects that can bring long-term land lease to all economic entities, and the state in a sociological sense, we consider that the provisions of the Law on Agricultural Land that relate to the lease of agricultural land are justified and in accordance with good agricultural

[17] Law on Agricultural Land ("Official Gazette of the Republic of Serbia" No. 62/2006, 65/2008 - other Law, 41/2009, 112/2015 and 80/2017)
[18] Law on Agricultural Land ("Official Gazette of the Republic of Serbia" No. 62/2006, 65/2008 - other Law, 41/2009, 112/2015 and 80/2017)

and agricultural rights by the countries of the region as well as by other countries of the wider region.

It can be expected that the envisaged law enforcement mechanisms will enable efficient management of state-owned agricultural land. Further action in this area will be conditioned by socio-economic trends, that is, it will interact with general economic development, relying on the clear determination of the state to support and through the appropriate legislative framework, enable the development of agriculture as one of the strategic industries.

The law clearly regulated the system of controlling the management and use of state-owned agricultural land, prescribed the obligation to keep books books and regulated control of the crop from a professional person, a graduated engineer of agriculture who is a member of the commission formed in accordance with the law, which is considered very significant for plantation, vegetable and fruit production, prescribed the procedure for renting land, exercising the right to cross-lease agricultural land, securing the traceability of the most important procedures and solutions related to the long-term lease there is a possibility of significant development of agricultural production, creation of conditions for the creation of new jobs, increase income of the Republic of Serbia and other convenience above mentioned.

If the legal solutions related to the lease of agricultural land are applied in practice, a favorable economic environment will be created for the improvement of agricultural production and rural development, the development of rural areas, the increase of the land used by business entities and the development of whole agriculture.

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9. http://ec.europa.eu/eurostat

# WORK STATUS AND WORK STRATEGIES OF RURAL YOUTH

*Marica Petrović, Jovana Čikić*[1]

## Abstract

*One of the main problems in rural areas in contemporary Serbian society is unemployment and underdeveloped labour market. The unemployment issue is one of the main concerns of rural youth and principal motive migration. Life trajectories of young people are also affected by the uncertain outcomes in the transition from education towards employment and new and harsh terms of employment etc. Those circumstances demand new strategies in the life paths towards adulthood. Thus, we have analyzed work status and work strategies of rural youth. The analysis is based on empirical survey data.*

**Key words:** *un/employment, rural youth, mobility*

## Introduction

Within neoliberal capitalism, there is a raising interest in research of the class structures and the position of youth in contemporary societies. Concept of class has been interesting again due to the increasing uncertainty of employment and ever-present precarious work[2] (Woodman, 2016). Bourdieu (1999: 94-95) said that precariat is present in both private and public sector „*...where produce almost the same effects which manifest in terms of unemployment: destruction of existence which deprived, among other, its temporal structures and degradation of relation towards world, time and space. Precariat deeply wounds those*

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[2] It is a well-known labour type in post-industrial capitalism. Precarious work implies specific position of employees on neoliberal capitalistic labour market characterised by insecurity.

*who suffer from it by making their future uncertain, it disables any rational prediction, especially minimum of faith and hope that is needed to rebel, particularly for collective rebellion against present, even if it is most unbereable one*."

Within contemporary societies, young people has been facing complex demans – increasing expectations in higher education, less certain relation between education and employment, increase of nonstandard employment. Those demands question relevancy of biological age for the entrance in adulthood (Wyn, 2009: 93-94) and cause forced phenomenon of prolonged youth (Tomanović, 2012). Thus, transitions to adulthood are postponed, diversified, fragmented and less linear. They are often characterised as "jo-jo" transitions, signifying back-and-fort between education and (un)employment. Such individualisations, which imply destandardized transitional trajectories, force young people to make individual decisions and take individual responsibilities even though available resources are not equally distributed (Mojić, 2014; 2016).

Unemployment is one of the major problems of young people in contemporary Serbian society. It is not only economic problem reflecting in the absence of income, but it has much deeper and greater social impact. While emphizing social dimension of unemployment, Sen (2002: 37) wrote that lack of income cannot be overcome just by state social payments[3]. It is also „*a source of widespread weakening of personal freedom, iniative and knowledge. Besides its numerous consequences, the unemployment contributes social exclusion of certain social groups, loss*

[3] In contemporary Serbia, unemployment benefits are minimal so they cannot be regarded as sufficient compensation for lack of income. "*The amount of social payments is calculated based on average income or legal unemployment benefit in the last six months that precede the month of the termination of the employment or the insurance. The amount of the unemployment benefit comprises 50% of the legal basis. The unemployment benefit cannot exceed 160% or be lower than 80% of the legal minimal wage for the month of payment*" (http://www.zso.gov.rs/novcana-naknada.htm). In July 2017, net unemployment benefit was 16,759.79 rsd (http://www.nsz.gov.rs/live/trazite-posao/dok-trazite-posao/nezaposleni/pregled-isplate-novcane-naknade.cid543). This amount was not sufficient for the fullfilment of the basic life needs per month. Average market basket for the July 2017 was 69.511,12 rsd and minimal market basket was 36.069,32 rsd (http://mtt.gov.rs/download/Kupovna%20moc%20jul2017.pdf).
About the conditions for exercising the right to unemployment benefit on: (http://www.nsz.gov.rs/live/trazite-posao/dok-trazite posao/nezaposleni/trajanje_prava_na_nov_anu_naknadu.cid540). .

*of self-confidence, self-consciousness and deterioration of psychological and physical health*" (Sen, 2002: 38).

Due to the hyperproduction of university diplomas and ambiguous role of education in contemporary societies (both reducing and reproducing social inequalities) (Čikić, Petrović, 2014), reserve army of labour consist not only of those with low qualifications. Also, the employees are aware of not to be irreplaceable and to have fragile and endangered privilege to work. Such objective insecurity is a base for developing a subjective one (Burdije, 1999).

Wyn (2009) emphasized that institutional trajectories and educational structures are not able to provide security or predictability in contemporary societies. That imposes significant challanges in development of educational systems for the forthcoming generations. Formal education is still highly appreciated cultural capital necessary for the employment – nevertheless, it is insufficient due to the greater acceptance of non-formally developed knowledge and skills. Also, former strategies of transitions to adulthood after finishing education have lost legitimity. All above has shaped contemporary conclusion that moving through the paved institutional paths is no longer a guarantee of success (Ule, Živoder, 2012: 318-320).

Contemporary Serbian society faces high rates of long-term unemployment[4] (Ognjenović, 2015). Young people with lesser individual and family capital are less successful in job searching (Mojić, 2012). Even though there is a tendency of prolonged schooling (at the tertiary level of education), there is also a significant ratio of young people within the NEET cathegory[5].

According to the *National actional plan for employment for the 2015* (РС–Министарство за рад, запошљавање, борачка и социјална питања, 2016), young people up to 30 years are considered as people difficult to employ[6]. *Plan* schedules specific measures and services for the people difficult to employ. One of them are subventions for the private

[4] Average duration of unemployment period is four years.

[5] NEET – Not in employment, education or training. In 2015, there were 19,9% of young people between 15 and 24 years of age in the NEET category (РС–Министарство за рад, запошљавање, борачка и социјална питања, 2016).

[6] Besides surplus of employees, unemployed people older than 50 years, unemployed with no qualifications and with low qualifications, disabled and Roma.

sector employers for employing younger than 30. The other is a package of services for the young ones between 15 and 30 years of age which comprises of evaluation of employableness, development of individual employment plan, identification of the most suitable employment measures, mediation in job searching and active measures of empolyment policies.

Contemporary labour market is characterised by various trends which led to a specific market position of young people:

a) flexibility – employees are ought to be able to perform in various work environments, to perform different tasks, to multitask;
b) fluidity – long-term employment contracts are rear; employment is easy to lose, but not so easy to find; young people often get employed at the low-productive, low-paid and part-time positions;
c) qualitative disparities between labour market supply and demands – such gaps manifest in the position of overqualified (over-educated and over-skilled) workers; the trend is caused by inflation of university diplomas; it creates an increases competition among population with tertiary education, dequalification of their labour, decrease of wages etc.;
d) mobility – as one of the preconditions for contemporary employees, mobility caused by employment are getting more selective, extensive and diverse; this especially refers to the (un)employed in societies of (semi)periphery;
e) intensive investments in employment policies and labour market programmes – at the national, but also global level; the focus is on investments in reducing social disparities based on youth unemployment; such investments include active training, internships, assistance in job searching, mobility programmes in education, self-employment programmes, etc.; specific measures are based on the concept of flex-security[7] with the aim not to secure work position but to enable stability of employment or continual activity in the labour market (Savković, Gajić, 2016).

Not all social groups are at equal risk of unemployment – especially vulnerable are children, youth, people with less education, women and rural population. Young rural population is in the most difficult position.

[7] It is a combination of elements of market flexibility and social welfare for the economically active population.

Thus, we have analysed characteristics of work statuses of rural youth as well as their work strategies.

## Method of research and data sources

The analysis of work statuses and work strategies of rural youth is based on the empirical data collected within the project "*Rural youth – need, aspirations and problems*". The research was conducted in 10 villages in AP Vojvodina[8]. Sample comprises of 50 respondents between 18 and 29 years of age per village (total of 500 respondents). Data were collected in semi-standardized interview based on 107 questions[9] and processed by appropriate statistical methods.

## Employed rural youth

Of 178 employed respondents (35,6% of total young respondents), 161 are employees and 17 are private entrepreneurs. There is a significant gender gap among employed respondents – among employees, ⅔ are men and ⅓ are women. $\chi^2$ test has shown statistically significant and strong association between employment status and age ($p$=.000, $C$=.540). Employment rates increases with age. Data on occupational structure[10] has shown that rural youth are mainly employed in services and sales, in agriculture (including farmers) and as experts and scientists. Men outnumbered women in almost all of the occupations, especially among farmers, labourers, craftsmen and private entrepreneurs. Women prevail in elementary occupations, but also among sales personnel, office administrators, experts and scientists. Gender parity has been achieved among technicians and associate professionals. Data have shown that women outnumbered men in occupations that require no or very high qualifications. $\chi^2$ test has proven statistically significant and medium association between gender and occupation ($p$ = .000, $C$=.399).

Half of the young rural employed respondents are on indefinite duration contract. Among those, gender parity is achievied. 34% of employed rural

[8] Villages are selected on purpose, according to their spatial distribution, level of municipality development and population size. The sample comprises of 10 villages: Nova Gajdobra, Veliko Središte, Donji Tavankut, jaša Tomić, banatsko Karađorđevo, Laćarak, Vojka, Beška, Čurug i Mol. Data were collected in 2012.

[9] Author is Marica Petrović.

[10] Occupational structure adjusted to the EU classification available on: https://ec.europa.eu/esco/portal/occupation.

youth are temporary employees. That type of employment is more common among male respondents (14% of employed men and 9,6% of employed women). Every tenth employed respondent is private entrepreneur. Men prevail among private entrepreneurs. There are more young rural women among illegally employed (three respondents). Also, there are three respondents employed by service contracts and temporary and periodical jobs contracts also.

Young rural respondents are mainly employed in the village they are living in (47%) or in the nearest city (31%). Every seventh respondent is employed in the nearest village. Spatial distribution of work places favours rural areas (61% of employments).

More than a half of the young rural employed respondents (59%) have work experience longer than two years. Every seventh respondent has work experience between 18 and 24 month and every tenth has work experience less than six months.

Six out of ten employed respondents have a job according to their qualifications. On the other side, 30,9% employed respondents are overqualified for their current work position and only 7,8% employed respondents are underqualified for their current employment. There is a statistically significant, but weak association between gender and qualification status ($p$=.016, $C$=.142). Data reveiled that women are less likely to be underqualified comparing to their current job position – only 2,9% of the female employed respondents perform in a position over their qualifications. On the other side, every third young employed rural woman (35.3%) is overqualified for her current working position. Nevertheless, regardlessly to gender, we have noticed a certain flexibility in employment patterns of rural youth according to qualification. Such flexibility is forced out due to the great unemployment rate, insufficient employment opportunities and increased level of rural youth`s education.
Among young rural employed respondents, 62,4% are at their first employment. There is a statistically significant, but weak association between gender and previous employment status ($p$=.002, $C$=.153). Young rural women are less likely to have previous employment (only 18% of them had one, comparing to 44,5% young rural men). More than half of the employed respondents (56,7%) thought of their current job position as temporary solution while searching for another, more suitable occupation. Also, 46,1% of them consider their current position to be in

partial accordance with their professional ambitions and not facilitating personal development and professional improvement.

Regarding labour rights, 68,5% young rural employed respondents said their rights are completely fulilled. Those who are not satisfied, emphasized several aspects of labour rights` violations, such as unpaid overtime and/or night work (20,2%), unpaid pension and health insurence (13,5%), lack of right to the weekend break (12,4%) and lack of right to the annual vacation (6,7%).

## Unemployed rural youth

As previously mentioned, unemployment has numerous both economic and non-economic consequences. Unemployment of young population directly increases its risk of social exclusion, especially when speaking of long-term unemployment. Also, it complicates personal social status when family of origin is couping with the material deprivation. Thus, negative effects of unemployment reflect not only on unemployed individual, but on his/her social environment and society in general. At the individual level, unemployment leads to the decrease of personal work ethics and self-efficiency as it enhances pessimistic work attitudes and decrease of work motivation. Also, unemployment is often a cause of psychosomatic disorders, deterioration of skills and self-esteem, restructuration of personal goals (in terms of the reduced/minimised life plans, expectations and aspirations), deviant social behaviour, family disfunctionality and disintegration, enhancement of social exclusion (Kuzmanović et al., 1988: 44; Sen, 2002: 121). The intensity of unemployment impact depends on numerous mediator factors such as: unemployment duration, personal reaction on unemployed status, value of employment, economic depth of unemployment risk, physical and psychological activity of unemployed person, his/her social status, personal stress coping strategies, gender (Kuzmanović et al., 1988: 44-45). Also, quality and quantity of social capital of unemployed person and his/her available family capital influence characteristics of unemployment impact. Those capitals determine not only the amount of available resources to mitigate unemployment`s negative impacts, but characteristics of subjective reaction[11] on unemployment (unemployment as a stressor).

[11] Kuzmanović et al. (1988: 73) emphasized different staged in subjective reaction on unemployment: school stage, optimism stage, pessimism stage and fatalism stage.

Specific type is long-term unemployment as it drives young people to the position of helplessness. After several consecutive tries and failures, many give up job searching and simply vegetate in parental home. Such practice caused a development of subprotective patterns within the process of the transition to the adulthood (Walther et al., 2009)[12]. Those familistic patterns are more matter of force than free choice. Also, they are only partially effective in reducing negative concequences of unemployment. Unfortunately, familistic patterns cannot prevent young people from accumulating and internalizing numerous inhibitions which lead to the loss of self-esteem and increased inferior feelings (Tomanović, Ignjatović, 2004). Even though unemployment is psychological, economic and cultural individual problem, it is certaintly a tremendous social issue manifested in economic and political arena (Bilić, Jukić, 2014; Radin, 2002). Youth unemployment is direct loss of human capital as young people cannot contribute to the economic growth and social cohesion (Novak, 2008). Serbian society faces persistent unemployment, high unemployment rates (especially among women and youth) and high long-term unemployment rates (especially among women) (Mojić, 2012). Lack of social capacities for reducing high unemployment rates is a one of the major political issues with significant macroeconomic consequences. There are internal/national, but also international expectations from the Serbian government to solve the unemployment as one of the most priority social issue.

Among young rural respondents, 146 (29,2%) are not currently employed. Research results are discouraging as ⅓ of the unemployed rural youth faces increased risk of social exclusion due to the long-term unemployment[13]. Status of unemployed rural youth is additionally burdened by the fact that almost half of them (43,9%) have no previous working experience which puts them into unfavourable position of labour market.

More than ⅔ of the young rural unemployed respondents (67.8%) have no income at all – they are economically supported by parents, spouses or other family members. Those with any income are earning it by doing manual labour, agricultural labour, seasonal labour, providing car repairing services, cleaning and housekeeping, hairdressing service,

[12] According to the Walther concept of transitional regime (Walther et al., 2009), Serbia (as many other postsocialist socities) is facing desintegrated social welfare system so young people are forced to use intergenerational transfers and help.
[13] Those respondents are without employment for more than two years.

catering, cheese producing etc[14]. There is a statistically significant and strong association between economic activity and income which confirms the impact of unemployment on poverty/financial deprivation which increases the risk of social exclusion ($p$=.000, $C$=.781). Also, there is a strong statistically significant association between unemployment duration and education level/qualifications ($p$=.000, $C$=.699) which confirms greater impact of higher educational capital on reduction of risk of social exclusion[15]. Nevertheless, even though it increases chances, education is not a guarantee for employment. In contemporary Serbian society, transition from education towards employment is considerably uncertain and university students are greatly aware of the difficulties they are going to be facing while job searching[16].

Most of the unemployed rural youth (120 or 82,2%) are registered at the National Employment Service (NES). Also, majority of them (96,6%) had never applied for the start-up credits donated by the NES nor they are familiar with such an option (only five of unemployed respondents have used such an opportunity). On the other side, six out of ten young rural unemployed respondents claimed to be glad to start personal business, if they have an opportunity to do so. Some of them are quite certain of the type of business they would like to start:

[14] Types of earning are listed by frequency of occurance. Thus, 11,9% are earning income from the sale of agricultural products, 10,5% are providing various services, 8,4% are doing seasonal labour or working on blasck labour market. One respondent receives social welfare and one is renting land/buildings.

[15] Among those who are unemployed more than two years, the most respondents have secondary (mainly vocational) education and only two respondents have tertiary education. Tertiary education is most common among young rural respondent unemployed less than six months.

[16] Results from the research conducted in 2014. at the Faculty of Agriculture, University of Novi Sad have shown that 68% of all students in the Department of agricultural economics and rural sociology thought to have poor chances to find an employment in the community they are living and 8% of them thought to have no chances at all. The most pessimistic are students coming from the rural areas. Also, research results have shown that majority of students though social capital (family, relatives, members of a political party) to be the most important factor of success in job searching. Personal qualifications and skills are less valued (Janković et al, 2015). The same research conducted at the Faculty of Agriculture, University of Belgrade has shown similar results. Almost ¾ of the rural students from the Faculty of Agriculture in Belgrade (71%) though their future to be in the urban surroundings. Female rural students are particularly keen of migrate to urban areas (Nikolić, Jovanović, 2015).

> "*Yes, I would like to start an enterprise for agricultural machinery production and repair*." (male respondent, 21-23 years, student of the Faculty of Mechanical Engineering),
> "*Non-governmental organization for enhancing youth to participate in political arena*." (male respondent, 24-26 years, student, of the Faculty of Philosophy)

while other have only a vague idea:

> "*Don't know for certain, I am young, but I would like* (to start a business)." (male respondent, 18-20 years, high school student)

> "*Well, something good, that* would make me money." (male respndent, 18-20 years, high school student).

Only every tenth young rural unemployed respondent had participated in programmes for active employment, training etc., organised by NES. Regardlesly to their registration at the Service, respondents have very low expectations from it, but they also are underinformed and underusing options provided by the Service.

Those who are not registered with the NES mainly listed low expectations from the Service or inadequate jobs offered by the Service as main reasons for not to be on NES` evidence:

> "*What, to charge for a parking while chicks are going by?*!" (male respondent, 21-23 years, secondary vocational education).

> "*Work made a man, but idleness made a gentleman*!" (male respondent, 21-23 years, secondary vocational education).

Some of the respondents are not registered with the NES for more superficial reasons:

> "*I have not made it to register; my Dad hadn't given me a car. And now, I am not up for it.*" (male respondent, 21-23 years).

> "*I have to much personal stuff to do.*" (male respondent, 21-23 years).

For young people today, the easiest, fastes and the most available way for job searching is Internet. Young rural respondents agreed, as they had pointed out specialised websites as the most appropriate for job searching. Also, rural youth often rely on social capital (friends, relatives, acquaintances). Third most common way for employment searching includes ads (in the papers, on the enterprises` websites). National Employment Service, CV distribution to specific enterprises/institutions and private HR agencies are at least suitable models for job searching.

Unemployed rural youth are active in job searching (77,9%) – they are looking for the ads, sending applications etc. A minority of the unemployed respondents is currently not loking for a job due to the loss of confidence in finding one without having (sufficient) social capital. They considered that personal qualifications would not be enough when applying for a certain position if they do not have sufficient social capital to `boost the skills up`:

> "*The state is the biggest thief. In old days, the personal qualifications were valued. Now, thousand with the qualification are on the NES evidency."* (male, 21-23 years)

As contemporary societies are characterized by mobility of goods, ideas, informations, capital and people, we have tried to examine mobility readiness of rural youth in relation to the employment opportunities. Majority are willing to move if employment conditions require. Nevertheless, research results have shown that high school/university students are keener to move for job purposes than unemployed respondents. Also, students are more prepared for the long-distance moves. On the other hand, unemployed respondents said they are not prepared to move just for the sake of employment. If they agree to move, it would be a shorth-distance migration.

Regardless to the unemployment status, young rural respondents do not perceive employment as an opportunity to leave village whatever the costs. They would prefere, if possible, to find a job in a village they are living in or the nearest city. If they have both opportunities at the same time - to work in their village and in the city – majority of the young rural respondents claimed to prefer living in a village if the rural job would be more suitable than job in the city (52,9%) and if the rural job is suitable as urban one (27,7%). Only 10,4% of the respondents would move to the city even if the job is less suitable than the rural one.

Mojić (2004) said that work strategies of rural youth differ from the ones of urban youth due to the social and spatial environment which provides different options for development of capitals. According to the author (Mojić, 2004), urban youth is more likely to develop proactive and risky economic strategies, unlikely rural youth who practices passive and low-risk working schemes. Also, there is a difference in a relation between work and life strategies – rural youth emphasises any kind of employment, while urban young people are focused on professional improvement.

According to rural youth, the most important factor of success in job searching is social capital. Also, membership in a political party is highly rated as useful tool in finding an employment. Despite of diplomas` inflation, rural youth still regards education as an important factor of successful job searching, along with the additional skills (such as foreign language). According to young rural respondents, money/buying is the least important factor in finding an employment.

Kruskal-Wollis test has proven statistically significant and strong correlation between economic activity of rural youth and their estimation of available household`s financial resources (based on income-need ratio) (p=.000)[17]. Among the young rural respondents whose income cannot fulfil their basic needs, majority is unemployed (39.1%). Also, unemployed makes majority (34.9%) among the young rural respondents whose income are barely fulfilling basic needs. On the other side, employed young rural respondents prevail among those who estimate their livelihoods as modest (34.5%) or good (25.5%).

Research results confirm that unemployment, especially long-term unemployment, influences personal changes in affective experience of reality, deviance, alienation, decreased need for self-actualisation. Thus, almost ¾ of young rural respondents (71,2%) did not perceive themselves as ambitious, ($p$=.001, $C$=.203), 56,9% confirmed lack of motivation ($p$=.003, $C$=.197), 49,3% said to feel worried about the future ($p$=.035, $C$=.162), 26,7% felt disappointed ($p$=.027, $C$=.166), 21,9% felt angree, 19,2% felt insecure and 15,1% claimed to be depressive. Data shown that ⅓ of unemployed rural youth have pessimistic vision of their future ($p$=.021, $C$=.171). Particularly disturbing is dominant fatalistic vision, as 71,6% of unemployed young rural respondents considered themselves powerless in influencing reality.

[17] This relation is confirmed after Bonferroni`s correction of alfa value (α=.002).

## Conclusion

Growing insecurity of employment in contemporary societies indicates new meaning of social and cultural capital and creates new challanges for development and sustainability of relations that can provide such capitals (Woodman, 2016: 23). Unemployment status is not reserved only for people of the lowest social status – unemployed people are heterogenous group, they differ socially, culturally, in qualifications. Young people are forced to found new strategies on their transition paths towards adulthood. Disappearance of fixed structural and predictive paths in life transitions is regarded as their flexibilisation, which leads to increased exposure to (new) risks rather than new chances for social success (Mojić, 2015). Educational and working strategies of youth significantly depend on family capital. According to Mojić (2016), those strategies are fragmented, atomised and based of combination of scarce system, family and individuals resources. Data have shown that unemployed (especially, long-term unemployed) young people are very hard to mobilize due to their diminished ability to think positively about future. Also, due to the high unemployment rates, employment is regarded as a rear commodity, desirable at any cost (Burdije, 1999).

Data have shown that unemployment is a significant problem of rural youth in contemporary Serbian society. Also, we can speak of forced flexibilisation of labour as more rural youth are overqualified for their current job position than under/equally qualified. There is a gender disparity in (un)employment status, manifesting in lower employment rates of young rural women and more frequent overqualified job positions. Research results have also shown that rural youth is experiencing high risk of long-term unemployment which puts them in a position of increased risk of social exclusion. Data have proven low expectations from the institutions. Also, there is a lack of system support for the youth – even if such support exists, it is sporadic and apstract action with no in-depth applicative use in problem solving. Despite their difficult position and often poor prospects, rural youth did not perceive employment as an opportunity for rural exodus at any cost.

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# HUMAN RESOURCES FOR AGRICULTURAL ORGANIZATIONS OF AGRO-INDUSTRIAL REGION, AREAS FOR IMPROVEMENT

*Marina Leshcheva[1], Anna Ivolga[2]*

## Abstract

*The article analyzes the level of provision of agricultural organizations with specific categories of workers in the Stavropol Region. The level of education and the age composition of workers in agricultural organizations are determined in this paper. It is revealed that the human resources capacity of the region's agriculture is formed in conditions of decreasing quantitative and qualitative characteristics of rural labor resources. Measures for increasing staff capacity are proposed in the article.*

**Key words:** *agriculture, human resources, staffing, level of education, wages, turnover of staff.*

## Introduction

Formation and effective use of human resources is an important condition for ensuring the country`s food independence in the parameters imposed by the Doctrine of Food Security of Russia. Today it is becoming one of the determinative factors in the innovative development of the agro-industrial complex. Many Russian scientists, such as Altukhov A. I., Afanasyev V. A., Baturin A. K. [1], Merenkova I. N. [2], Syusyura D. A. [3] and others write about it in their publications. The reproduction methodology of staff capacity is considered in the publications of Pervih N. A. and Lovchikova E. I. [4]. Bogdanovskiy V. A. [5] and Soskieva E.A. [6] study the problems of rural employment. Analysis of the status and prospects of the rural labor market are set forth in the publications of

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Bondarenko L. V. At the same time, the problems of staffing the agrarian sector of the economy of individual regions and areas for improving the current situation are not fully understood. This determines the purpose and objectives of the study: to analyze staffing of agriculture in the Stavropol Region and develop priority areas for its improvement.

Conditions, materials and methods. Studies were carried out on the basis of dialectical, abstract-logical, comparative methods using the analysis of official statistical information and the study of scientific publications.

All the data for the research was taken from the annual statistic reports of the Federal State Statistics Service in the Stavropol Region, was obtained as a result of labor market and social sphere monitoring at the regional level and research of human resource capacity in agricultural organizations in 2013-2017.

Some share of data was received after expert and questionnaire surveys of directors, specialists and employees in agricultural organizations of the Stavropol Region.

The object of study is the agriculture of the Stavropol Region, the subject of this study is the human resource capacity of the industry.

According to the annual reports of agricultural organizations subordinate to the Ministry of Agriculture, the number of employees in the farms of all organizational and legal forms of the Stavropol Region as of 1.01. 2016 was 50,817 people (Table 1) of which 90.9% are employed directly in agricultural production.

For 2013-2015, the number of employees of agricultural organizations has decreased by 2,741 people (5.1%), including those who are directly employed in agricultural production - from 48,757 to 46,191 people (2,566 people, or 5.3%).

There is some share of unreported employment. On the one hand, this fact reveals increase of self-employment of population, development of entrepreneurship based on verbal arrangement (seasonal occupation, building, trade). On the other hand, it deprives workers of some rights and guaranty that could be provided by official employment and is a reason of cut tax revenue.

**Table 1**. *Worker composition of agricultural organizations of the Stavropol Region, number of people*

| Indicators | 2013 | 2014 | 2015 | 2015 to 2013, % |
|---|---|---|---|---|
| Total number of employees of agricultural organizations | 53558 | 51437 | 50817 | 94,9 |
| including workers engaged in agricultural production | 48757 | 46777 | 46191 | 94,7 |
| including permanent workers | 35696 | 34049 | 33876 | 94,9 |
| including tractor-drivers | 8500 | 8246 | 8295 | 97,6 |
| milking machine operators | 726 | 700 | 704 | 97,0 |
| cattlemen | 1670 | 1557 | 1392 | 83,4 |
| pig workers | 510 | 433 | 469 | 92,0 |
| sheep and goat breeding workers | 1145 | 1058 | 887 | 77,5 |
| poultry workers | 2704 | 2933 | 3281 | 121,3 |
| hoarse workers | 218 | 175 | 163 | 74,8 |
| temporary and seasonal employees | 2293 | 2306 | 1961 | 85,5 |
| non-manual workers | 10768 | 10422 | 10354 | 96,2 |
| including managers | 2358 | 2280 | 2262 | 95,9 |
| specialists | 7311 | 7137 | 7163 | 98,0 |
| Workers employed in subsidiary industrial enterprises and fisheries | 3587 | 3499 | 3335 | 93,0 |
| Workers of housing and communal services and cultural and domestic institutions | 182 | 142 | 148 | 81,3 |
| Workers of trade and public catering | 562 | 548 | 585 | 104,1 |
| Workers engaged in construction of households | 330 | 316 | 307 | 93,0 |
| Employees of children's institutions, educational institutions, courses at the farm | 20 | 21 | 8 | decreased by 2.5 times |
| Employees engaged in other activities | 120 | 120 | 243 | Increased 2 times |

**Source:** *Labor and Employment in Stavropol Region. 2016: Statistical Compendium.*

Changes in the structure of production, improvement of technology, growth of the labor endowment, migration of rural population to the cities and a number of other reasons lead to a reduction in the number of workers in agricultural organizations in the Stavropol Region.

For 2013-2015 the number of permanent workers decreased by 1820 people, managers and specialists - by 414 people.

There is a shortage of managers and specialists in the industry. This is especially true of economists (70% of the need is provided), power engineers and electricians (90.5%), veterinarians and herd reproduction specialists (95.5% security). The unmet need for other categories of employees is about 4% (table 2).

Lack of professionally trained staff still takes place in rural areas as a result of local tension on labor market. Thus, for each vacant position there are 75 unemployed people in Novoselitskiy district, 31.9 people in Shpakovskiy district, 21.1 people in Arzgirskiy district. High level of tension highlights the lack of properly skilled employable population.

Need for skilled labour is expected to increase in future. Currently there is a number of investment projects being implemented in regional agro-industrial complex, each aimed at 1040 workplaces.

Therefore, employers will look for highly qualified worker for these vacancies. This need for workforce will increase with a longer time lag. Expansion of precision agriculture technologies based on Global Navigation Satellite System, a system of national satellites for remote land sensing, technologies for data interpretation, meteorological observation stations, electronic land registries implies sufficient number of properly skilled personnel.

In this regard, it is necessary to intensify integration of business community and education, develop professional competences, broaden interaction of real economy and professional educational institutions.

**Table 2.** *Provision of agricultural organizations of the Stavropol Region with managers and specialists, %*

| Employee categories | 2013 | 2014 | 2015 |
|---|---|---|---|
| Top managers and specialists | 94,6 | 95,2 | 96,8 |
| heads of agricultural organizations | 100,0 | 100,0 | 99,6 |
| exempt deputy heads | 99,4 | 97,6 | 95,8 |
| Including chief specialist | 96,5 | 97,3 | 97,4 |
| including:<br>chief agronomists | 99,5 | 98,4 | 99,3 |
| chief zootechnicians | 91,3 | 90,3 | 91,7 |
| chief veterinarians | 97,6 | 94,8 | 96,4 |
| chief engineers | 93,8 | 95,9 | 98,2 |
| chief power engineers | 94,4 | 96,9 | 95,8 |
| chief hydraulic engineers and ameliorators | 100,0 | 100,0 | 100,0 |
| chief economists | 97,3 | 95,8 | 98,4 |
| chief accountants | 97,6 | 99,3 | 96,8 |
| other chief specialist | 96,7 | 100,0 | 97,9 |
| line managers | 82,7 | 85,8 | 97,6 |
| mid-level specialists | 97,3 | 97,2 | 96,0 |
| including:<br>agronomists | 96,5 | 95,5 | 97,2 |
| zootechnicians | 97,7 | 96,7 | 97,3 |
| veterinarians | 95,2 | 91,7 | 95,6 |
| herd health/reproduction specialists | 91,2 | 90,9 | 95,5 |
| engineers | 96,8 | 97,3 | 95,1 |
| power engineers | 100,0 | 96,2 | 90,5 |
| hydraulic engineers and ameliorators | 100,0 | 100,0 | 97,8 |
| economist | 97,1 | 97,5 | 70,9 |
| accountants | 98,3 | 98,4 | 99,6 |
| marketing specialists | 97,4 | 98,6 | 95,9 |
| ecologists | 100,0 | 100,0 | 96,4 |
| Other employees | 97,4 | 97,9 | 97,6 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region*.

It should be noted that education level of managers and specialists is growing, but still remains insufficient (Table 3). The proportion of managers with vocational education has increased from 87.8% to 90.4%

over the past three years, while only 48% of them have higher education, 42.3% have secondary education, and about 10% of managers and specialists have neither higher nor secondary vocational education.

**Table 3.** *Education level of managers and specialists of agricultural organizations in the Stavropol Region, % of the total number*

| Level of education | 2013 | 2014 | 2015 | Deviation from 2013 to 2015 (+;-) |
|---|---|---|---|---|
| Vocational education | 87,8 | 90,3 | 90,4 | 2,6 |
| including higher vocational education | 48,0 | 49,0 | 48,1 | 0,1 |
| Secondary vocational education | 39,8 | 41,3 | 42,3 | 2,5 |
| Do not have neither higher nor secondary vocational education | 12,2 | 9,7 | 9,6 | -2,6 |
| Including students trained in correspondence or evening classes | 0,7 | 0,8 | 0,7 | 0 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

In the Stavropol Region there is a reduction in the proportion of managers and specialists under the age of 30 (from 12.1% in 2013 to 10.8% in 2015) (Table 4) At the same time, the number of managers and specialists of the retirement age continues to increase and has already increased from 11.7 to 12.8%. It is necessary to pay attention to the growing gap between generations in the highest level of managers of agricultural organizations. While in 2013 the difference in the proportion of managers in retirement age and youth was 16.6%, in 2015 it reached 20.6 %. Thus, today we are witnessing the “aging» process of the management body of agricultural organizations in Stavropol Region.

**Table 4.** *Distribution of the number of managers and chief specialists of agricultural organizations in the Stavropol Territory by age, %*

| Indicators | 2013 | 2014 | 2015 | Deviation from 2013 to 2015 |
|---|---|---|---|---|
| Managers and specialists under the age of 30 | 12,1 | 11,4 | 10,8 | -1,3 |
| Women over 55 and men over 60 | 11,7 | 11,8 | 12,8 | 1,1 |
| including heads of organizations | | | | |
| under the age of 30 | 1,8 | 1,5 | 1,0 | -0,8 |
| women over 55 and men over 60 | 18,4 | 18,1 | 21,6 | 3,2 |
| chief specialists | | | | |
| under the age of 30 | 7,0 | 6,8 | 6,4 | -0,6 |
| women over 55 and men over 60 | 16,5 | 14,8 | 18,1 | 1,6 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

In order to overcome the current situation administration of the Stavropol Region adopted and implement subprogram «Sustainable development of rural areas» for 2016-2021. This program was developed under the national program «Sustainable development of agriculture». The regional subprogram implies purchase of 45.5 thousand $m^2$ of housing for people living in rural areas including 30.3 thousand $m^2$ for young families and young specialists.

The social benefit can be granted to Russian citizens in case of compliance with the following requirements:

- permanent residence and primary work location in rural area;
- availability of own and/or borrowed money amounting to 30% of calculated value of building (purchase);
- acknowledgement of need for housing improvements.

The social benefit can be used for:
- purchase of accommodation in rural area built less than 5 years ago;
- construction or finishing construction of accommodation;
- participation in shared-equity construction of accommodation in rural area.

The period of construction should be 1.5 year after issue of a certificate.

The social benefit is granted first to people working on a contract or private entrepreneurs in agribusiness. Then it goes to people working in social sphere and to people engaged in other areas in the last turn. The program includes priority grant of social benefit to young families, young specialists with 3 or more children.

It should be noted that despite all the advantaged of the Program its target values are not attained in the region. Construction of accommodation is not finished and accommodation purchase on the secondary market is constrained by the period of its previous use (5 years). It is difficult to find such accommodation in rural areas and it is hardly available for sale.

The education level of mid-level managers in the farms of the Stavropol Region is even lower than that of the heads of farms. Only 39% of foremen, heads of departments, areas, complexes, and their deputies - managers of departments, farms, warehouse managers, and craftsmen have higher education.

Over the past three years, educational level of line managers has significantly increased, the proportion of mid-level managers and specialists with secondary education has increased from 31.7% to 48.7%, and the proportion of those who do not have vocational education has fell from 31.5% to 12.2%.

At the same time, only 0.5% of mid-level managers and specialists are trained in correspondence or evening forms, the bulk of workers in this category have full-time vocational education in technical schools and colleges (table 5).

**Table 5.** *Education level of line managers, % of the total number*

| Level of education | 2013 | 2014 | 2015 | Deviation from 2013 to 2015 (+;-) |
|---|---|---|---|---|
| Vocational education | | | | |
| including higher vocational education | 36,8 | 41,4 | 39,1 | 2,3 |
| Secondary vocational education | 31,7 | 41,1 | 48,7 | 16,9 |
| Do not have neither higher nor secondary vocational education | 31,5 | 17,5 | 12,2 | -19,2 |
| Including students trained in correspondence or evening classes | 0,5 | 0,5 | 0,5 | 0 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

The proportion of youth in the age structure of line managers is 9.1%. Over the past three years, the share of young managers has decreased by 0.8 percentage points. The share of specialists under 30 years has decreased by 1.2 percentage points during this period (Table 6).

**Table 6.** *Distribution of the number of mid-level managers and specialists of agricultural organizations in the Stavropol Region by age, %*

| Age | 2013 | 2014 | 2015 | Deviation from 2013 to 2015 |
|---|---|---|---|---|
| Mid-level managers: under the age of 30 | 9,9 | 9,1 | 9,1 | - 0,8 |
| Women over 55 and men over 60 | 12,0 | 12,4 | 12,0 | 0,0 |
| Mid-level specialists under the age of 30 | 13,7 | 13,5 | 12,5 | -1,2 |
| Women over 55 and men over 60 | 9,5 | 9,7 | 10,5 | 1 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

Workers of able-bodied category older than 30 years predominate in the structure of permanent workers of agricultural organizations in the Stavropol Region (Table 7).

**Table 7.** *Age structure of workers employed in agricultural organizations of the Stavropol Region, % of the total number*

| Indicators | 2013 | 2014 | 2015 | Deviation from 2013 to 2015 |
|---|---|---|---|---|
| Under the age of 30 | | | | |
| permanent agricultural workers | 9,9 | 10,5 | 11,8 | 1,9 |
| crop workers | 10,1 | 9,9 | 11,4 | 1,3 |
| including tractor-drivers | 12,1 | 11,8 | 13,3 | 1,2 |
| livestock workers | 12,6 | 12,8 | 16,3 | 3,7 |
| Working age over 30 | | | | |
| permanent agricultural workers | 82,2 | 80,9 | 75 | -7,2 |
| crop workers | 80,8 | 79,7 | 77,7 | -3,1 |
| including tractor-drivers | 78,7 | 76,8 | 74,5 | -4,2 |
| livestock workers | 82,2 | 81,5 | 64,9 | -17,3 |
| Retirement age | | | | |
| permanent agricultural workers | 7,9 | 8,6 | 13,2 | 5,3 |
| crop workers | 9,1 | 10,4 | 10,9 | 1,8 |
| including tractor-drivers | 9,2 | 11,4 | 12,2 | 3 |
| livestock workers | 5,2 | 5,7 | 18,8 | 13,6 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

Their proportion in the total number of workers is 75%, about 12% are young people under 30, 13.2% are employees of retirement age. Most of them have not yet reached the limit of their productive, useful and effective professional activities and can benefit by transferring their knowledge and experience to younger workers. However, the increase in number and proportion of pensioners proceeds quite quickly and reflects

the aging process of work collectives. So, in 2013 the proportion of women over 55 and men over 65 in the total number of permanent workers was 7.9%, and then in 2015 it has reached 13.2%. The aging process of the workforce among livestock workers is especially noticeable. The proportion of workers of retirement age in this group has increased by more than three times - from 5.2 to 18.8% over 2013-2015.

In this regard, the problem of finding replacements of pensioners arises, which requires certain preemptive actions in order to recruit and retain young workers. The situation is exacerbated by competition of urban non-agricultural organizations that offer more attractive and flexible working and payment conditions.

The level of wages in agriculture is 19% lower than the average regional level, while for unskilled workers there are jobs with wages that barely exceed the subsistence level. Sheep breeding workers, pig workers, temporary and seasonal workers, as well as workers in housing and communal services and workers in catering are paid the lowest level of wages (table 8).

The level of wages of all categories of employees has increased by 40% on average during the period under review. The rate of labor remuneration growth outstrips the inflationary rise in price of consumer goods and services. However, the returns to labor of managers and other categories of agricultural workers vary considerably. The average wage of managers is 37.3 thousand rubles. The most highly paid categories after managers are tractor-drivers (25, 45 thousand rubles.) and operators of machine milking (25 thousand rubles.). The wages of workers in other categories are significantly lower.

Thus, workers engaged in pig breeding get only 15.96 thousand roubles per month, cattle-farm workers get 17.8 thousand roubles, casual and seasonal workers get 14 thousand roubles. Workers in housing and utilities sector get 13.28 thousand roubles, in trade and catering – 13.99 thousand roubles. Such level of salaries cannot work as an incentive and has insufficient impact on increase of labour efficiency.

**Table 8.** *Average monthly salary level of workers of agricultural organizations in the Stavropol Region, thousand rubles / month*

| Indicators | 2013 | 2014 | 2015 | 2015, % to 2013 |
|---|---|---|---|---|
| Total number of employees of agricultural organizations | 15,09 | 18,12 | 21,26 | 140,88 |
| including workers engaged in agricultural production | 15,29 | 18,42 | 21,64 | 141,53 |
| including permanent workers | 14,71 | 17,81 | 20,83 | 141,60 |
| including tractor-drivers | 18,53 | 21,86 | 25,45 | 137,34 |
| milking machine operators | 17,45 | 20,09 | 25,03 | 143,44 |
| cattlemen | 12,64 | 14,44 | 17,89 | 141,53 |
| pig workers | 14,62 | 15,18 | 15,96 | 109,16 |
| sheep and goat breeding workers | 8,88 | 10,67 | 12,85 | 135,13 |
| poultry workers | 17,63 | 22,67 | 24,60 | 139,53 |
| hoarse workers | 12,29 | 15,84 | 15,94 | 129,70 |
| temporary and seasonal employees | 8,63 | 10,86 | 14,00 | 162,22 |
| non-manual workers | 18,60 | 22,09 | 25,71 | 138,22 |
| including managers | 27,37 | 32,72 | 37,30 | 136,28 |
| specialists | 17,00 | 20,01 | 23,42 | 137,76 |
| Workers employed in subsidiary industrial enterprises and fisheries | 13,71 | 15,56 | 18,32 | 133,62 |
| Workers of housing and communal services and cultural and domestic institutions | 8,98 | 10,88 | 13,28 | 147,88 |
| Workers of trade and public catering | 9,79 | 11,94 | 13,99 | 142,90 |
| Workers engaged in construction of households | 14,43 | 17,21 | 18,14 | 125,71 |
| Employees of children's institutions, educational institutions, courses at the farm | 17,92 | 20,59 | 18,66 | 104,13 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

The low pay is one of the main reasons for staff turnover. Every year one fifth of permanent agricultural workers are dismissed, including 19.6% of crop workers, 16% of tractor drivers, and 20% of livestock workers (Table 9).

**Table 9.** *The turnover rate for employees of agricultural organizations in the Stavropol Region*

| Employee category | 2013 | 2014 | 2015 | Deviation from 2013 to 2015 |
|---|---|---|---|---|
| permanent workers | 0,24 | 0,233 | 0,20 | -0,03 |
| crop workers | 0,25 | 0,235 | 0,20 | -0,05 |
| tractor-drivers | 0,20 | 0,18 | 0,16 | -0,04 |
| livestock workers | 0,26 | 0,23 | 0,20 | -0,06 |

**Source:** *drawn up by the authors based on the data of the Ministry of Agriculture of Stavropol Region.*

According to the results of a questionnaire survey of managers, specialists and permanent agricultural workers along with low wages, the main reasons for staff turnover are poor infrastructure conditions for the rural population.

The conducted research leads us to a conclusion that the human capacities in agriculture in the Stavropol Region are formed in conditions of decreasing the quantitative and qualitative characteristics of rural labor resources, which indicates the need to improve the forms and methods of managing the formation of the human resource capacity in rural areas.

The main policy document regulating the medium-term development of the country's agricultural sector is currently the State Program for the Development of Agriculture and Regulation of Agricultural, Raw Materials and Food Markets for 2013-2020. The federal target program "Sustainable development of territories for 2014-2017 and for the period until 2020" is implemented as a part of the State Program. It assumes the implementation of the following key activities related to improving the staffing supply of rural area:

- diversification in agro-based economy;
- development of social and engineering infrastructure in rural area;
- improvement of the living standards in rural area, provision of housing for young professionals and their families;
- support of local initiatives, aimed at improving the living conditions of the rural population;
- support of complex compact development and improvement of rural settlements;
- formation of positive attitude of the society to the rural lifestyle.

The implementation of these measures gives some positive results, but no radical changes are observed. As a supplement to the measures taken we propose to create conditions in agrarian and agro-industrial regions that are necessary for the training of staff with primary vocational education directly in rural areas. It is unreal to organize secondary professional technical educational institutions everywhere. However, opening of their branches in strong farms, creation of professional education groups in large rural schools, acceleration of the integration of universities and specialized secondary educational institutions is possible. Organization of such educational institutions closer to the places of residence and the subsequent labor activity of the future young people of the industry is fundamentally important.

## Conclusion

In order to improve the industry's supply with highly qualified staff, it is necessary to create a system for monitoring and managing the human resources of the agro-industrial complex, including targeted training of specialists for farms and mechanisms for feedback from graduates and employers on employment in the specialty. To improve the qualitative level of staff recourses of agricultural organizations, it is necessary to improve the content and technologies of continuous agricultural education on the basis of interaction between educational institution and authorities of the subjects of the Federation and agribusiness.

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# EDUCATION AS A FACTOR OF ECOLOGICAL AWARENESS DEVELOPMENT[1]

*Marina Novakov, Dejan Janković*[2]

## Abstract

*The paper gives an overview of the role of knowledge in a modern society that is characterized by intense social changes. The analysis is dedicated primarily to the role and objectives of education for the improvement of the environment or environmental education. In addition, the aim of the paper is to analyze the place and role of ecological education in some of the most important environmental documents in the Republic of Serbia. Analyzes are also based on data from available databases regarding ecological movements, associations and NGOs in Serbia. It is concluded that in the last decades an important steps have been made in inclusion of ecological contents in the teaching process in relation to the previous situation, and that there is a significant number of associations dealing with ecological content.*

**Key words:** *education, ecological education, ecological awareness, social movements.*

## Introduction

Environmental problematic escalated in the seventies of the last century, first of all in developed industrial countries. Ecological topics become very popular, and their popularity is based on objective problems encountered by industrial society (Despotović, Đuretić, 2006). On the

[1] Paper is part of the research on the project III 46006 "*Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals' implementation within Danube region*", Project period 2011-2014, and project ON 179028 "*Rural labor markets and rural economy of Serbia - the diversification of income and poverty reduction*, Project period 2011-2014.

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other hand, agrarian and peasant societies were able to regulate somehow nature for themselves. The product of this symbiosis, Max Sorre, called "ecumene". This word emphasizes the fact that nature, as we know it today, is the result of long-term human activity, many generations and numerous civilizations. However, "pure nature" is nothing but a myth created by a civilized man as a result of the imagination of a world other than his (Mendras, 1986: 37). According to Danilo Markovic, the industrial system created by the development of technology was not only between nature and society, but also against nature and society (Markovic, 2015: 162).

Modern societies are the result of a series of complex social changes combined in terms of modernization, industrialization and urbanization. Some of the consequences of the modernization process are social and ecological problems that manifest as a disturbance of the balance of the environment. The environmental problems facing the world today are not, however, the exclusive feature of modern and developed societies, but are deeply embedded in human history. Many of them were created over a long period of time, so that in the last two centuries they have dramatically strengthened their influence. Different countries and regions have different views on environmental issues (Ponting, 2009). Social changes in the eco-system produce unpredictable effects that do not only deal with natural science, but social and ecological problems become the subject of analyzes in social sciences. Ecological risks are hidden risks that largely evade the daily perception and are often based on abstract scientific calculations, and represent global risks as they cannot be restricted locally (Beck, 2011).

All changes of man and society should be followed by (an adequate) education. This development also causes a change of consciousness, so education is conditioned by the value orientations of the society, *i.e.* the relationship that a man has with regard to the inner and outer nature. Socio-ecological problems (ecological crisis) can also be viewed as a consequence of the modern ideology of progress that rests on faith in the supremacy of man over nature. Changes in the relationship between man and nature change consciousness, and therefore the content of education as a product of this mutual relationship changes. Aurelio Peccei, one of the founders of the Club of Rome, does not see the solution of the ecological crisis in the development of technology, but the primary task is to improve the development of man. The solution of the ecological crisis arises from the change of value, from the new determination of the

relation of man to nature. For the sake of own survival, "it is necessary for a man to establish an inner relationship with his ecological foundations of life. Building such a relationship with nature, through its new understanding, is the task of the education process, because the solution to the ecological crisis according to Peccei lies in the idea of learning" (Andevski, 2006: 22). Thus, the exit from the ecological crisis representatives of the Club of Rome have seen in a future-oriented learning.

Since education is an important component of sustainable development, the author's attention is focused on the role of education (primarily ecological) in contemporary society. One of the most interesting contemporary views in the analysis of social and ecological problems is the theory of ecological modernization, which is presented in the paper in relation to the position of Ulrich Beck, one of the leading contemporary sociologists. In addition, the paper analyzes some of the current strategic documents in the field of environmental protection (National Environmental Program, Environmental Protection Program of the City of Novi Sad for the period 2015-2024, and the Law on Environmental Protection) in the context of their orientation on education and ecological education. Also, the analysis of the presence of ecological movements and non-governmental organizations in the territory of Serbia has been conducted.

## Social-ecological problems and risk society

Nowadays ecology became one of the unavoidable topics not only of science but also of everyday life. Environmental problems have come to the fore together with the development of industrial civilization. In the early stages of industrialization, there was no awareness of the importance of environmental issues, but only in the second half of the last century, a critical awareness of the need for the protection of the natural environment was formed (Tripković, 1998). In addition, the relation between man and his environment is not, and cannot be the subject of study of only one science. The ecological complex has four elements: population, technology, organization and environment, and ecological problems are in their basis socio-economically founded. Social ecology is thus just one of disciplines that investigates the relationship between man and his environment, and she does so from a sociological point of view (Markovic, 2015), which is justified in the consideration of global (environmental) risks.

In a modern society, due to the rapid development of production forces and their uncontrolled use in primacy, there has been a disturbance of the ecological balance that has the character of an ecological crisis. It is a question of such environmental pollution that the survival of all living beings is endangered, as well as man (Marković, 2015: 53). Pessimistic views about the possibilities of the development of society consider that modern society is approaching to its end. The fear that scarcity and hunger will accompany a rapid increase in population is not without foundation, and many authors point out that there are physical boundaries how many people can live on Earth. Human life means the processing of energy, which releases one part of the heat due to life processes. This will lead to a thermal limit due to the accumulation of people, which would be endangered by a huge increase in the number of inhabitants. For example, a human mass of one trillion could produce heat corresponding to the melting point of iron (Supek, 1989: 60).

Global consumption models and attitudes towards the natural environment have a great impact on the availability of resources around the world. Today's societies are much more dependent on one another than it was before. We are all, as Anthony Giddens says, travelers to a "space ship called Earth" wherever we live, so that all of us are affected by changes that, on the other hand, leave the consequences for nature (Gidens, 2003). A dramatic example of such changes is Easter Island, one of the most isolated places on the planet. This island is located in the Pacific Ocean, with size about 400 km2. On the island there are over 600 massive stone statues over 6 meters high. There was once a rich ecosystem on the island. But, the position of kings over time began to depend on the size of the statues that were able to build, which required large quantities of timber. Every ruler who tried to break this tradition would fail. This resulted in a shrinking of forests on the island, and nature has become unsuitable for human life there. Namely, the cause of the collapse was the degradation of the environment caused by the seizure of forests around the island. The history of Easter Island is a striking example of the dependence of human society on the environment and the consequence of the irreparable damage to it. When the first Europeans visited the island in the 18th century there were no trees on it. When the environment was destroyed, society quickly collapsed from barbarism. Like the Islanders, the Earth's population also has no way to leave the planet. Like the Easter Island, the planet Earth has limited natural resources available to human society and its needs (Ponting, 2009; Giddens, 2010).

The influence of man on the natural world has always been enormous, as can be seen from the above example. However, hunting and gathering societies mostly lived out of nature, so they tried little to change the world around them. With the emergence of the agro culture, the situation has changed because even primitive land-processing methods can cause soil erosion. Still, before the development of modern industry, "nature has more dominantly dominated man's life than he influenced it. Today, man's aggression on the natural environment is so intense that it can be said that there are almost no natural processes to which human activity does not influence. Still developing modern industry has led to increased demands for energy and raw materials. However, world reserves of such sources of energy and raw materials are limited, and some key resources will necessarily be wasted if global consumption is not constrained. Even climate change is probably under the influence of global industry development. Environmental issues are not only about how to treat and prevent endangering of the environment - including more and more often industrial disasters - but also the way of life in industrialized societies" (Gidens, 2003: 624-625). And Goleman warns that our species threatens to pollute the natural world at a speed that far exceeds the carrying capacity of the planet. Therefore, ecological intelligence, as a type of wisdom in adapting to the environment, enables us to "apply what we learn about the ways in which human activity affects ecosystems in order to inflict less damage and live sustainably in our own corner - today it is the whole planet" (Goleman, 2010: 37).

One of the most important contemporary social-ecological viewpoints today is of Ulrich Beck, on a risk society. He emphasized the idea of risk in the context of the ecological dimension of globalization, where in the definition of globalization stands the view that it "implies processes that are the consequence of transnational actors, their chances of power, orientation, identities and networks undermining national states and their sovereignty and interaction connect" (Beck 2003: 28). He believes that social production of goods systematically monitors social risk production, and a risk society is a disaster society in which there is a threat that the state of emergency becomes normal (Beck 2001: 31, 37). Due to the increasing environmental vulnerability and insinuation to the detriment of certain technologies, "those who are suddenly exposed to public scourge as risk producers dispute, as far as they can, the arguments that tie them to the pillar of shame and with the help of the" counter-science", which is gradually institutionalized in industry, try to introduce other causes, and thus, other challengers into the game. The thing is complicated. Access to

the media is central. Uncertainty in industry is intensifying: no one knows who will be next, to whom the anathema of environmental morality will be thrown. Good arguments, or arguments that can pass through the public, become a condition for business success. People working in public institutions, "argumentation experts, get their business opportunity" (Beck 2001: 48-49). Now also in the kitchen it is necessary to have a wide knowledge in "nutritional engineering" that will help against harmful substances in agriculture and the chemical industry. However, the risks are not only risks, but also the market chances and it is precisely the risk society that makes even greater antagonisms between the affected by the risk and those who profits from the risk. Similarly, the social importance of knowledge grows, and with it the media that have the ability to shape and expand knowledge, and therefore determine a risk society as a knowledge, media and information society. Risks can be manipulated insofar as changing the definition of risk can create the needs of a completely new type and, therefore, new markets. Beck argues that sciences with their narrow specialization are not able to give an adequate response to civilization risks because they themselves participate in growth and emerging risks, and thus become legitimate sponsors of global industrial pollution. Beck points out that growing interest in knowledge increases productivity. But what - on the one hand leads to productivity growth, - on the other, it makes people sick, and what science has for the "latent side effects" and "unproved connections" are for their children's coughing from harmful substances (Beck 2001: 50-53,69,82,86-90, more on Beck's point of view in Novakov, Petrovic, 2013).

Beck points to the trend of globalization of risk. In a book published ten years after *Risk Society*, which is the *World Risk Society*, the dynamics of a risk society takes place on the other side of the stock and class, because global dangers endanger everyone, even those that caused them. Thus, "nitrates in the water do not stop before the faucet of the CEO" (Beck, 2011: 61). They are all in the same boat, but there are, as he says, a passenger, a wheelman, a mechanic and a drowning man. Nevertheless, there is a dynamic inequality of global risks for which the local vulnerability analysis is central. His theory of a world-class society makes a difference between old and new risks, with new risks triggering the global anticipation of global disasters shaking the foundations of modern societies. The attributes of such global risks are delocalization, non-profitability and irreversibility. Finally, he notes that the conflict dynamics of ecological hazards should be understood and studied only within the framework of methodological cosmopolitanism (Beck, 2011).

## Ecological or education for the protection and improvement of the environment

The development of the education system was significantly influenced by the process of industrialization and the growth of cities. In the beginning, education was almost exclusively general, classical-humanistic, and logistic, because only the highest social strata could afford it. Then it is put into the function of training the governing elite. The decisive step in the development of education was when it began to systematically take place within the school as a specialized institution in which the knowledge and skills needed to perform certain social roles and occupation of social positions were acquired. This qualitative leap emerged in the West after the establishment of a civil society. Then begins the "rapid development of natural and technical sciences whose results are directly applied in practice, contributing to accelerated social development. Education is becoming increasingly massive, convergent and permanent. At the same time, it is increasingly important for the social status of an individual and social group" (Mimica and Bogdanović, 2007: 371).

Education is considered a major factor of modern social development and it has long been noticed "that our culture is characterized by excessive belief in what is called education and upbringing. This almost mythical formula has contributed to the process of education seen as a new kind of religion that should enable the achievement of the leading ideals" (Koković 1994: 108). The link between education and society is viewed mainly through two opposing theoretical orientations - according to one an education is only a mean of reproduction of the social structure, and to the second, education is capable to develop a new type of society, and it is an important factor in the reform of society (Novakov and Janković, 2016).

Education related to environmental problems is a process of acquiring knowledge about the relationship of a person with the overall environment that surrounds him. Every man must "re-examine himself to discover the particular forms, ways and styles of life. This, among other things, is done through the education system. With many other measures to address environmental protection, adapting the education system to these tasks, at all levels - from pre-school to postgraduate - is a permanent task focused on finding a solution in a long-term perspective" (Koković, 2010: 79). The basis of student attitudes towards the environment is knowledge, managing basic ecological concepts and continuous information, with the addition of knowledge, there must be a willing

attitude towards the environment, *i.e.,* willingness to action and the desire to participate in the preservation of the environment in different ways. As Koković emphasizes, ecological education must not be inspired by an apocalyptic vision. Ecological education should emphasize the need to change the established relationships of production, the mode of production and the profit role of technology and technology. Fostering the ecological awareness of all the structures of society, "cultivation for ecology" becomes such a new educational motto. Ecological socialization and education should include a critique of raising man's victory over nature. Knowledge of ecology and environmental protection is important for the formation of awareness of environmental threats, and the cultivation of responsibilities should be a permanent duty of man to protect nature. In educational work, everything related to ecology "must be based on the understanding of the relationship of society, nature and culture" (Koković, 2010: 79-80).

Throughout history, man has not had the same opinion of himself and his role and place in nature. Thus an anthropocentric way of thinking can be traced back from antique to this day. More recently, the awareness of the need for "harmony with nature" is the beginnings of ecological thinking. Change of the relationship of man and nature, changes the awareness and thus the content of education. The very act of education is not called into question, but history shows suspicion in the principles of content selection. Environmental education is tasked with researching a model of human behavior towards an environment based on restoring a lost connection with nature. According to Andevski, this problem can be solved by interpreting the thematic problems of the environment in the light of education, that is, by integrating practical environmental problems with the classical topics of academic education (Andevski, 2006: 27). Ecological education cannot be separated from general education, but seen as an integral part of the process of socialization. As such, ecological education has four main objectives. Those are:

- An effort to awaken awareness of ecological-environmental problems. Developing both the emotional and the rational ability of an individual.
- Developing specific capabilities for solving current and future environmental problems, strengthening the competence of individuals, and striving to improve self-organization and own initiative.
- Launching a discussion on the humanization of social structures (political factors) of the environment.
- Try to show individuals the perspective of life and provide personal and social orientations (Andevski, 2006: 29)

Ecological education as an integral part of general education aims to develop ecological knowledge, beliefs, attitudes and behaviors of children and adults, which will enable understanding of the existence of human existence with nature. The task of ecological education is to analyze the relationship between man and nature and in a new way shape it (Andevski, 1997).

Education on environmental problems and their solving should contribute to the development of ecological awareness and the sense of responsibility for the freedom that people have towards natural resources in their use thanks to the development of productive forces, and above all to their development, which emerged with the scientific-technological revolution. This education based on scientific knowledge on its basis should also be humanistic.

On the basis of this, ecological education can be defined broadly as "the process of acquiring knowledge about ecological problems, as global problems, the causes of their emergence and the possibilities of their solution" (Marković, 2015). According to this definition, education for the protection and improvement of the human environment is a "conscious and planned development of knowledge about the human environment during human life, which aims to develop awareness of the basic characteristics of the human environment, the relationship in it and the relationship with it, on the basis of which a person will seek to preserve and improve the environment in a way that ensures the existence of man's work in the present and the future" (Marković, 2015: 364). Such education should be based on the knowledge of both natural and social sciences about the environment. In fact, ecological education should contribute to the development of a new approach to the human attitude to the environment. It should contribute to improving the quality of human life. This education must exist in schools as an integral part of educational programs, but also in all forms of social influence on the development of social consciousness and human behavior.

Since the eighties of the last century, ecological education in Serbia has started to pay increasing attention. An analysis of the curriculum of biology in the elementary school in the mid '80s of the 20th century by Matanović and Živkov (Matanović and Živkov, 1985) showed that *ecological contents were poorly represented*. The extent of ecological content in Vojvodina region is shown by the fact that the pupils from the fifth to the eighth grade had 229 hours of biology, while the ecology was 64 hours, or about 27%. In other parts of Serbia, the situation was even

worse, as only 8% of the biology hours came to ecology. The conclusion of these authors is that even teachers were not sufficiently prepared for the modern teaching of ecology. Methodological textbooks that could be used by teachers were not present at that time.

Since UNESCO's 1989 promotion of environmental education as a fundamental goal in environmental protection, the situation has changed. Under the Environmental Protection Act of 1992, ecological facilities become an integral part of the curriculum of educational institutions. This resulted in the opening of the first ecological kindergartens, the expansion of environmental seminars and conferences, as well as the work on ecological literature. Thus, the implementation of ecological content in the new programs of working with pre-school children has occurred. At the elementary school level, the environmental issues are most often studied in the context of specific school subjects. In the first cycle of compulsory education, the subjects like *The World Around Us* in the first and the second and the *Nature and Society* in the third and fourth grade, as well as *Nature Protectors*, are most prominent in dealing with ecological content in the first two grades of elementary schools (Marić-Jurišin: 2012).

## Education and environmental education in strategic documents on environmental protection in Serbia

Legislation for the protection of human environment had been brought in the old age. Thus, the earliest law on forest protection was brought in old Babylon in the 18th century BC. In the 3rd century BC the Indian Emperor Ashok brought several laws that dealt with the protection of nature (Marković, 2015). In considering the documents of importance for the protection of the environment, we will not return so far into the past, and the focus will be primarily on Serbia and local communities.

The Constitution of the Republic of Serbia proclaimed in 2006, proclaimed the right for a healthy environment as one of the fundamental rights and freedoms of every citizen. Article 74 states that all citizens have the right to a healthy environment, but also to timely and complete notification of their condition, as well as the obligation to protect and improve it (Sl. Glasnik, 98/06). Strengthening awareness of the importance of the environment has its foothold in the *Law on Environmental Protection.* Article 6 of that document stipulates that state bodies, scientific institutions, institutions in the fields of education, health, information, culture and other institutions, as well as other forms of association, shall encourage, direct and provide awareness raising on

the importance of environmental protection. The Law further provides that rising of the awareness on the importance of environmental protection is ensured through the education system, scientific research and technological development, training in the process of work, public information and popularization of environmental protection.

In 2010, Serbia created the National Environmental Program (hereinafter referred to as the Program) that aimed implementation of environmental protection planning and management. This Program has been prepared with the aim of developing a modern environmental policy in the Republic of Serbia for a period of one decade. Also, the Program is in the function of the realization of Serbia's accession to the European Union. One of its principles is raising awareness of the importance of environmental protection. This principle highlights the importance of an environmental education in order to increase the level of understanding of the problems in this field by the public. In regards to that issue is the principle of information and participation of the public, which requires that everyone has the right to be informed in a timely manner about the state of the environment. As general causes of environmental problems, among others, a low level of environmental awareness, insufficient education and inadequate public participation in decision-making have been identified. In connection with this, it is clarified that formal education in the field of environmental protection within the educational process at all levels is still not satisfactory. Certainly, as one of the measures envisaged for the implementation of this Program (under item 8), education and awareness are also mentioned. Activities related to education and awareness rising on this area and ecological culture are being realized in cooperation with the Ministry of Education, where it has been identified that there is a need for a strategic approach in the implementation of environmental education in accordance with the principles of sustainable development. On a strategic plan, education for environmental protection in the function of sustainable development has been recognized as an integral part of national policy. In addition, it is also noted that there is also non-formal education. It, as well as other forms of awareness rising, is assessed as insufficiently coordinated, non-systematized, and it is said that they are not available to all categories of population. The slow development of non-formal education, in addition to the lack of a strategic approach, has been influenced by insufficient information availability, limited media interest and insufficient opportunities for citizens' participation in environmental decision-making (Program, 2010).

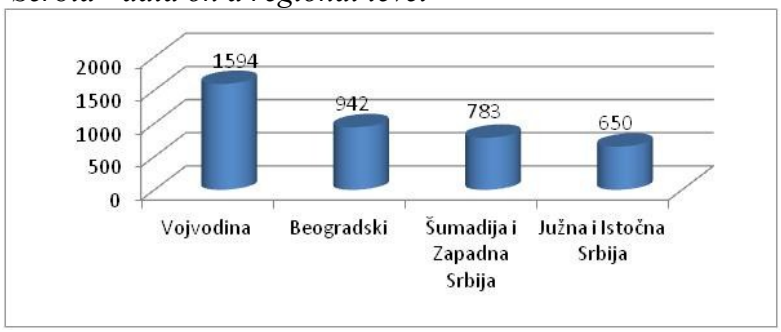
In addition to these laws and documents at the national level, programs that are adopted at the local level are also important for improvement of environmental education. Program for protection of the environment of the City of Novi Sad (2015-2024) covers the analysis of the state of the environment in the territory of the City of Novi Sad in the designated decade. The last (sixth) part of this program relates to education and raising public awareness on environmental protection that largely coincides with assessments of the situation in this area with the mentioned National Program (2010). The document states that the city administration organizes or participates in lectures, seminars, environmental gatherings and co-finances educational activities that contribute to strengthening the environmental awareness of citizens, which is also stated as one of the general goals of the environmental policy. One of the measures proposed to achieve this goal is, among other, an increased number of projects for concrete applicable results in the short term (Program of the City of Novi Sad, 2015).

## Ecological awareness, movements and NGOs in Serbia

Social movements, as forms of public, voluntary and predominantly non-institutional collective action, play an important role as sources of social change. This is especially true nowadays when they are considered as some of the essential elements of vital democracy. Social movements arise only with the modern state and the independence of the civil society, and they appear in three waves: the movements of citizenship (especially intellectual layers), the workers' movement and the 19th century, and the so-called social movements in the second half of the 20th century which includes, among others, the ecological movement (Mimica, Bogdanović, 2007: 401). The ecological movement originated, as Enzensberger says, only when the areas where the bourgeoisie resided were endangered by environmental troubles. Thus, the vulnerability of the living conditions of the ruling layers to ecological disorders was a trigger for wider social action (according to Marković, 2015: 40,234). Environmentalists have highlighted the demand for a reversal of the human-nature relationship that would allow coexistence in harmony, which would again prevent an ecological disaster. The importance of ecological movements has been growing in time. So it is not possible to talk about climate change in terms of climate change, not to mention the green movement that for years has a strong impact on the ecological pollution. “Being green”, says Giddens, has become almost synonymous with efforts to limit climate change (Gidens, 2010: 14).

From the margins of society, awareness of environmental issues slowly spreads through mass media. Thus, ecology and ecological awareness become a "new spirit of time". The term ecological awareness usually denotes a description of the goal of ecological education, but it is also often encountered in political discussions. Ecological awareness is the "spiritual dimension of ecological culture and encompasses acquired knowledge and habits, values, attitudes and beliefs, accepted norms of what is healthy and good in the natural and social environment, and what is not, how health is preserved, and what it endangers the way in which the consciousness and quality of people's lives can be improved in the existing conditions. Environmental awareness is accompanied by ecological actions that individuals and groups actually undertake in preserving, improving and creating a healthy, gentle and social environment. In the world of ecological action, the slogan is known: think globally, act locally"(Koković, 2010: 78). In addition, environmental awareness is not a static category, given once for all. Its origin is conditioned by the state of nature, but also by the state of society that shapes man's relation to nature. It is a historical category, and one of its three basic elements in the content sense, in addition to ecological knowledge, evaluating the ecological situation, is ecological behavior (Andevski, 1997: 45; Marković, 2015).

**Chart 1.** *Representation of NGOs dealing with ecological problems in the area of Serbia - data on a regional level*




**Source**: *Author's calculation based on the database (2016)*

Ecological idea finds its widest articulation in citizens' initiatives for environmental protection (Andevski, 2006). Some of the types of ecological activism are associations, movements and societies that deal with environmental issues, and in Serbia there are a total of 3.969. That would mean that for every 1.810 inhabitants there is one such organization. Observed by regions (Chart 1), most are in AP Vojvodina (1.594) and least in South and East Serbia (650). However, the above data refers to all registered associations, irrespective of whether they are active

or not. In addition to environmental NGOs, are all those who, among other things, are engaged in ecology and environmental protection. The situation changes with only active environmental NGOs that are in Vojvodina 244, of theose 129 in Backa region 79 in Banat and significantly less - 36 in Srem region (Figure 1).

**Figure 1.** *Map of active citizens' associations dealing with ecology in the area of AP Vojvodina (data for 2016)*


**Source:** *Provincial Secretariat for Urban Planning, Construction and Environmental Protection*

The attitude of citizens towards ecological movements and their ecological attitudes was the topic of various research conducted in our country. Thus, the research on ecology and ecological movements conducted in 2001 in Šabac (Mišković, 2001) examining the population of students and secondary school pupils on a sample of 323 respondents showed that awareness of ecological problems was moderate. The established order of influence of sources important for the formation of ecological awareness of young people is as follows: first, ecological catastrophes, on the other, television and radio, on the third professional literature, and on the fourth ecological movements and associations. This is followed by school, press, friends and political parties. Most young people (86.3%) considered ecological movements as necessary. And the results of the research done earlier in 1997 on the cultural identity of youth in Vojvodina region, which included their ecological awareness, showed that 91.1% of young high school students expressed readiness to personally engage in the field of environmental protection (the sample included 374 high school students) and that most young people had a positive opinion of environmental movements (Despotović, 2002). The research on the development of environmental awareness of adults in Serbia was conducted in 1993 in Novi Sad on a sample of 330 people aged 15 to 55 years and over. Results pointed that as the school grows, the level of ecological awareness and behavior increases, and that there is

a correlation of occupation and ecological activity, while the place of residence does not correlate with ecological awareness or activity (Andevski, 1997).

A recent study of the attitudes of the citizens of Vojvodina towards ecological problems conducted in 2009 on a sample of 610 respondents showed that in determining the value orientation 70% of the respondents agreed with the view that the value of nature is not determined by a person, but that is the value per se. This means that citizens at the beginning of the new millennium have a non-anthropocentric attitude towards their own natural environment (Pušić, Pajvančić, 2010).

Survey conducted with representatives of local government, civil society organizations and citizens of Serbia on the perception of the quality of the environment on a representative sample was carried out in 2010. The research was done by the research team of the Institute for Sociological Research at the Faculty of Philosophy in Belgrade. The survey of citizens' attitudes was carried out, on the basis of a sample of 1.952 respondents. The survey was conducted with 232 representatives of local authorities in over 60 Serbian municipalities, and 47 civil society organizations (CSOs). The results showed great environmental concern both of citizens and representatives of local authorities, as well as of the higher level of concern for classical (directly visible environmental degradation), but for new ecological problems (global environmental issues). The importance given to environmental issues as political issues is such that they come to the list of priority issues. Economic issues for most actors are the most important issues that need to be addressed by state policy. They are followed by corruption and crime, also the education system and health care, and so on. The results also showed that citizens are rarely pro-ecologically engaged, but, at least declaratively, they are interested in participating in environmental decision-making. They also expressed low confidence in OCD (Petrović, 2012).

Investigation of attitudes about the importance of the environment in the value system of the respondents in Serbia was also the subject of a survey conducted in 2013 by the method of so-called on-line interviewing on a sample of 250 respondents. The importance that respondents attach to the environment at the country level is high and is found to be important immediately behind the health of the population. This follows the economic situation and education, which is marked as very important. Significant information that has occurred is that 76% of respondents prioritize environmental protection even if this results in a slowdown in economic growth (Milošević, Rodić, 2015).

## Conclusion

The (non)reproducibility of most natural resources imposes the need for humanity to approach this issue differently: all previously divided economic and environmental principles must be taken into account together. In addition, the assumption is that the interest in efficient environmental management at the local and regional level is much higher than at the global level (Janković, 2012), which is why NGOs and other "local" ecological associations are of great importance. Through its actions in the local environment (and beyond), they can significantly contribute to raising environmental awareness and encouraging the population to engage in certain environmental protection activities. In that sense, ecological education should also be "the basis for conceiving economic development on the principles of sustainable development, which represents a civilization requirement in contemporary society. Organic education should contribute to the development of ecological awareness, and developed ecological awareness should be the basis of a deliberate, scientifically based, ecological policy"(Marković, 2012: 367). In addition to the formal one, one should not lose sight of non-formal education. That is why it is necessary to continuously strive for family, school, work organization and mass media, so that young people as well as adults can get to know the problems of the environment. Ecological education thus appears as an important component of conceiving sustainable development, and by improving education, knowledge is increased - the most important development resource of modern society.

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# SPECIFICS OF THE APPLICATION OF THE REGULATORY FRAMEWORK SOLVENCY II IN THE INSURANCE SECTOR IN SERBIA

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## Abstract

*The last financial crisis has renewed the issue of regulation and supervision of financial systems. Consequently, the actuality and importance of managing financial risks is gaining importance and regulatory institutions introduce capital standards based on specific risk sensitivity. In order to harmonize regulation of the insurance industry and increase insurance coverage, the European Commission has adopted the Directive on the launch and performance of insurance and reinsurance operations, known as Solvency II. One of the most important innovations of the Directive is the introduction of a risk-based solvency model, according to which insurers are required to allocate capital in relation to certain categories of their risks, which results in an obligation to increase the capital of insurance companies. This paper aims to provide a discussion on the forthcoming model of Solvency II regulation that highlights its impact on discontinued operations in the insurance industry. Consequently, this article uses an analysis of current and upcoming solvency legislation together with relevant literature and various secondary data.*

**Keywords:** *insurance companies, regulation, harmonization, supervision, solvency II*

## Introduction

In the previous period, the activity of insurance in the European Union was regulated by a number of directives from the Solvency I Framework, which, in addition to numerous advantages, identified certain deficiencies: sufficiently incentivize insurance/reinsurance undertakings (hereinafter: undertakings) to adequately manage risks and

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investments, remove all impediments to timely supervisory intervention, ensure adequate allocation of capital and pay sufficient attention to group supervision. (Strategy for implementation of solvency II in Serbia, 2016)

According to (Vaugan, 2009) since 2002, since the adoption of the Solvency Directive I, there is a continuous effort to develop new regulatory capital requirements, focused on risk. Given that this approach did not allow identification of all potential asset risks, the need for a more comprehensive approach has emerged. On 25 November 2009, the European Parliament and the Council adopted the Solvency II Directive, (*Directive 2009/138/EC of the European Parliament and of the Council on taking-up and pursuit of the business of Insurance and Reinsurance*) initiating and performing insurance and reinsurance activities, supplemented on April 16, 2014 by the 2014/51/ EU Directive of the European Parliament and the Council (known as the Omnibus II Directive).

The Solvency II Directive was adopted with the aim of improving the Solvency I Directive, which, after the several years transition period required to adapt to new regulatory requirements, began to apply in the European Union on January 1, 2016. Solvency II replaces 14 directives of the Solvency I Framework and introduces a maximum harmonization regime which ensures greater convergence of the internal market of insurance services in the European Union (Strategy for implementation of Solvency II in Serbia, 2016).

Solvency II is the framework for managing and using capital, and securing a single insurance market at the European Union level. Its essence is to recognize the impact of all the risks it faces, that all risks in the business of insurance companies should be quantitatively and qualitatively recognizable in order to be adequately managed. Exposure and risk management of the insurance companies determines the required level of capital, and aims to encourage insurance companies to promote internal risk management systems, in accordance with the principle that a higher level of quality of risk management reduces the required necessary level of capital that the company should have. From the use of internal models, it is expected to provide 30-40% reduction of capital requirements in relation to the standardized model.

## Objectives and specificity of the Solvency II Directive

The goal of Solvency II is not to increase the general level of capital, but rather to provide a high standard for risk assessment and efficient capital allocation. It should also contribute to increased transparency and support development throughout Europe. (Milic, Milosevic, Ercegovac, 2014.) The key objectives of Solvency II are as follows (What is Solvency II, 2011):

- *Improved consumer protection*: It will ensure a uniform and enhanced level of policyholder protection across the EU. A more robust system will give policyholders greater confidence in the products of insurers.
- *Modernised supervision*: The "Supervisory Review Process" will shift supervisors' focus from compliance monitoring and capital to evaluating insurers' risk profiles and the quality of their risk management and governance systems.
- *Deepened EU market integration***:** Through the harmonisation of supervisory regimes.
- *Increased international competitiveness of EU insurers***.**

The Solvency II Directive basically redesigns the business policy of insurers and reinsurers through: inclusion of risky aspects in each segment of their business, affirmation of careful measurement of the risk of the insurer's portfolio (through analysis of credit, market, business, liquidity risk and insurance risk); holistic approach to valuation of assets and liabilities (based on market inputs), developing sophisticated risk management systems, defining the required amount of capital using a standard approach or an internal model (the amount of which will be proportional to the profitability of each insurer's business and its investment strategy) and encouraging risk diversification in order to reduce it (Đurić, Jovanović , 2015).

Solvency II has adopted a three-pillar structure, drawing on the experience of Basel II regulation in the banking sector (Basel Committee on Banking Supervision, 2006). Both are based on three pillars that include quantitative and qualitative requirements and market discipline, and include specific components that focus on capital, risk, supervision, and disclosure. However, it is important to acknowledge that banking and insurance are distinctly different industries (Solvency II, A closer look at the evolving process transforming the global insurance industry, 2011). Each of these two

principles represents a unique process for itself because it deals with different types of risks and management models, with differences and similarities in requirements, application and impact of each pillar.

**The first pillar** refers to quantitative requirements regarding the provision of financial assets that would provide a solvency to the insurance company, or aim to ensure adequate capitalization of the company based on a risk-based capital. These requirements ensure the harmonization of standards for assessing assets and liabilities on market bases (Strategy for the Implementation of Solvency II in Serbia, 2016). All assessments should be done in a consistent manner through standard or internal models approved by the supervisor for the calculation of regulatory capital requirements.

This pillar contains the following components: assessment of the value of assets and liabilities, amount of capital, determination of the amount of technical reserves, as well as analysis of the level and quality of own funds. The solvency position of an insurance company is determined on the basis of the difference between the estimated value of assets and liabilities of the company. Solvency II establishes two levels of capital requirements that allow the timely intervention of the supervisor: capital required for solvency (*SCR-solvency capital requirement*) and minimum required capital (*MCR-minimum capital requirement*). *The SCR*, which can be determined using the standard formula or internal model, is designed to include all quantifiable risks in the business of a company and should ensure that the company can submit events that occur once in a year for a period of 200 years (Strategy for the implementation of Solvency II in Serbia, 2016).

According to Solvency II there are basic and supplementary funds. Own funds include the following three categories: *Tier 1* – permanently available assets, *Tier 2* irrevocable assets, third category *Tier 3* - those that do not fall into the first two categories.

CEIOPS/EIOPA From October 2005 to March 2011, the European Insurance and Pensions Supervisory Agency implemented and published the results of the Impact Study (Quantitative Impact Study - QIS 5), which examined the impacts of Solvency II legislation on the EU insurance sector. In March 2011, EIOPA announced the results of the QIS5, which accounted for about 70% of all insurance companies in the European Union, or 2540 insurance companies from 30 countries whose

business will be regulated by the Solvency II Directive (EIOPA, 2011). The conducted QIS5 quantitative impact study has so far been the most demanding and comprehensive analysis. Valuation of assets and other liabilities, calculation of technical reserves, and calculation of MCR and SCR were tested. The results of the QIS5 study indicate a strong and stable financial position of insurance companies. They will dispose of 355 billion euros excess of SCR own funds and 676 billion euros of excess of own funds MCR, as defined by the Solvency II Directive. This confirms the stable financial position of the insurance and reinsurance companies in the EU, as they make excess of their own funds above the level prescribed by regulatory requirements in the market environment (EIOPA, 2011). The purpose of the study was to encourage insurance and reinsurance companies to actively work on the preparation of the process for compliance with the Solvency II provisions. QIS 5 did not test the "second" and "third" tier.

According to the results of the study, more than 36% had SCR coverage in the range of 100% and 200%, while the solvency ratio of the QIS study participants was 196%. Most of the QIS study participants had twice as many as 28% or three times more than 24% of their capital requirements. The solvency ratio was below 100%, with 12% of participants (EIOPA, 2011).

Comparison of capital claims of insurance companies under the Solvency I directive and according to SCR and MCR under the Solvency II Directive is shown in Table no. 1. All participants recorded coverage of MCR requirements, while 72% of all QIS study participants could cover their MCR more than three times.

**Table 1.** *Capital requirements and surplus*

| | **Current regime** | **Solvency II** | |
|---|---|---|---|
| | | **SCR** | **MCR** |
| Solvency ratio | 310% | 165% | 466% |
| Surplus | 476 | 355 | 676 |
| Requirements | 227 | 547 | 185 |
| Eligible own funds | 703 | 902 | 861 |

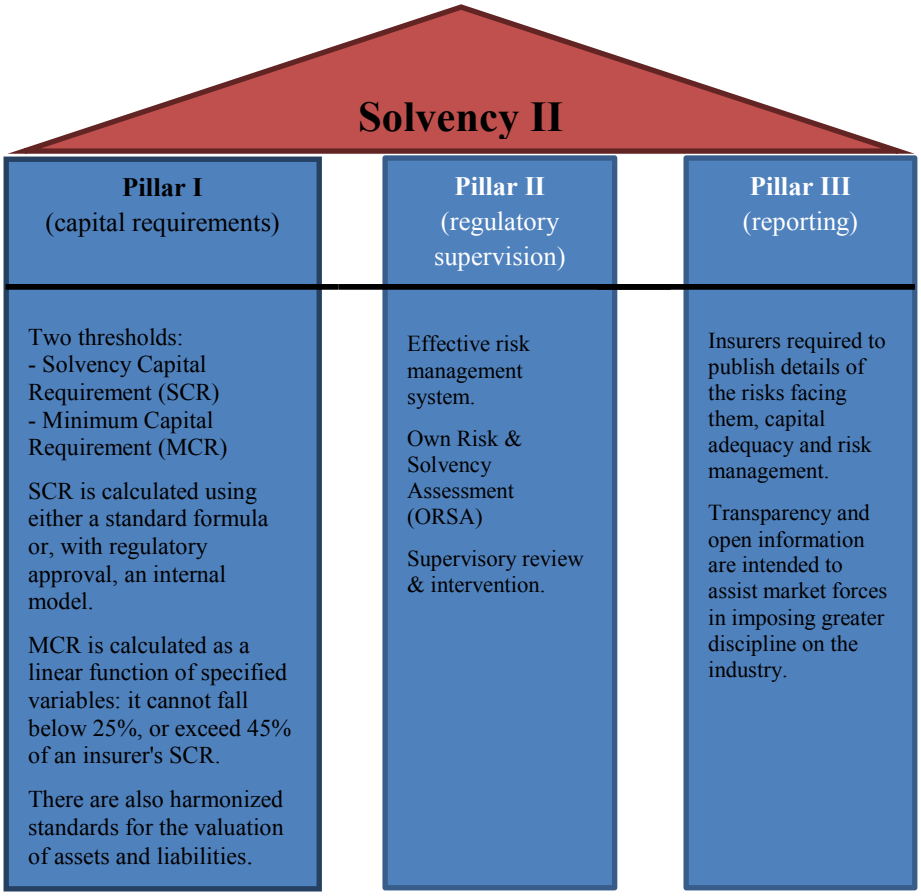
**Source:** *EIOPA, 2011*

The assessment of technical reserves must correspond to the value that the company would have to pay when it transferred its obligations to another insurance company at that moment. In addition, a certain amount of own

funds, as a security cover, is necessary in case some unforeseen events weaken the solvent position of the insurer (Đurić, Jovanović, 2015). *European Insurance and Occupational Pensions Authority - EIOPA* published final guidelines on the requirements of the first pillar at the end of 2014 (EIOPA, 2014).

*The second pillar* of the Solvency II Directive imposes multiple standards in the management of the company and risk management, the requirement of companies to assess risks comprehensively in order to provide a potential level of solvent capital and implement strategic and action plans for maintaining an adequate level of solvency (*Own Risk and Solvency Assessment - ORSA*). The expected outcomes of this process are: creating interactions between technical and managerial levels in risk management, developing and adapting the integration of risk management processes. Implementation of the ORSA model which requires a firm to undertake its own forward-looking self-assessment of its risks, corresponding capital requirements and adequacy of capital resources (Solvency II, A closer look at the evolving process transforming the global insurance industry, 2011) and also confirming the adequacy of the tools and processes used in assessing the ability of the insurance company to react to potential risks. The assessment may be conducted and disputed by an internal or external auditor.

*The third pillar* is aimed at a higher level of disclosure and transparency in terms of reporting to regulators and the interested public: *Solvency and Financial Condition Report – SFCR* (publicly available document), *Regular Supervisory Report – RSR (available only to regulators)* and *Quantitative Reporting Templates – QRT*. In addition, public disclosure will be carried out through *the Solvency and Financial Condition Report,* while regulatory reporting will be made through *the Regular Supervisory Report*. Both reports will need to contain qualitative and quantitative components. Following public consultations on reporting and disclosure requirements, EIOPA set up seven reporting modes, as a combination of quarterly and annual reporting, as well as information for public disclosure. The Company will not be obliged to publish the information whose disclosure may jeopardize the company's further operations.




**Source:** *www.lloyds.com*

For the purpose of quality communication between the implementation pillars it is important that they do not overlap and do not introduce double levels of rules. Each aspect of the Solvency II Directive interacts with other areas, i.e. there is no component to be looked at in isolation. Three-pillar structure of Solvency II is presented in the Figure 1 and is briefly discussed in the following subsections.

## The state of the insurance sector in Serbia

The main goal of the National Bank of Serbia is to achieve and maintain price stability and to strengthen and preserve the banking and financial system. It acts as the regulator and supervisor of the largest financial sector, including the insurance sector. In Serbia, the financial sector is the second most important, after the banking sector the insurance sector "with

a total premium of 93 euros per capita and share of the total premium in the gross domestic product with 2.0% in 2015" (The Strategy for the Implementation of Solvency II in Serbia , 2016). The dominance of the non-life insurance premium is dominant, while the share of life insurance premiums in the total premium is continuously increasing and amounts to almost 25% of the total premium in 2015.

According to the National Bank of Serbia, at the end of 2015, 24 companies operated on the market (20 insurance companies and four reinsurance companies). According to the ownership structure of the capital, 18 companies are in majority foreign ownership, primarily from the European Union. The largest number of companies in the Republic of Serbia are dependent companies from Austria, Slovenia, Italy, France and Croatia.

So far, the insurance sector in the Republic of Serbia has made a significant approach to the insurance sector in the European Union, which is reflected in the rules governing the performance of insurance activities, entering the domestic market and business of dependent companies in the European Union, in transferring specific knowledge from parent companies, the development of new insurance products in the Republic of Serbia, the continuous development of life insurance, and the improvement of the level of protection of users of insurance services. Further approximation of the insurance sector of the Republic of Serbia to the level of development of this sector in the European Union will depend on the general economic situation and further improvement of the regulatory framework and practice of insurance in the Republic of Serbia.

In the period since the beginning of the global financial crisis in 2008, insurance companies suffered less loss than the banking sector. The effects of the crisis on the performance of insurance companies are still felt through a reduced demand for life and non-life insurance products and services, as well as a reduction in investment returns. The decline in the rating and bankruptcy of a number of insurance companies further reduce the market value of stocks of insurance companies and increase the cost of obtaining capital in this sector. Insurance companies that used good examples of risk management, invested in non-risky placements and diversified their portfolios, managed to avoid or mitigate to a certain extent the consequences of financial risk exposure.

According to the indicators of the development of the insurance market - the ratio between the total premium and gross domestic product and the total premium per capita, the insurance sector in Serbia is still underdeveloped and is well below the average of the member states of the European Union. According to the share of the premium in the estimated gross domestic product in 2015 of 2.0%, Serbia is ranked 61st in the world, while this indicator for EU member states amounts to as much as 7.6% (NBS report for the insurance sector in Serbia in 2016 year, 2017). However, compared to a group of developing countries with an average of 2.9% and countries of Central and Eastern Europe, whose average is 1.9%, it can be concluded that Serbia is in a satisfactory position.

From the comparative indicators for 2016 and the previous year, the following changes are noted in the observed year in % (NBS report for the insurance sector in Serbia in 2016, 2017):

- an increase in the balance sum of the insurance sector by 12.4% was achieved, and it amounted to RSD 215.6 billion;
- capital increase of 13.4% was achieved and it amounts to RSD 50.8 billion;
- Increase in technical reserves of 13.2%, amounting to RSD 148.4 billion, as well as investing their principal amount in government securities, both in life and non-life insurance;
- the total premium reached the level of 89.1 billion dinars, with a growth rate of 10.1%;
- The share of non-life insurance of 74.1% in the total premium remains, with permanent decrease, still dominant. The non-life insurance premium recorded a growth of 7.2%, whereby liability insurance for motor vehicles, property insurance and motor vehicle insurance - is lagging for growth;
- life insurance increases the participation in the total premium from 23.9% to 25.9%;
- the number of insurance companies decreased from 24 to 23, while the number of employees of 10,954 increased by a rate of 0.9%.

Further functioning of the insurance sector can be improved through the application of Solvency II approach that can provide identification and assessment of exposure to all types of risks and their interactions.

## Legal framework for the implementation of Solvency II in the Republic of Serbia

The adoption of regulations regulating insurance activity in Serbia in late 2014 and in the first half of 2015 created normative preconditions for a significant step towards the convergence of the state of insurance sector in Serbia with the level of development of that sector in the European Union, in order to secure the level of the Insurance Sector in Serbia protection of the insurance services in Serbia that will correspond to the level enjoyed by those persons in the European Union (NBS report for the insurance sector in Serbia in 2016, 2017)

On December 18, 2014, the National Assembly of Serbia adopted a new Law on Insurance, which harmonized domestic regulations with the Solvency I Framework, with the implementation of certain Solvency II requirements. During the development of these regulations, the Solvency 1 framework was applied in the European Union, and the harmonization of domestic regulations was implemented with this framework, and individual Solvency 2 requirements were also transposed, in line with the level of development of the insurance market in Serbia. Accordingly, it can be said that at this moment in Serbia the Solvency 1½ framework has been established. Namely, certain Solvency II provisions relating to the qualitative requirements of the second pillar have been implemented (a management system that includes four key functions: risk management, internal control system, internal audit and actuarial function, as well as own risk and solvency assessment - ORSA, supervisory based on risk assessment, fit and proper requirements for licensing of supervising entities, etc.).

The implementation of the Law started on June 27, 2015, until the NBS passed 14 decisions of importance for the implementation of the Solvency II Directive, and the Government adopted a regulation that specifies certain issues of importance for the performance of activities, improvement and protection of the users of insurance services in Serbia.

The Law on Insurance and by-Laws, adopted in accordance with the Solvency II Directive, the following is regulated (Strategy for Solvency II Implementation in Serbia, 2016):

- the establishment of a company and the commencement of activity, i.e. issuing a license for carrying out insurance/reinsurance business

- Requirements for the performance of insurance activities are prescribed, which include, among other things, eligibility requirements for acquiring qualified participation in the company, for performing the function of a member of the management board of companies, and establishing an efficient management system.
- Rules have been established for the valuation of assets and liabilities of the company, primarily technical reserves for covering all obligations under the insurance contract and capital adequacy.
- Liberalization of the insurance sector through the freedom to establish branches and the freedom to provide insurance services from the date of accession of the Republic of Serbia to the European Union is foreseen.
- Solvency II requirements have been implemented with regard to the obligation of the companies to, before concluding the insurance contract and during its validity, adequately inform the contracting authority with the prescription of the minimum content of such notification.
- For the first time, the possibility of supervising a group of companies is also foreseen. Reorganization and liquidation of companies are largely regulated in accordance with the rules that apply in the European Union (Law on Bankruptcy and Liquidation of Banks and Insurance Companies, 2015).

With decisions on:

- For the management system in the insurance/reinsurance company the qualitative requirements of Solvency II are determined (risk management, internal control system, actuarial function and internal audit), *ORSA* (insurance companies for the first time performed their own risk and solvency assessment in 2015) and the entrustment of operations to third parties.
- On the content of the opinion of the authorized actuary, the obligation to give opinions on technical reserves, premiums and reinsurance according to Solvency II requirements has been determined.
- - requirements and manner of supervising the operations of the insurance/reinsurance company and other subjects of supervision in the insurance business have been identified with regard to the establishment of risk-based supervision in accordance with the *EIOPA* Guidelines on the supervision process.

## Specificity of Solvency II application in Serbia

Considering the commercial, economic and social importance of the insurance industry, intervention of the competent state institutions in the form of prudential supervision of the operations of this sector is necessary. Prudential supervision enables monitoring of the insurer's business and provides protection against possible risks, prevents the pyramidal collapse of confidence by the insurance beneficiaries and, consequently, the entire insurance sector.

In the Republic of Serbia, the first phase of Solvency II implementation has been completed. The strategy for the Implementation of Solvency 2, adopted on July 7, 2016 by the Executive Board of the National Bank of Serbia, foresees the phase implementation of Solvency 2 in the domestic insurance sector. The National Bank of Serbia completed the first phase foreseen by the Strategy, which was implemented (NBS, the first phase of Solvency 2 implementation in the Republic of Serbia completed):

- detailed gap regulatory analysis,
- analysis of the possibility of excluding the application of the Solvency II Directive to small companies, and
- analysis of the readiness and capacity of companies for the implementation of Solvency 2.

A detailed gap analysis has determined that full alignment with the fifth and partial alignment with a dozen of the provisions of the Solvency II Directive has been made. The highest level of compliance has been found within the qualitative requirements of the second pillar. The first pillar of Solvency 2 has not been implemented and harmonization with new quantitative requirements is required, which primarily includes rules for calculation of technical reserves for determining solvency, as well as calculation of capital adequacy. The analysis found that the alignment with the requirements of the third pillar, related to the reporting of the supervisor and the publication of pre-determined information by the companies, will be more significant in the implementation phase than in the harmonization of the regulations itself. It is necessary to establish the group supervision framework in accordance with the new rules and to harmonize the requirements related to the termination of the work of the companies within the European Union (NBS, The first phase of Solvency 2 implementation in the Republic of Serbia is completed).

Article 4 of the Directive foresees the exclusion of the Solvency 2 requirement on the so called small companies that meet the prescribed requirements, which can operate within a country and whose work permit is not treated as a "European passport". The analysis found that all companies in Serbia were covered by the Solvency 2 requirements and, according to available information, in the regime of small companies there would be no existing company.

The analysis of the willingness and capacity of companies for Solvency 2 implementation encompassed an analysis of the previous implementation of the second pillar and an analysis of the comprehensive readiness of companies for the implementation of Solvency 2. The implementation of the second pillar analysis is seen through the establishment of key functions and the quality of own risk and solvency assessment of companies (ORSA) where it was established that there is an adequate level of readiness and capacity for Solvency 2 implementation in this segment. The analysis of the comprehensive readiness of companies for the implementation of Solvency 2 has established that the insurance sector in Serbia placed a significant emphasis on the implementation of Solvency 2, that the management of companies, as a rule, is included in its implementation and that most companies think Solvency 2 will have a positive effect on their business. In the companies it is believed that employees do not have sufficient knowledge of Solvency 2 and there is a great need for capacity building, with the expected support of parent companies from the European Union and the National Bank of Serbia. Certain number of companies, as a part of groups from the European Union, already have some experience in Solvency 2 application, with the companies emphasizing the complexity of the first pillar that relates to quantitative requirements.

The conducted analyses have shown that there are quality prerequisites for the implementation of Solvency 2 in Serbia. In the second phase of the strategy, a readiness test for the domestic insurance sector for the implementation of Solvency II will be conducted - a quantitative impact study, currently being prepared at the National Bank of Serbia. This phase will last until the end of the first half of 2018. The assessment of the effects of implementation will include the implementation of a quantitative study of the impact of new Solvency II requirements on the capital adequacy and technical reserves of individual companies and the insurance sector as a whole (Strategy for the Implementation of Solvency II in Serbia, 2016).

A comparative analysis of best practice opportunities in the implementation of regulations in EU countries, transposition of significant areas of Solvency II and implementation of new regulatory requirements is foreseen.

By the end of 2018, drafting and drafting of regulations will be made based on the results of a detailed analysis of compliance and impact assessment. Parallel to the development of Phase II, regulations will be prepared relating to compliance with requirements of II and III pillars, for which no quantitative impact assessment is required.

## Conclusion

Solvency II encourages a holistic and advanced approach to risk management to which insurance companies are exposed in their business exposes. Its goal is to help improve the functioning of discipline in the insurance market by increasing the level of transparency and disclosure by the insurer. Altogether, it should improve the international competitiveness of insurance companies and their operational efficiency by setting standards that require them to focus on managing the risks their organization faces.

Solvency II should provide a balance between the risks taken and the business results through better risk management. This should also encourage innovation in product development and strengthen insurance companies focused on creating economic values associated with strong risk management. It should have an impact on the operations of insurance companies globally through a potential increase in operational efficiency in the domestic insurance market and raising standards and expectations related to risk and capital management.

It will contribute to the health of the insurance industry and benefits for insurers through the creation of a framework that consistently reflects economic principles, strong management and risk management, recognition of benefits through diversification, risk mitigation techniques, adequate risk pricing, and reliance on market mechanisms through increased transparency through public disclosure.

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# BUDGET SUPPORT FOR AGRICULTURE AND RURAL DEVELOPMENT IN BOSNIA AND HERZEGOVINA

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## Abstract

*Given that agriculture is important economic activity in Bosnia and Herzegovina and that there are natural and human resources for its further development, the state tends to provide support through measures of agricultural policy. The aim of the paper is to present the state of agriculture and the scope of financial incentives, budget support for the development of agriculture in Bosnia and Herzegovina, respectively. Since the agricultural sector absorbs almost a quarter of the employed population and generates a significant part of GDP, it is imposed as appropriate to explore possibilities of its more dynamic development. Using historical and descriptive method, the state of agriculture and rural development in Bosnia and Herzegovina is reviewed. Other methods that are used are comparative analysis, statistical method, graphic method, indicators, logical methods and others. For more dynamic agriculture and rural development, it is necessary to allocate significantly higher funds from the budget, to reform agricultural policy, gradually harmonize it with the EU agricultural policy, respectively, which attaches importance to rural development. Budget funds should be directed to infrastructure projects in rural areas, to stimulate intensive production, processing capacities, as well as systems of sustainable agriculture.*

**Keywords:** *agricultural budget, agriculture, rural development, Bosnia and Herzegovina.*

## Introduction

Agricultural sector is not developed in the Republic of Bosnia and Herzegovina, although there are natural and human resources. Without

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detailed considering the reasons of stagnation of this sector comparing with others, as well as in relation to the agriculture of countries in the region, the intention is to review the current state and problems, in order to trace the way of empowering this potentially important sector.

The country is aware that many agricultural producers conduct short-term business policy, and with its measures in the form of premiums, subsidies, favorable loans, etc, it balances their economic gain from the production, and thus, ensures that there are no negative tendencies, which could threaten the sector of food production (Drobac, 2008). Every serious country strives to provide enough agricultural food products, standard of living of farmers, to keep social peace by acceptable food prices and so on. In order to achieve these goals, it is necessary to establish adequate financing system, where the agrarian budget is just one of the modalities.

Financing is the most complex problem of agriculture, and the essence of problem is the inadequate relation between investment in agriculture (allocation from state budget) and contribution of agriculture to creating a gross added value. Agriculture contribution to national economy is significantly higher in relation to the annual allocation from the agrarian budget, which justifies the need for greater budget support in relation to the current. Djuric et al. (2016), claim that the role of the state is reduced to the providing financing, which will set agricultural holdings in some favorable economic position.

## The Aim of the Paper

The aim of the paper is to represent the mechanisms of budget support to the primary agricultural production in the Republic of Bosnia and Herzegovina, and to strive to quantify their contribution to the growth and development of this potentially significant economic activity.

The representation of budget structure, specificity and overall support by entities and lower levels of government, as well as cantons and municipalities, will be used to define new guidelines for improving the state of agricultural sector and rural development in Bosnia and Herzegovina.

## Methods of the Paper

By historical and descriptive method, the state of agricultural production and rural development in Bosnia and Herzegovina is reviewed. The other

methods that are used are comparative analysis, graphic method, statistical method, indicators, logical method and other methods typical for social sciences.

## The state of Agriculture in Bosnia and Herzegovina

Agriculture is the most important activity in Bosnia and Herzegovina because it presents the factor of social security and large part of the population generates income by food production and other agricultural products. Bosnia and Herzegovina is predominantly rural country (61% of the population inhabits rural areas). Agricultural areas occupy a modest 20% of the total areas, which is not sufficient for intensive agricultural production. Significant areas of the highest quality (over 30%) are not used due to unresolved property and legal relations. High share of plant production (over 2/3) depicts the underdevelopment of agriculture (Djulic, 2014). However, agricultural sector of Bosnia and Herzegovina is interesting for potential investors, considering the geographical position of the country (close to the market), availability of natural resources, and tradition in production, cheap labor, etc.

Agricultural food sector is very important for forming and stabilizing further social and economic development of Bosnia and Herzegovina. However, sector failed to activate and rationally exploit the natural resources, that Bosnia and Herzegovina disposes of, which should be the strategic direction of reformed agricultural policy. According to statistical data (2012), in the structure of agricultural land, a total of 2.163.000 ha, arable land occupies 1.006.000 ha, orchards and vineyards 109.000 ha and meadows and pastures 1.048.000 ha.

The agricultural structure of agricultural holdings is unfavorable in Bosnia and Herzegovina. The average size of landed property of 1,97 ha[3], with average of 4 parcels, is significantly below the EU average. In the structure of plant production, extensive crops are dominated (cereals), and livestock production stagnates for a long time and presents only 1/3 of the total agricultural production (Bajramovic et al., 2015). Such agricultural structure disables the organization of highly profitable and competitive agricultural production. Without the change in production structure, the introduction of modern equipment and technology, financial support, the

[3] Data from the 2010 pilot project on the agricultural census in BiH, since the complete inventory has not been conducted since 1960.

productivity and competitiveness will not increase, but there is a risk of regression of agricultural sector.

The strategic directions of future development are agriculture development of Bosnia and Herzegovina based on the use of natural resources, aimed to increase the efficiency, competitiveness and implementation of the concept of sustainable development of rural areas, and refer to (Colakovic, 2010):

- increase of production volume and average yields,
- higher degree of specialization and modernization of production,
- more rational use of natural resources,
- the adoption of standard and rule of the Common Agricultural Policy (CAP) and EU instruments (funds),
- higher degree of processing of raw materials of agricultural origin
- association of small producers,
- balancing the foreign trade of agricultural and food products,
- increasing material and financial support to agricultural production and rural areas,
- personnel and material strengthening of institutions for support for agriculture sector.

In the structure, small natural holdings dominate (about 36%). About 13% are registered farms, where people have employment, including those that are engaged in agriculture due to income supplement. Less than 1% of farms are commercial type. The share of agriculture in GDP[4] is in decline and in 2012, it is 8.2% (Djulic, 2014).

The governments of the Federation of Bosnia and Herzegovina, Republic of Srpska and the Brcko District, the cantons in the Federation of Bosnia and Herzegovina and local government structures, have increased funding for support to agriculture in recent years, but it is still significantly less than in the surrounding countries and the EU (Colakovic, 2010).

Little progress, which is achieved in agriculture development of Bosnia and Herzegovina (e.g. fruit growing) seems more as the result of changes, which occurred as a consequence of market conditions, rather than organized agrarian policy. The growth of price of agricultural food products, the lack of incentives, repairing the damage and increasing the import, leads already

[4] Observed by entities, in the Republic of Srpska, agriculture accounts for 14% of the economy, while in the Federation of BiH, this share is about 5%.

underdeveloped agrarian sector into an even worse position. If support for this sector is not given, Bosnia and Herzegovina will become food dependent country and the result of it will be even worse economic and social situation.

Agriculture development of Bosnia and Herzegovina is fairly limited by unfavorable foreign trade conditions. By entering Croatia into the EU and exiting from the Central European Free Trade Association (CEFTA), Bosnia and Herzegovina lost a market worth 100 million euros, which additionally deteriorated negative foreign trade and the state of agricultural sector (Djulic, 2014). It can be noted that agricultural sector of Bosnia and Herzegovina is not well organized and gives very modest results. All in all, the perspective of agricultural sector, without radical reform efforts, is not guaranteed.

## Agrarian Policy in Bosnia and Herzegovina

The competent institutions in the field of agriculture in Bosnia and Herzegovina have available measures for the development of the agricultural sector, and these are: direct financial incentives, capital investments, rural development, public procurements and other measures (expert meetings and educations, support for organizing farmers, interest regression, etc.). Measures of direct monetary incentives must be based on transparent processes and susceptible to objective evaluation (Foreign Policy Initiative BH, 2011), and have an aim to encourage the self-sustainability and profitability of market-oriented agricultural producers, improve the technical-technological and organizational aspect (CBC Assembly, 2013).

There is no consistent policy of support to agriculture and the measures are not coordinated with the EU agricultural policy. The dispersion of funds that are allocated for support to agriculture by entities, reduces their effect. Thus, the most important is the harmonization of incentive policy in agriculture across the country, and then with the EU agricultural policy. The harmonization of support in entities and cooperation with the state level is the prerequisite for the integration of agriculture in the EU and in World Trade Organization (Gavric, 2012). Bosnia and Herzegovina does not have rural development strategy. The Republic of Srpska has adopted strategy for rural development, but it has problems in implementation due to lack of financial resources.

In the Federation of BiH, the rural development strategy was not made with the excuse to wait for a national strategy. Support measures for

sustainable rural development programs have a character ‘ad hoc’ annually, and the problem is the lack of funding. The biggest allocation for rural development was in 2013, mainly for investments in function of increasing competitiveness (KM 29.4 million). The Brcko District also does not have a rural development strategy (Budimir et al., 2013; Bajramovic et al., 2015a).

Agricultural policy and measures of the current Strategy for development of the agricultural sector of the Federation of Bosnia and Herzegovina (2015-2019) are based on creation of conditions for transfer of knowledge, technologies and information, creating regulatory and institutional prerequisites (laws and funds), as well as connecting the research institutions, producers and administrators (Bajramovic et al., 2015a).

Rural infrastructure (roads, irrigation and drainage systems, electricity network) presents restrictions for development of agribusiness in rural areas, due to high expenses, which generates. The example could be limited public transport in rural areas, which presents restriction for labor supply (Sotton et al., 2010).

The Law on Agriculture, Nutrition and Rural Development of BiH is the first concrete step in harmonization of agrarian and rural policy with the CAP EU, and it is aimed to structurally arrange sector policies and help to sector harmonization. The Law defines the framework measures for agrarian and rural development directed on support for agricultural markets (improving the quality, direct support to farmers, support for exports) and support to the concept of rural development (investment growth, education, youth support, infrastructure development, early retirement, competitiveness, environmental protection and sustainable agriculture, supplementary activities). Greater coordination between the state and entities of BiH in the approximation of the Acquis in agricultural areas and rural development has a crucial importance (Foreign Policy Initiative BH, 2011; ACED, 2012). The ambition of BiH to become a member of the European Union will mean the harmonization of agrarian policy with the CAP EU, which will not be easy and there is justified fear that European integration will negatively affect the sector of agriculture. This is because agriculture is one of the most extensive chapters that are been negotiated, and candidate countries are not sufficiently competitive in order to be able to deal equally with competition in the European market (ACED, 2012).

Agricultural policy of BiH will be based on the gradual introduction of the CAP EU measures and non-implementation of new measures, which are not on the CAP. Certainly, important step is development and implementation of the BiH Rural Development Strategy, as a conditional document in the process of EU accession and using pre-accession IPARD program (Bajramovic et al., 2015). The use of IPARD funds is significant, because the new investments are realized, which will contribute to the empowering the competitiveness and preparing for the single EU market (Jahic et al., 2017). The task of agricultural policy and management structures at the macro level is as urgent as to meet the conditions for withdrawing IPARD funds.

Agricultural and rural policies in BiH are gradually approaching to the aims of the CAP EU, and those are (ACED, 2012):

- competitiveness improvement through support to restructuring, development and introduction of innovations,
- environmental protection and sustainable land management,
- improving the standard by stimulating the diversification of economic activities in rural areas.

Advancement of knowledge and skills in agricultural production, as well as greater support (financial, technical) should be the preoccupation of BiH agricultural policy, their entities in the context of EU accession, respectively.

Development Strategy of BiH (Colakovic, 2010) sets priorities:

- establishing the functional institutional capacity for agriculture and rural development (formation of the missing and strengthening the personnel of existing institutions).
- advancement of productivity and competitiveness of agricultural subjects through raising the quality and food safety, investments in primary production and processing, marketing, arrangement of agricultural land, formation of the cooperatives and clusters,
- sustainable and rational management of natural resources (raising ecological awareness, education on sustainable production systems, biodiversity preservation),
- raising farmers' standards through the diversification of income resources - improving the rural infrastructure, supporting rural entrepreneurship, branding, agro-ecotourism.

It is necessary to improve agricultural statistics, agricultural information system, harmonize land registry, and to advance land management (Budimir et al., 2013). One of the most important tasks is to determine the availability and the state of agricultural land, while in order to improve its management, it is important to determine the ownership structure, the size of property, the way of use and the degree of exploitation. The Law on Agricultural Land is the basis of advancing the land management from a macro aspect (Kuzman and Prodanovic, 2017).

The share of agriculture about 7% in GDP (FBiH-5% and RS-11%) with relatively high number of employees (around 20%) is not an indicator of development and competitiveness, but it is a reflection of underdevelopment of the secondary and tertiary economy sector. The foreign trade deficit in the exchange of agricultural and food products amounts around 2 billion per year and is constantly increasing (Sutton et al., 2010; ACED, 2012; Budimir et al., 2013).

Agricultural policy should be defined through financial and implementation framework for many years, and it is very important to provide stable agrarian budget from which the sustainable agricultural production and rural development programs will bee financed. Reform of agricultural policy includes redirecting existing subsidies to new investments, infrastructural projects in rural areas, encouraging export-oriented production, processing, sustainable agriculture systems, as well as the change of plant production structure in favor of more intensive (Kuzman et al., 2017).

Considering so far low level of stimulation agriculture development and rural areas, entity agricultural policies have two ways that they can start in order to develop agricultural sector (ACED, 2012):

- simplification of complex and uncoordinated management structure,
- Increasing the efficiency of institutions through improved utilization of developmental funds of the EU support, staff training, better understanding specific needs of rural communities, planning, improving developmental environment and stimulating mechanisms, regional and international cooperation exchange of experiences, and constant intern and external evaluation of results.

## Agricultural Budget as a Measure of Support for BiH Agriculture

Support to agriculture through agricultural budget is the only form from a set of agrarian policy measures, which exists in full sense in BiH. However, budget for agriculture and rural development in entities is still low and it is necessary to increase funding for subsidies in agriculture, as well as more efficient use of them (Gavric, 2012).

Agricultural budget is oscillating by age at the BiH level, and oscillations are also present in the entities. The Republic of Srpska had the same level of agriculture support by 2010 in the amount of 80 million KM, and after that, it was significantly reduced (by 20 million KM). As well, in the FBiH, agricultural budget registers decreasing trend in the observed period, and the largest was in 2012 when it amounts 86 million KM. Agricultural budget of the Brcko District is at stable level for observed period, and mostly it is allocated in 2015. For the agriculture development of BiH, stable and predictable support is necessary through agricultural budget, which should be gradually increased.

**Table 1**. *Agrarian Budget of BiH - paid (2009 - 2015) (000 KM)*

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|
| **The Federation of BiH** | 71.126 | 79.393 | 74.636 | 86.404 | 78.161 | 75.671 | 76.600 |
| **The Republic of Srpska** | 81.547 | 81.186 | 62.862 | 73.169 | 60.000 | 59.893 | 60.000 |
| **The Brcko District** | 6.055 | 5.067 | 4.557 | 6.505 | 6.677 | 7.509 | 7.509 |
| **Total of BiH** | **158.730** | **165.646** | **142.056** | **166.078** | **144.838** | **143.073** | **143.109** |

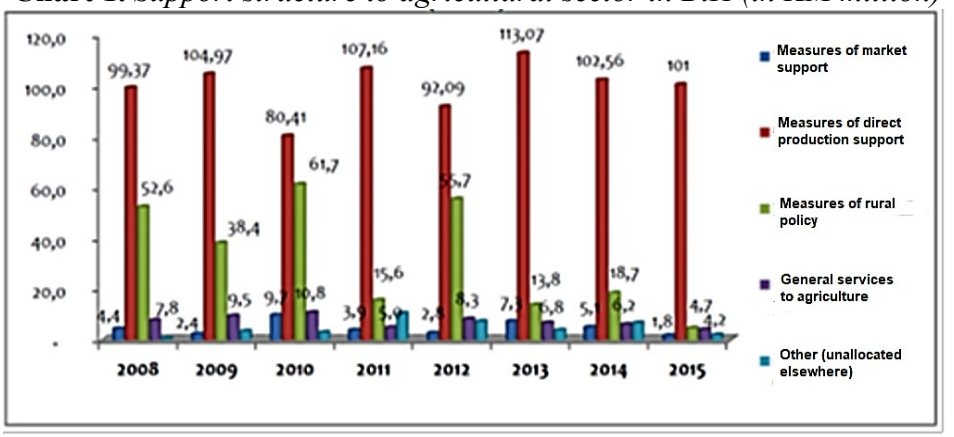
**Source:** *Office for Harmonization and Coordination of Payment System in Agriculture, food and rural development of BiH*

The total allocations for agriculture in BiH in 2015 amount to slightly over 140 million KM and it presents significant decrease in relation to previous years.

Agricultural budget of BiH determines funds for agricultural production, but also for encouraging rural development program, as shown in Chart 1. The biggest part of funds is directed on direct support to agricultural producers and that frequently increase of support leads to the damage of

rural development program (for three years, support for natural programs has been decreased by about three times). If BiH wants to implement the concept of rural development based on the EU, it must give greater support to programs, which will diversify the rural economy, i.e. increase allocation for rural projects. Additional funds could be provided from the EU pre-accession funds intended for agriculture and rural development (ACED, 2012; Gavric, 2016).

**Chart 1.** *Support structure to agricultural sector in BiH (in KM million)*

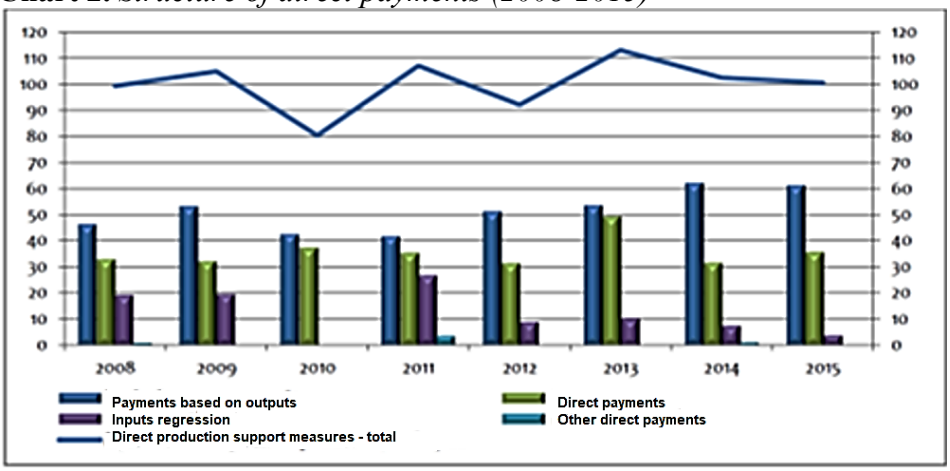



**Source:** *Gavric, 2016*

The greatest support is evident through direct production subsidies (in 2013-113 million KM) (premiums, reimbursement, payment per throat or ha). Measures of rural development are on the second place in terms of amount of allocated funds (in 2010-61,7 million KM), and disadvantageous is current trend of drastic reduction of funds for rural development support programs. It can be noted that the burden of crisis is reflected on rural development programs, which can not be less relevant for support to the overall rural economy. Measures of rural development affect the empowering of competitiveness of agricultural holdings, thus, it is very important to provide higher amount of funds. Market support, as well as general services in agriculture is symbolic, so in 2015, it is allocated about 6 million KM, 4,7 % of the total budget, respectively. Other funds (reallocations) refer mainly to the debt for previous year, reserves and measures, which can not be classified in the above.

Although certain funds for measures of market support are determined, active and real price-market mechanism in BiH and its entities has not been established (Bajramovic et al., 2015).

**Chart 2.** *Structure of direct payments (2008-2015)*




**Source:** *Gavric, 2016*

Such system of support, where total amount of support falls while direct support to productions grows, is to a certain extent justified, because in crisis, creators of agrarian policy always apply measures that are the most popular for farmers, and those are measures of direct support (Gavric, 2012).

Direct payments to producers dominantly refer to the outputs (milk premiums), to a less extent, they are payments based on surface area/throats of cattle. Growth trend of payment share per surface area/throats of cattle is noticeable, which is good, since it is a measure, which is harmonized with the CAP EU.

In the Federation BiH, support to agriculture is regulated by the Law on Agriculture, the Law on Financial Support in Primary Agricultural Production, the Law on Agricultural Land, the Law on Cooperatives (Foreign Policy Initiative BH 2011; ACED, 2012). The aim of the Program of Financial Incentives in Agriculture and Rural Development of FBiH (Official Gazette of the Federation BiH, No. 23/16):

- increasing the supply of domestic agricultural products with the quality improvement, health and hygiene,
- increasing the volume of agricultural land use,
- insurance of stable income and adequate standard of living for agricultural producers,
- gradual harmonization of agrarian policy with the CAP EU and integration of agricultural sector into the global market.

Agricultural policy of the FBiH, defined through Strategy of Agricultural Sector Development, is focused on (Bajramovic et al., 2015a):

- support for income stability of agricultural holdings,
- technical-technological improvement of production,
- transfer of information, knowledge and new technologies,
- competitiveness and marketing orientation,
- rational and sustainable management of natural resources,
- value chains development – horizontal and vertical integration,
- rural development,
- establishing efficient administration.

Agriculture development strategy of the FBiH predicts agricultural budget (excluding cantons) in the amount of 6% of the total entity budget (the legal minimum is 3%, or about 70 million KM), as well as strategic development commitments (developmental component and approximation to the EU agricultural policy). Additional support comes from the cantons, which are obligated to stimulate agrarian with an additional 70 million KM. Projection of the total budget transfers to the agricultural sector in 2014 is the amount of 72.76 million KM, which should be increased to the level of 95.37 million KM by the end of the implementation period. Market-price support and direct payments would gradually decrease, while funds for support to rural development would increase, which corresponds to the approximation to the CAP EU (Bajramovic et al., 2015a).

Encouraging agricultural production refers to: direct encouraging some of 'strategic productions', non-refundable participation for investments and interest subsidy on loans. Other transfers include support: professional institutions, veterinary, plant protection, manifestations and symposiums, new technologies, commodity reserves, organic production, and non-governmental interest organization.

Expected results of support strategy to agricultural sector are absent. Agricultural budget did not reach desired 6%, but mostly oscillated between 3% and 4%, cantons did not allocate support funds by equal intensity, while certain models of payment in certain periods were not included in financing (most often rural development model) (ACED, 2012).

Total financial support for agricultural sector of the Federation of BiH for 2016 amounts 65.800.000 KM, and the structure is shown in Table 2.

**Table 2.** *Distribution of funds for agriculture in the FBiH (2016)*

| PLANT PRODUCTION | | ANIMAL PRODUCTION | |
|---|---|---|---|
| **Production of vegetable and fruit cultivation, grapes and olives** | **KM per ha** | **Cattle production** | **KM/unit of measure** |
| Production of bread cereals (wheat and rye) | 550 | Production of fresh cow milk | 0,28/l |
| Production of barley, oats and triticale | 350 | Dairy cows in the milk purchase system | 100/throat |
| Production of silage corn | 300 | Fattening cattle Breedingbreeding Breeding of cattle in the system of cow - calf | 450/throat |
| Production of oilseeds and buckwheat | 400 | Fattening calf heifer from import | 250/throat |
| Production of medicinal and aromatic herbs | 600 | **Sheep and goat production** | |
| Vegetable production | 2 000 | Production of sheep and goat milk | 0,30 |
| Production of fruits, grapes and olives | 900 | Breeding livestock (sheep, goats) | 35 |
| Production of tobacco | 1 500 | **Pig production** | |
| **Production of seeds** | | Fattening pigs | 60/throat |
| Production of seeds of cereal, corn, soya and sunflower | 800 | Breeding livestock- sows | 150/throat |
| Production of potato seed (basic seed) | 1 700 | **Poultry production** | |
| Production of potato seed (seed I varietal reproduction) | 1 300 | Growing 18-week-old chicks | 0,35/beak |
| **Production of planting material** | | **Breeding flock** | 1,20/beak |
| Declared seedlings of treetop fruits and vines | 0,45/piece | **Beekeeping** | 15/hive |
| Declared seedlings of berries | 0,35/piece | **Fish production** | 1,25/kg |

**Source:** *Official Gazette of the Federation of BiH, No. 23/16*

In addition to the listed support measures, funds from agricultural budget are also determined for (Official Gazette of the Federation of Bosnia and Herzegovina, No. 23/16):

- Regression of interest on loans for capital investments in agriculture – 2.000.000,00 KM,

- Co-financing the insurance premium – 50.000,00 KM,
- Co-financing the professional conferences, congresses, symposia, seminars and fairs – 80.00,00 KM,
- Realization of project of importance of the FBiH - 1.960.000,00 KM,
- Organizing farmers (cooperatives, associations and alliances) – 60.000,00 KM,
- Co-financing the introduction of standards and certification – 50.000,00 KM,
- Co-financing agricultural food products export-oriented – 1.200.000,00 KM,
- Other expenses – 100.000.00 KM.

Financing the agriculture in the FBiH is very unstable and constant modifications of the modality itself are present, thus farmer can not rely on this mechanism (Bajramovic et al., 2015).

In the Republic of Srpska, the amount of agricultural budget, predicted by the Agricultural Development Strategy for the period 2009-2015, is 6% of total budget for the first three years of implementation of the Strategy, and after that by 2015, those allocation will be increased to 8%. Material support includes three areas: current subsidies, investment programs and rural development. The criteria and ways of funds allocation are defined each year by the Rulebook on the conditions and ways of achieving financial incentives for development of agriculture and villages. Although this model and budget support has received great approval during its creation, it has not been sufficiently and strictly conducted in practice. Budget allocations for agriculture have not reached planned volume, and instead increasing the allocation of funds, after three years of implementation of the Strategy, they have been significantly reduced in practice (from 80 million KM to 60 million KM) (ACED, 2012).

In the Brcko District, agrarian payments are regulated by the Law on Incentives in Agricultural production, which is adopted in 2006. By this Law, minimum of funds is prescribed, which must be allocated annually for agrarian sector (4 million KM), and the incentive structure that supports: plant and animal production, organic production, capital investments, interest rate regression for agricultural loans, development of professional institutions and introduction of new technologies and cultures in primary agricultural production. Funds allocation is precise in

detail by the Rulebook on manner and conditions for incentives in agricultural production (ACED, 2012).

Financing from a modest agricultural budget (about 2% of total budget) is not directed on areas that generate the highest growth rate. About 60% of the BiH agricultural budget spending is directed on subsidizing production, while only small part directs on services, although investing in public good (research and advisory services, market infrastructure, natural resources management) brings far more effects than subsidies, and especially direct subsidies for production. Subsidy gets characteristics of social transfer, instead of productive support to agricultural sector (Sotton et al., 2010).

Instead of the policy of higher investment in the agricultural sector of BiH, it leads to significant disturbance of this sector, and impact of natural factors (drought and flood) is an additional disadvantage.

## Conclusion

Current state of agricultural sector in BiH indicates that institutional and budget support is necessary. It is necessary to build domestic agricultural institution in order to implement support model to agrarian, which the EU applies, with certain adaptations in consent with specifics of BiH. Furthermore, it is necessary to provide external financing, subsidize production and investments, loans (interest rate), to stimulate rural development programs and establish advisory services, whose task will be to review the needs of local farmers and resolving their problems, as well as implementation of concrete agricultural policy.

For more dynamic agriculture development, as well as rural development in BiH, funds of agricultural budget must be increased and directed to deficit and intensive production. The share of agricultural budget should be gradually approximated to the share of agriculture in GDP, the share of 10% in total budget, respectively. Thereby, it is important properly to structure agricultural budget in order to contribute to efficient modernization of agricultural sector. The change of subsidies structure is necessary, focusing on the services, investments and productions, which impact high outputs.

Taking into account that agrarian is the most vital economic area and that agricultural resources of BiH are as much that their realistic possible using provides significantly higher production than the need, the priorities in incentive system of this economic area should be as soon as formed.

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# INTRODUCTION OF MISCANTHUS IN AGRICULTURAL PRODUCTION IN SERBIA AND THE POTENTIAL FOR USING BIOMASS FOR OBTAINING ALTERNATIVE FUELS

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## Abstract

*According to research results to date on uncultivated agricultural surfaces, as well as on soils under recultivation, best production results were obtained by cultivating the perennial grass species miscanthus. From the ecological point of view, miscanthus is very important, because it can be cultivated in areas with high levels of environmental pollution for the purposes of remediation. The produced plant mass, fresh or dry, represents stored energy that can be used to obtain gas, liquid or solid biofuels, that can replace fossil fuels. The advantage of these fuels results from the fact that they have lower carbon dioxide emissions, and thus a more beneficial effect on reducing global warming caused by the greenhouse effect. In addition to reduced $CO_2$ emission, less dependence on import of fossil fuels, primarily oil, has in many countries in the world created much interest in cultivating miscanthus as an energy crop, which is reflected also in the fact that this contributes to the economic development of rural areas. Direct material costs of forming plantations in the first year amount to 262,100 dinars, and full biomass production begins already in the third year.*

**Key words:** *miscanthus, use, conditions for success, cultivation, costs of forming plantations.*

## Introduction

In the Republic of Serbia agricultural areas have been significantly reduced. According to statistical data over 850,000 hectares are uncultivated. The majority of these areas are in rural areas in hilly-mountainous regions of Central Serbia. The increase of uncultivated areas is a consequence of aging

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of rural households and the reduced number of able-bodied family members, who could work in intensive plant production.

The most simple way to reduce these areas is to change planting structures, i.e. cultivation of plant species that due to their manner of use are called energy crops. This group encompasses numerous wild and cultivated annual and perennial species, whose generative and vegetative organs are used to produce biofuel. According to botanical affiliation and the manner of cultivation, energy crops can be field or forest crops (*Jankovic et al.* 2017). In Serbia, for several years already, research is under way about possibilities to cultivate plants whose biomass would be used for obtaining biofuel. In agricultural areas, as well as on soils in recultivation, best production results were achieved by cultivating the perennial grass species miscanthus (*Dzeletovic et al.*, 2009; *Drazic et al*., 2010; *Dzeletovic and Glamoclija*, 2015; *Maksimovic et al*., 2016).

According to its biological characteristics this is a perennial plant that develops underground perennial and above ground annual organs. After 2-3 years plants achieve full potential with high annual biomass production (*Heaton et al*., 2004; *Djuric et al., 2015; Maksimovic*, 2016). The produced plant mass represents stored energy that can be used for obtaining gaseous, liquid and solid biofuels. The advantage of these fuels lies in the fact that they have lower $CO_2$ emissions and therefore a beneficial effect on reducing global warming caused by the greenhouse effect. *Lewandowski and Heinz* (2003) state that the option should be to cultivate miscanthus, which, compared to other crops from the grass family has better production characteristics. Miscanthus is sensitive to less favorable ecological conditions, but it can be cultivated on various types of soils, from the most inferior degraded soils, to the most fertile, offering economically profitable biomass yields. As opposed to most grasses, miscanthus uses the C4 route to take in and utilize solar energy producing a raw material with a reduced content of other organic compound and with a significantly higher combustion coefficient. Via combustion, biomass creates less ash which is favorable due to a reduced concentration of harmful gases. In addition to reduced $CO_2$ emissions, in many countries in the world, less dependence on import of fossil fuels, primarily oil, causes high interest in cultivating energy crops, also reflected in the fact that this contributes to the economic development of rural areas, as emphasized by *Oljaca et al.* (2007). Miscanthus is a good energy crop, because it has the adequate capacity to take in and convert solar energy to biomass with maximum efficiency, minimum inputs, and a favorable effect on the ecosystem. In addition, as

pointed out by *Heaton et al*. (2004), costs of production technology need to be lower or at the level of the price of fossil fuels. *Sims et al*. (2006), also give the advantage to miscanthus in comparison with related crops emphasizing that the energy yield of 204 GJ $ha^{-1}$ is higher than for wood mass of softwood, willow and poplar, by approximately 22%, and compared to seeds of oil plants by 7.5 times. The produced biomass can be used in several ways, so that miscanthus is not only an energy crop, but a versatile useful plant.

## Economic importance of miscanthus

**1. Energy crop.** The primary economic importance of cultivation is the use of the produced biomass for obtaining biofuel. Biogas is extracted from the raw material by biological fermentation of organic carbon compounds that are reduced under anaerobic conditions to carbon dioxide and methane with the aid of catalyzing microorganisms. Fresh miscanthus biomass contains significant quantities of sugar and can be used to produce the liquid fuel bioethanol. This energy source is obtained by chemical or biotechnological procedures. Another way of obtaining bioethanol, used more frequently, has three phases. These are raw material preparation, fermentation and separation of the main product and byproducts. Solid biofuel is obtained from air-dried biomass, prepared in several ways, depending on the manner of use in boiler plants. In large boiler plants (thermoelectric power plants), after mowing and drying, dry biomass is formed into round or square bales and placed under overhangs beside the place of use (*Dzeletovic et al.* 2009). If the farmer has special mechanization, dry miscanthus stalks can be harvested using special silo combine harvesters and the obtained biomass used to produce briquettes and pellets (*Michel et al*., 2006). The advantage of using the above ground biomass as solid fuel is in its high energy value (9.2-17.1 MJ $kg^{-1}$), *Lewandowski et al*. (2003). Combustion of 1 kg of dry biomass produces up to 17.744 MJ of energy. Carbon dioxide, released during combustion was previously fixated by the plants via the process of photosynthesis, therefore its concentration in the atmosphere does not increase. Compared to coal, per $kWh^{-1}$ of produced electrical energy, during combustion miscanthus releases 0.131 kg $CO_2$, and coal 0.99 kg $CO_2$ per unit. Thus, as stated by *Styles and Jones*, (2007), miscanthus directly reduces gas emissions that cause the greenhouse effect. The advantage of miscanthus as a source of renewable energy in relation to other plant species is also in the chemical composition of the biomass used for combustion. During harvesting in February-March, dry stalks contain 0.19-0.67% nitrogen, 0.31-1.28% potassium, 0.08-0.14% calcium, 0.1-0.5% chlorine, 0.04-0.19% sulfur, and combustion produces

1.6-4.0% of ash containing less heavy metals than the ash of forest trees (*Hasler et al*., 1998; *Lewandowski and Heinz*., 2003). Agronomic cultivation of miscanthus is economically profitable when costs of production and the obtained product are compared. Results stated by *Ercoli et al*. (1999) show that that the relation between energy yield and energy invested into miscanthus production is 22:1 when intensive agrotechnical measures are utilized, while in a system of sustainable agriculture this is 47:1. With a small investment (without fertilizers and irrigation) energy use is significantly reduced, but biomass yields are also lower. When analyzing dry miscanthus biomass yield from 20 t $ha^{-1}$ and the relationship between energy yield and the energy invested in agrotechnics, *Lewandowski et al*. (2003) concluded that this is between 14:1 and 20:1, depending on agroecological and soil conditions. Mentioned data shows that miscanthus is a valuable energy crop.

**2. Raw material for paper production.** According to statements by *Cappelletto et al*. (2000) miscanthus stalks have a high content of cellulose and hemicellulose, and obtained pulp is an excellent raw material for paper production.

**3. Construction material.** Miscanthus stalks are used to cover economic and housing buildings, as *Fowler et al*. (2003). *Acikel* (2011) concludes that if ground miscanthus fibers are added in the production of structural concrete elements, concrete with significantly improved quality is obtained. Ground miscanthus, incorporated into concrete elements increases their resistance to pressure by 4-28%, to compression by 9-25%, to bending 4-9%, and flexibility by 2-6%.

**4. Production of biodegradable products.** Results of *Fowler et al*. (2003) for production of plant pots show that miscanthus biomass mixed with natural resins in a 70:30 ratio can be used. These pots for cultivating plants are 100% biodegradable. Plastic parts, prepared using this procedure have good quality, and can be biologically degraded after use (*Fowler et al*. (2003).

**5. Decorative plant.** The introduction of several species of the *Miscanthus* genus into Europe and America, led to the creation of many decorative forms, used for designing decorative areas in parks and in home gardens. Since the plant tolerates air pollution and shade very well, it can also be cultivated in such areas.

**6. Soil melioration.** Finely cut post-harvest miscanthus remnants can be used as mulch in orchards and for widely spaced farm crops. The goals of mulching is to regulate the water-air and thermal regime of the soil, to curb weeds, improve microbiological activity in the soil, balance nitrogen mineralization and the incorporation of substances assimilated by plants (*Glamoclija et al.*, 2015; *Djuric et al.,* 2015). As a perennial grass that develops a strong and branching root system, miscanthus significantly reduces the risk of soil erosion by wind and water (*Heaton et al*., 2004). According to statements by *Arduini et al*. (2004) miscanthus plants incorporate certain heavy metals that stimulate the growth of above ground biomass, therefore they can be cultivated on soils under recultivation in order to reduce concentrations of heavy metals, for example cadmium.

**7. Introducing greenery in nonagricultural areas.** Miscanthus can be cultivated on soils under recultivation, along water courses, roads, in hunting areas and other areas not encompassed by agricultural and forestry production.

**8. Plant for feed.** The above ground miscanthus biomass is rich in carbohydrates and could be used for preparing feed for domestic ruminants (*Burner et al*., 2017). Analyzing the possibilities to use perennial grasses miscanthus, Spanish (giant) reed (*Arundo donax*) and a miscanthus hybrid, obtained by crossing sugarcane and miscanthus (*Saccharum sp* × *Miscanthus sp*.), *Anderson et al*. (2008) conclude that the useful value of biomass depends on conditions for growth success (water regime) and the species.

For several years already experiments concerning the possibility to cultivate miscanthus on various types of agricultural soils, as well as on soils in recultivation are being done in Serbia. Results to date show high annual biomass yield (20 t $ha^{-1}$) and successful cultivation on lower quality soils and open the possibility to produce miscanthus as an annually renewable raw material for obtaining various biofuels. Compared to other energy crops, miscanthus has advantages, because with lower agrotechnical investments it has higher net energy production per unit area (*Dzeletovic and Glamoclija*, 2015).

## Miscanthus biology

The interspecies hybrid *Miscanthus* × *giganteus* Greef et Deu is a perennial plant with characteristics of an ideal energy crop. It is

characterized by a high annual yield, good solar energy to biomass conversion, efficient use of mineral salts and water and satisfactory tolerance to pests and pathogens (MAFF, 2001). Being an infertile interspecies hybrid, miscanthus develops from perennial underground rhizomes, therefore its spread in the environment is very slow and there is no danger of weed forming in adjoining areas. Commercial multiplication is done using rhizome sections with at least two buds, from which spring growth of adventive roots and above ground stalks with leaves begins at temperatures of 10-12°C.

Annual vegetative growth is simple. In the year of planting, in April, above ground stalks appear from the rhizome and rapidly grow, so that at the end of August they are 2 m high. The plant has maximum daily growth during May and June, when under favorable weather conditions daily growth per plant is 30-35 g of dry mass, i.e. 0.28-0.32 t $ha^{-1}$. During the fall biomass growth is reduced due to the drying and shedding of leaves. With additional minerals (nitrogen), vegetative growth of plants is prolonged to mid-November. Without additional nutrition this growth ends in mid-October (*Djuric et al.* 2015). Stalks are very similar to bamboo stalks and very rarely form branches. The interior is filled with parenchyma that forms a solid nucleus. At the end of July bottom leaves begin to die out, and the drying process of the entire above ground biomass is accelerated in the fall. Before the winter, products of photosynthesis are moved from above ground organs to rhizomes. Under the influence of winter frosts, dry leaves fall from mature stalks, forming a bed of leaves on the ground. During the winter stalks dry out, and their water content falls to 15-30%

Under agroecological conditions in Serbia, the plant life cycle begins in April, when the soil heats up to $10^{o}$C, and is manifested by the appearance of above ground stalks. The highest influence on the number of stalks that will be formed from buds on rhizomes is exerted by thermal conditions during the winter period. For this reason, at planting it is important to place rhizomes into deeper soil layers. In areas with cold winters and with little snowfall, the bed of fallen leaves is left on the surface (*Greef et al.,* 1997). During the perennial life cycle, plants form a strong cluster from which in every subsequent year numerous underground and above ground stalks will develop. Under favorable conditions maximum yield is obtained in the third year, and lasts 15-20 years if miscanthus is cultivated on a soil with good physical and chemical characteristics and with a favorable water regime (*Lewandowski et al.,* 2003). If plants are

cultivated using adequate technological production measures annual biomass yield decreases gradually.

## Conditions for successful growth

For high and stable yields of above ground biomass, plants must be provided a favorable water regime, especially in the year when the plantation is formed (*Maksimovic*, 2016). Soils with good water regime are the most favorable for overall plant growth. Good water supply in interaction with nitrogen nutrition in the year of planting very significantly influences plant mass growth and general plant development (*Zub and Brancourt-Humel*, 2010). Plants well developed in their first year will synthesize larger quantities of nutritive substances which enables better overwintering of the rhizome. In subsequent years, plants are supplied with water from deep soil layers owing to the strong and deep root system, but they react favorably to irrigation during critical periods. As emphasized by *Ercoli et al.* (1999), crop irrigation significantly increases the effect of used nitrogen fertilizers. One kilogram of nitrogen used can result in obtaining 37-50 kg of biomass. High levels of winter precipitation after which water lies on the surface have an unfavorable effect on the rhizome.

Thermal conditions during the vegetation period are very important for favorable annual plant growth (*Greef et al.,* 1997; *Drazic et al.*, 2010). Although it originates from cooler and wetter areas, the plant is sensitive to winter frost, especially in the year of planting (*Lewandowski et al.,* 2003). In the first year, plant overwintering depends on the depth of planting. *Clifton-Brown and Lewandowski* (2002) state that shallowly planted rhizomes are especially sensitive, and perish at frosts of -3.5°C. Conclude that deeper planting of larger sections of the rhizome, as well as covering the surface with straw, and in subsequent years with fallen leaves achieves more secure overwintering of plantations.

Miscanthus thrives best on fertile soils with favorable physical characteristics, but gives satisfactory yields on poorer sandy alluvial soils or soils with high contents of organic substances, within the limits of 15-30 t $ha^{-1}$. It is very tolerant to a broad range of pH, but the optimum is 5.5-7.5 (*Dzeletovic et al*., 2015). According to research to date, miscanthus should not be cultivated on soils that are too moist during the winter and early spring (*Glamoclija et al.*, 2008). Soil under miscanthus has a higher concentration of organic carbon and total nitrogen, because

of high quantities of leaves, roots and rhizomes. And such soil contains significantly increased concentrations of organic sulfur, an uncreased capacity of exchangeable cations and porosity, while moisture and volume mass are reduced (*Kahle et al*., 2001).

## Technology of production

All operations related to forming miscanthus plantations in regular agricultural production can be performed using standard agricultural mechanization (*Dzeletovic et al.*, 2015).

**Crop rotation.** As a perennial plant, miscanthus should be cultivate outside of crop rotation. The best preceding crops for forming plantations are arable species that leave the soil without weeds, with good physical characteristics and enriched in plant assimilation products. This group encompasses annual plants and perennial Papilonaceae, as well as winter wheat. However, miscanthus is most often cultivated on neglected agricultural soils, as well as in areas under recultivation (*Maksimovic*, 2016). In this case, before planting, the field should be cleaned of perennial weed, which is achieved by using total herbicides, for example glyphosates. Once formed, a plantation is used for 15-20 years.

**Soil cultivation.** The first operation is autumn deep plowing to a depth of 30 cm with the goal to introduce organic fertilizers which will be distributed in the root system zone, as well as to destroy perennial rhizome weeds (Glamoclija et al., 2015). In the spring the soil should be cleaned of weeds, best with total herbicides, and then prepared for planting using harrows, seed preparing cultivators or rototillers (Djuric et al., 2015).

**Plant nutrition.** NPK mineral fertilizers are used for additional plant nutrition. Quantities and ratio between specific assimilative substances depend on the natural fertility of the soil. Plants utilize assimilative substances in the NPK very rationally, because of the very pronounced process of displacement of nutritive substances from underground to above ground organs during the vegetative season, as well as their return to the rhizome in ripening phases of the above ground biomass. Compared to other main elements of nutrition, nitrogen plays the most important role in plant nutrition, as emphasized by *Lewandowski et al*. (2003); *Dzeletovic et al.* (2009); *Drazic et al*. (2010) and other researchers. They point out that the issue of rational utilization of mineral fertilizers is current also from the aspect of environmental preservation. According to results of own research, authors point out that before planting, 50 kg $ha^{-1}$ each of nitrogen,

phosphorus and potassium should be introduced. Similar results were obtained by *Dzeletovic and Glamoclija* (2015) when studying the effect of increased quantities of nitrogen on product characteristics of miscanthus in the year of planting. The plantation was formed on a carbonate chernozem type soil with s medium level of supply of main nutritive elements (NPK). Mineral fertilizers were introduced before planting, and quantities of phosphorus and potassium in all variants were 50 kg $ha^{-1}$ each, while the level of nitrogen used was 50 kg $ha^{-1}$ in the first, 100 kg $ha^{-1}$ in the second, and 150 kg $ha^{-1}$ in the third variant. During the vegetative period, stalk height was monitored by phenophases (Table 1).

**Table 1.** *Average height of miscanthus plants in the first year by phenophases, cm*

| Treatment/dates | 3 July | 30 July | 30 August | 28 September | 29 October |
|---|---|---|---|---|---|
| $N_1 P_1 K_1$ | 88 | 131 | 152 | 154 | 154 |
| $N_2 P_1 K_1$ | 60 | 111 | 137 | 144 | 143 |
| $N_3 P_1 K_1$ | 53 | 81 | 127 | 136 | 133 |

**Source:** *Dzeletovic and Glamoclija* (2015)

Results of this research showed that required quantities of nitrogen for miscanthus plants can be provided with 50 kg $ha^{-1}$ of the active substance. Quantities of nitrogen fertilizers above this level have no effect on the vegetative growth of plants. Under conditions of intensified nutrition with nitrogen, plants formed smaller stalks. However, analysis, by phases of plant growth, of the chemical composition of leaves showed that the increased quantities of nitrogen used in plant nutrition influenced the dynamics of incorporation of this fertilizer and of the synthesis of nitrogen compounds (Table 2).

**Table 2.** *Average nitrogen content in green miscanthus leaves, %*

| Treatment: | 30 August | 28 September | 29 October |
|---|---|---|---|
| $N_1 P_1 K_1$ | 1.26±0.05 | 1.09±0.04 | 0.89±0.03 |
| $N_2 P_1 K_1$ | 1.15±0.14 | 1.16±0.04 | 0.76±0.03 |
| $N_3 P_1 K_1$ | 1.37±0.23 | 1.53±0.11 | 1.26±0.07 |

**Source:** *Dzeletovic and Glamoclija* (2015)

In the year of planting a plantation, the entire quantity of mineral fertilizers should be introduced before planting rhizomes, and if the need for additional plant nutrition arises, it is best to use this before above ground stalks appear. Depending on soil fertility, quantities of nitrogen can even be increased, and supplemental feeding in following years can be left out if the effect of this agrotechnical measure is minor. Research by other authors showed that enhancing plant nutrition with nitrogen is of

no major importance for the vegetative growth of plants, because owing to their strong roots they utilize the used assimilative substances very well, so that loses by leaching into deeper layers are reduced. *Lewandowski et al*. (2003), also point out that supplemental plant nutrition is specific, especially from the aspect of the use of potassium fertilizers. If used in major quantities, potassium mineral fertilizers have an unfavorable effect on the quality of raw material for combustion by increasing ash content. *Himken et al*. (1997) state that 21-46% nitrogen, 36-50% phosphorus, 14-30% potassium and 27% magnesium is returned from above ground organs into rhizomes. In the spring assimilative substances from rhizomes return to above ground plant organs, which makes miscanthus plants partially independent from supplemental mineral nutrition (*Christian et al*., 2001). If the leaf mass is not removed from the soil surface, its decomposition and humification increases the natural fertility of the soil, which also has a favorable effect on total mineral salt requirements of plants. When miscanthus is cultivated on less fertile soils and on soils in recultivation system, supplemental nutrition should also be provided in subsequent years. The quantity of fertilizers to use should be determined according to the natural fertility of the soil and plant needs, in order to rationalize production costs (*Kahle et al*., 2001; and *Dzeletovic and Glamoclija*, 2015).

**Planting.** As a sterile triploid interspecies hybrid, miscanthus propagates only vegetatively, by macropropagation (rhizomes) or micropropagation (tissue culture), as stated by *Dzeletovic* (2012). In large scale commercial production, the planting material used are sections of the rhizome approximately 10 cm long and with 2-3 buds. Under our agroecological conditions, manual planting is done in the first half of April, or after the danger of spring frosts passes. Planting earlier in the spring has its advantages, because of the better utilization of the favorable soil water regime for accelerated root formation and plant growth. According to results of research in progress, planting in the autumn (October) has advantages over spring planting, because by the spring rhizomes better adapt to environmental conditions, so that spring plant growth begins earlier. Before extraction, rhizomes are cut in the ground using a rotary digger, and then removed using universal harvesters for root-tuberous plants (*Wilkins and Redstone*, 1996). Rhizomes can be planted manually on small surfaces, or using larger planters for potatoes. Today, there are also specially designed planters for miscanthus rhizomes with which this operation can be done very precisely in relation to the depth of planting and the distribution of plants in a row. Before starting mechanical

planting, it is necessary to classify the rhizomes, remove large rhizome sections that cannot pass through the tube of the planter, as well as sections without 2-3 developed buds. The miscanthus planter is a two-row machine that plants rhizomes into furrows previously created using plows. According to statements in the MAFF (2001) publication, planters have good performance, so that the efficiency of forming plantations is approximately 92%. The planters whose performance was studied by had a box that could carry up to 5 tons of planting material. By engaging only one worker for 1 hour, it is possible without any major difficulties to plant 0.3-0.5 ha, i.e. approximately 4 hectares daily. The efficient performance of planters can be expected to additionally decrease the costs of forming a plantation (*Lewandowski et al*., 2003). Planting depth plays an important role in the subsequent growth of the root system and above ground stalks, as well as plant tolerance to frost (*Glamoclija et al.*, 2015). Planting is optimal if rhizomes are covered by 10-12 cm of soil, although *Christian and Haase*, (2001) conclude that optimal plant growth in the year of planting is achieved by planting the rhizome at a depth of up to 20 cm. After placing rhizomes in the furrows and covering them using harrows, the field should be rolled using smooth or ribbed rollers, especially if the surface layer is dried out. Rolling compacts the surface layer of soil and provides better contact between the rhizome and the soil (*Dzeletovic*, 2012; *Maksimovic*, 2016). When determining planting density, the spreading of plants during the life of the plantation should be taken into account. Optimal density of a plantation is achieved by planting 10,000-12,000 rhizomes per hectare. If rhizome sections smaller than standard dimensions (10-15 cm) are used for planting the number should be increased to 20,000-25,000 to compensate for poorer sprouting (*Heaton et al*., 2010). Studying the effect of planting density (1-4 rhizomes per $m^2$) on the yield of miscanthus biomass, *Lewandowski et al*. (2003) concluded that higher plant density offers an advantage only during the initial years of growth, but not later, when plants form strong clusters. Planting at a distance of 76 cm x 76 cm requires 17,200 rhizomes and this vegetative spacing is optimal for plant spreading and the agricultural mechanization used at the University of Illinois, as stated by *Lee et al*. (2014). It is expected that the initial benefit of high density is reduced as soon as the plant reaches maturity, while the maximum production of dry biomass will be the same regardless of initial planting density (*Clifton-Brown and Lewandowski*, 2002). *Lewandowski et al*. (2003) recommend planting density of 2 rhizomes per $m^2$ as the most appropriate for producing miscanthus as a bioenergy source. Studying the effect of planting density (2 or 3 rhizomes per $m^2$) on the yield of biomass under our agroecological

conditions, *Dzeletovic et al*. (2012) and *Maksimovic* (2016) conclude that planting density is significantly influenced also by soil characteristics. These authors recommend higher planting density on soils rich in organic substances and with a heavier mechanical composition, and less density on lighter, structural soils.

**Plant care and protection.** During the first year, the most important measures of care on plantations are cultivation between rows and hilling in order to keep the area between rows loose and free of weeds, followed by irrigation if soil moisture content is under 70% of maximum water capacity. *Lewandowski et al*. (2003) point out that irrigation of plantations in the year of planting improves initial plant growth, which is confirmed also by results stated by *Glamoclija et al.* (2015) emphasizing that plant watering is an important measure of care, especially in periods of lengthy draught. Simultaneously the plantation can be provided supplemental nitrogen if it is assessed that initial plant growth is slowed down. Seasonal variations of growth of above ground biomass are mainly a result of stress caused by draught. Watering can be done using various mobile irrigation systems. Needs for irrigation mainly depend on climate conditions and soil characteristics and significantly increase the production price, but if miscanthus is cultivated on marginal soils or technogenous media (ash landfills), the plantation should be watered every day during the first year. Weed suppression is one of the biggest problems in the first year, especially if the plantation was formed on soil that was not used for intensive agricultural production (*Lesur*, 2012; *Maksimovic et al*., 2016). In addition to mechanical measures for suppressing weeds, herbicides used in the production of maize and other millet type cereals can be used (*Serafin and Ammon,* 1995). In subsequent years plants exhibit strong spring growth, and cover spaces between rows well, so that weeds can be suppressed by tilling the soil between rows using rotocultivators. In its homeland, East Asia, miscanthus is subject to attacks of pests and pathogenic fungi, therefore when importing planting material, it is necessary to implement all quarantine measures. Pathogenic fungi belonging to the *Fusarium* genus can cause diseases if winters are warm and humid. There are few insects that feed on miscanthus biomass, although aphids (*Leptosphaeria* sp.) are sometimes found on plants. However, to date no significant limitation of miscanthus production caused by pathogens or pests has been noted in Europe (*Lewandowski et al*., 2003). Under our agroecological conditions, miscanthus is tolerant to pests and pathogen so that there is no need to use chemical agents to protect plantations (*Glamoclija et al.*, 2015).

**Miscanthus harvesting** is done using special mowers, but ordinary (roto) or silo-combine harvesters can also be used. Harvesting time depends on how the biomass will be used. Fresh biomass used for obtaining biogas, is mowed in August, while dry stalks for solid biofuel or for other purposes are harvested in the winter, most often in February or March. Moving the time of harvest to the second half of the winter period reduces the yield of above ground biomass, but provides better raw material for biofuel, because all undesirable nutritive substances have been moved to underground plant organs (*Clifton-Brown et al.*, 2002; *Dzeletovic*, 2012;). Although in the first year yields have no major commercial value, stalks should be mowed by the beginning of the next vegetative season. Multiphase harvesting of dry stalks implies mowing, turning over the swath, gathering and bailing, with or without bale compaction. This method permits the crop to dry in swaths, which is faster than the drying of upright stalks (*Lewandowski et al*., 2003). In order to efficiently harvest larger areas, mechanization should be adapted to plant height (2.0-3.5 m) and the hardness of miscanthus stalks. In Western Europe countries specialized mechanization is used to harvest entire stalks and tie them into bundles, if they will be used as construction material, or in the industry of paper and geotextile (*Glamoclija et al.*, 2015).

**Product storage.** To prevent biomass moistening and spoilage, bales left in the field must be covered with protective, impermeable material, but it is better to store under overhangs. For large bales to be stored in a warehouse, stalk water content should be under 25%. Since drying in warehouses is difficult, stalks should be harvested when the water content drops under 18%. Dried bales can be stored up to three years without any change of raw material quality (*Heaton et al*., 2004). Green miscanthus stalks are stored under anaerobic conditions prepared similarly to maize silage. In addition to storage in bulk, miscanthus biomass is also stored as briquettes and pellets (*Jankovic et al.*, 2016). In years with maximum production, up to 100 t $ha^{-1}$ of raw biomass i.e. 10-25 t $ha^{-1}$ can be obtained (by harvesting in August), and under irrigation even over 30 t $ha^{-1}$ of stalks, containing 15-30% of water (*Maksimovic et al*., 2016). After the harvest approximately 3 t $ha^{-1}$ of leaf mass is also left in the field, which can serve as a protective covering for rhizomes against freezing, or can be used as raw material for preparing artificial manure compost (*Djuric et al.*, 2015).

## Economics of miscanthus cultivation

Direct material costs of forming a plantation in the first year amount to 262,100 dinars (Table 3).

**Table 3.** *Analytical calculation for forming a miscanthus plantation*

| Elements | Quantity | Price | Value, rsd |
|---|---|---|---|
| Production costs | | | |
| 1. Material costs | | | |
| - NPK mineral fertilizer | 300 kg $ha^{-1}$ | 35 rsd | 10.500 |
| - rhizomes | 22.000 $ha^{-1}$ | 10 rsd | 220.00 |
| - herbicides (Glyphosate) | 4 l $ha^{-1}$ | 400 rsd | 1.600 |
| 2. Machines | | | |
| - plowing | 10.000 rsd | | 10.500 |
| - soil preparation | 2.000 rsd | | 2.000 |
| - planting | 4.000 rsd | | 4.000 |
| - cultivation between rows | 2.500 rsd | | 2.500 |
| - hilling | 6.000 rsd | | 6.000 |
| - irrigation | 5.000 rsd | | 5.000 |
| **Total costs** | | | **262.100** |

**Source:** *Own research (Djuric and Glamoclija)*

In the first year dry biomass yield can reach 1-1.5 t $ha^{-1}$. This quantity of biomass does not have adequate quality or commercial value, and does not cover production costs. If the crop is adequately cared for, the yield in the second year can be 4-7 t $ha^{-1}$, and under optimal water regime conditions even up to 20 t $ha^{-1}$ (*Bilandzija*, 2014). Depending on soil type, yield realized in the third year, by applying necessary agrotechnical measures, was 1.35-18.6 t $ha^{-1}$, (*Maksimovic, et al*., 2016), although in experiments without irrigation *Dzeletovic et al.* (2015) obtained 20.22 t $ha^{-1}$ of biomass. According to these results it can be pointed out that full biomasse production begins already in the third year.

## Conclusion

Results of own research compared with results of other authors permit following conclusions:

- From the agronomic point of view, miscanthus is an important plant species that can be cultivated using standard agricultural mechanization;
- The possibility of cultivation under different agroecological conditions and on different types of soil offers the potential to better use agricultural resources in general;
- The relatively simple production technology and the possibility to finalize the product within the household enables a higher level of employment for household members, as well as the development of small facilities for producing all types of biofuel;

- Miscanthus enables large agricultural producers to better utilize soil in the system of recultivation and to secure larger quantities of energy raw materials to construct small facilities to produce electricity;
- From the ecological point of view, miscanthus is very important because it can be cultivated in areas with high environmental pollution for the purposes of remediation;
- High initial investments to form plantations should be alleviated via adequate subsidies. This enables better economy of available forest resources and a decreased dependence on overuse of fossil fuels.

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# TOURISM IN FUNCTION OF DEVELOPMENT RURAL AREAS IN THE REPUBLIC OF SERBIA[1]

*Predrag Vuković, Svetlana Roljević Nikolić*[2]

## Abstract

*Rural tourism is rapidly began to develop after World War II, primarily in Western Europe, and then realizing the benefits of practicing, in Eastern Europe and North America. Today, the rural tourism has become a global trend. The character, intensity and dynamics of the development of rural tourism are conditioned by: natural geographical characteristics of the area, anthropogenic heritage, degree of socio - economic development, level of awareness of the local population about the advantages of dealing with rural tourism, etc. Rural areas are today burdened with numerous problems (accelerated aging of the rural population, population migration to urban urban centers, decline in macroeconomic indicators, etc.). Problems are present in all rural areas of Serbia. Bearing in mind that precisely the majority of the territory of Serbia consists of rural areas (85%) and that they have 43.6% of the population (Census 2011), it is justified to address the urgent problems in these orders. Tourism has a synergic character, since it enables the connection of a large number of commercial and non-commercial activities. It allows the creation of a large number of different tourism products and thus leaves positive multiplier effects on the local environment reflected in employment growth, macroeconomic indicators, stopping negative demographic trends, etc. The paper analyzes the impact of rural tourism on rural areas. It points to the scope and dynamics of the current development and points to the trends of future development.*

**Key words:** *tourism, rural areas, development, synergy, economy.*

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[1] Paper work is part of the project III 46006 – "Sustainable agriculture and rural development in function of Republic of Serbia strategic goals achievement within the Danube region", and project 179028 „Rural work market and rural economics of Serbia - diversification of income and decrease of rural poverty" financed by the Ministry of Education and Scence Republic of Serbia, member of researching team, period 2011-2017; 179028- Rural labor market and rural economy of Serbia – Diversification of income and decrease of poverty.

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## Introduction

Today, tourism has become a phenomenon that has entered in all the spheres of economic and social life. Today, there is almost no economy in the world that does not invest and does not expect any effects from investment in tourism.

The revenues generated by individual countries from tourism are such that it is one of the most profitable industries, and in a number of countries it has become a leading industry.

*Annual Report* of the World tourist Organization (UNWTO)[3] World tourist Organization highlights that 2016 proved to be another excellent year for international tourism despite many challenges. International tourist arrivals grew for the seventh consecutive year to reach 1.2 billion, a sequence of uninterrupted growth not recorded since the 1960s.

The strongest growth was recorded in the Africa and Asia and the Pacific regions. International tourist arrivals reached 1,235 million in 2016. 2016 saw growth in international arrivals of some 46 million, or 4% over 2015.

Tourism has grown above average, at around 4% per year, for seven straight years. 300 million more people travelled internationally for tourism between 2008 and2016. Growth in advanced economy destinations (+5%) exceeded that of emerging economies (+2%) in 2016. Rural tourism nowadays is global trend.

European Federation of Rural Tourism (EUROGITES)[4] is formed by 34 professional and trade organizations from 27 countries[5] of geographical Europe. It represents a tourism sector with an estimate of 500.000 micro-enterprises and about 5 - 6,5 million bed places.

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[3] UNWTO (2016): Annual report, tourism in numbers, Madrid, web.link: http://cf.cdn.unwto.org/sites/all/files/pdf/annual_report_2016_web_0.pdf (accessed 20th December 2017 )

[4] file:///C:/Users/Predrag_v/Downloads/EuroGites%20short%2020170103_EN.pdf (accessed 20th December 2017)

[5] Member countries of EU are by 01/2017: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, United Kingdom Non-EU members: Bosnia-Herzegovina, Georgia, Iceland, Norway, Russian Federation, Serbia, Switzerland.

The product goes from the rural Bed & Breakfast and self-catering in private homes or farms, up to small family-run rural hotels or guesthouses, and related restaurant or activity tourism services. As a whole, this sector stands for about 15% of the European tourism capacity. The Republic of Serbia is a member of this organization.

## Brief overview on state of rural areas in the Republic of Serbia

Rural areas[6] cover 85% of the territory of Serbia with 55% of the population creating over 40% of the DP of Serbia (Table 1.). The population density in rural areas is 63 inhabitants per $km^2$ and below the national average by one-third.

The population is relatively stable; in the period 1991 – 2002 it dropped by 2.5% below the national average. Considerable change has occurred when compared with historic trends in the rural population and labour force of Serbia from the 1990s (Bogdanov, N. 2007, p. 61.):

- Migration from villages to cities which, in the second half of the $20^{th}$ century, brought about the drop in rural population and demographic drain in villages of certain regions, was stopped or considerably slowed down;
- Reversible migrations from villages to cities which is characteristic of transitional states, were reported in Serbia as well. These processes are explained by deep economic crisis and the closing down of large industrial complexes. This lead to principal growth in rural population being recorded in suburban and rural areas surrounding larger industrial centres. In addition, a large number of refugees and internally displaced persons from the territory of former Yugoslavia in 1990s also settled in rural areas.

Among the many factors explaining these demographic changes, the primary one certainly relates to workplaces closures and reduced opportunities for employment in cities. Restitution of land in the course of transition in Serbia did not greatly affect the return of population to rural areas, as was the case in other Euro-Asian transitional states (Macours, K. 2005).

[6] As defined by the OECD definition of rurality

**Table 1.** *Main characteristic of rural areas in the Republic of Serbia*

| | Serbia | Total urban | Total rural |
|---|---|---|---|
| **1. Geographical characteristics** | | | |
| Area, km$^2$, 2004 | 77 508 | 11 556 | 65 952 |
| Number of settlements, 2004 | 4 715 | 811 | 3 904 |
| **2. Population and human development indicators** | | | |
| Population (Census 2002) | 7 498 001 | 3 336 341 | 4 161 660 |
| % Change in population2002/1991 | 98.96 | 102.42 | 96.35 |
| Density | 97 | 289 | 63.10 |
| In or out migration rate | 1.48 | 3.63 | - 0.14 |
| *Age structure (%)* | | | |
| Under 15 years of age | 15.69 | 15.10 | 16.17 |
| Over 65 years of age | 16.54 | 15.36 | 17.49 |
| *Aging rate* | 1.05 | 1.02 | 1.08 |
| *Educational structure of population over 15 years of age (%):* | 100 | 100 | 100 |
| Incomplete education | 21.84 | 14.01 | 28.19 |
| Primary education | 23.88 | 20.41 | 26.69 |
| Secondary education | 41.07 | 47.21 | 36.09 |
| Higher and high education | 11.03 | 16.05 | 6.95 |
| Unknown | 2.18 | 2.32 | 2.07 |
| **3. Employment** | | | |
| *Employment by sectors (%)*: | 100 | 100 | 100 |
| Primary sector | 23.36 | 11.25 | 32.98 |
| Secondary sector | 30.08 | 29.32 | 30.69 |
| Tertiary sector (including public sector) | 43.76 | 56.74 | 33.44 |
| Unknown | 2.80 | 2.69 | 2.89 |
| *Total economically active population* | 3 398 227 | 1 527 319 | 1 870 908 |
| *% Of the unemployed, total* | 22.22 | 23.33 | 21.32 |
| Total of economically active women | 1 474 242 | 697 866 | 776 376 |
| % Unemployed women, total | 24.22 | 25.08 | 23.44 |
| Rate of activity | 53.76 | 53.95 | 53.61 |
| Rate of employment | 41.81 | 41.36 | 42.18 |
| **4. DP (for 2004)** | | | |
| DP (mill. EURO) | 14 102 | 8 334 | 5 768 |
| % Primary sector in DP | 19.33 | 10.23 | 32.48 |
| % Secondary sector | 39.48 | 38.34 | 41.12 |
| % Tertiary sector | 40.79 | 50.99 | 26.06 |
| % Public sector | 0.40 | 0.44 | 0.34 |
| % Agriculture, hunting, forestry, water manag. | 16.33 | 7.01 | 29.81 |
| DP per capita Serbia = 100% | 100.00 | 132.82 | 73.69 |

**Source:** *Bogdanov, N. (2007): "Small rural households in Serbia and Rural Non-Farm Economy", UN DP, Republic of Serbia, Ministry of Agriculture, Forestry and Water Management, p. 62.*

In the document "The Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024" (Official Gazette of the Republic of Serbia, No. 85/2014) it is stated that the structure of the employment of the rural population by sector has been dynamically changed over the last years. Employment in agriculture remains the largest in comparison with other sectors. In the period 2004-2012, it ranged between 43 and 50%, which is very high compared to other European countries. Only one in four or five inhabitants of rural settlements is in the industry, and all of them are less. On the other hand, the rural population is increasingly employed in the tertiary sector, which can be interpreted in two ways: on the one hand, by increasing the stability of jobs in the activities of this sector, and on the other hand by increasing the number of employees in the public administration, education, public utilities and social services sectors.

The income of rural households in most share (35-42%) comes from income of employment (regular and supplementary), immediately followed by the share of pensions that are very high and rising (about 30% in 2012). Agricultural income varies between 6-9% of the total available household income, which is highly defined by agricultural yields in some years. At the same time, the value of natural consumption, which is largely attributed to the consumption of food produced on agricultural holdings, is stable at the level of 12-14%. In any case, the income derived from agriculture is relatively low compared to wages from other sectors and social benefits, which is a clear indicator of low productivity of the sector.

Beside women, rural youth are also facing with high risks of exclusion from the labor market. Young people aged 15-24 years in only 21% of cases are employed in non-agricultural sectors. Although in this age group even half of them are inactive, what points to difficulties in accessing jobs is the significantly higher participation of the unemployed, which in this category, as well as the next age categories (25-34 years), is only 15.5%.

## Fazes of development rural tourism in the Republic of Serbia

Rural areas with the preserved nature and tradition of different rural areas have always attracted people to stay and vocation. More recently, the interest of people for vocation in rural areas has increased, primarily due to problems which are present in urban centers such as environmental pollution, increasing alienation from the natural environment, uniformity and

standardization offered by modern lifestyles in urban urban areas, etc. A certain number of authors (Lane 1994, Runte, 1990, Feifer, 1985) cite the 19th century as a historical time point since it has begun developing rural tourism. Their need to specifying time point is primarily motivated by the number of tourists who from that time begun to visited rural areas. However, such a precise timeframe in terms of determining the start point of rural tourism development should not be taken "strictly", especially, because people has gone for vocation and recreation in rural areas much earlier. Regarding this is witnessed by many facilities that were built and used for the purpose of their vocation, and are present in huge numbers there today. These are objects, such as summer houses, villas and objects for similar intentions. The countries that leading by the number of such facilities are United Kingdom, Germany, Switzerland, Austria, France, Russia, etc. (Vuković at al. 2010). In Republic of Serbia rising interest for rural tourism vocation has begun to record since the seventies of the twentieth century.

Zodorov, A. V., (2009) state that rural tourism developed in most countries on the same way. He divided development of rural tourism in phases. If we accept his classification we can conclude that in the Republic of Serbia, rural tourism has developed on a same way with all characteristic and phases as it has in all other countries. First phase of development rural tourism can be named *independent establishing*. Monitoring of process of development rural tourism can show that rural tourism in the Republic of Serbia has started to develop since seventies of twentieth century. The villages that so called “pioneers” were Sirogojno, Seča Reka and Devići. Leading tourist agencies from that time such as "Yugoturs" and "Putnik" were involved in the business of bringing foreign tourists to rural areas. Thus, according to the 1992 Serbian Tourist Association, in the Knić municipality there were about 35,000 foreign tourists from 21 countries. The largest number of tourists was recorded from Great Britain, Germany, Russia and Italy. (Todorivić, M. & Bjelac, Ž., 2009; Milojević, Lj., 2004, etc.) Municipalities in which rural tourism developed successfully until 2000 were Brus, Valjevo, Gornji Milanovac, Ivanjica, Knić, Kosjerić, Kraljevo, Lučani, Mionica, Požega, Prijepolje, Rača Kragujevac, Sokobanja, Užice, Čajetina, Čačak and Šabac. Indicators of the development of rural tourism are illustrated in Table 2.

**Table 2.** *Indicators in the development of rural tourism in Serbia in the period 1990 - 2000 according to the data of the Tourist Organization of Serbia (TOS)*

| Year | 1990 | 2000 |
|---|---|---|
| Nomber of villages | 50 | 41 |
| Nomber of Households | 800 | 170 |
| Nomber of beds | 3 000 | 800 |

**Source:** *Milojević, Lj., (2004): „Rural Tourism in Serbia", p.30, UNWTO: „Rural Tourism in Europe: Experiences, Development and Perspectives", p. 27 -31, Proceeding from Seminars, Belgrade (Serbia and Montenegro, 24-25 June 2002), Kielce (Poland, 06-07 June 2003), Yaremcha (Ukraine, 25-26 Sept. 2003) published by UNWTO 2004. Web link: http://www.idestur.org.br/download/20120219145557.pdf (access 14.01.2017.)*

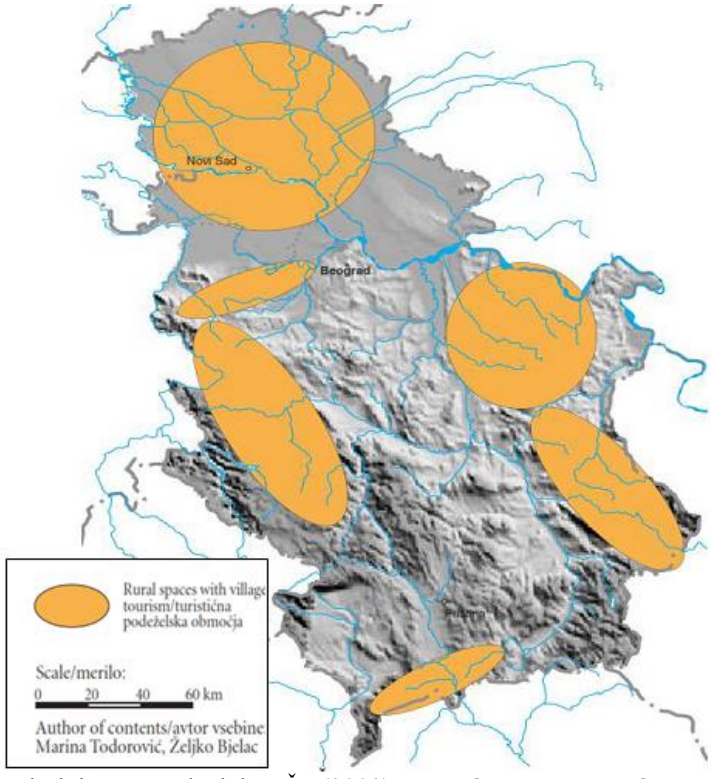
Milojević, Lj., (2004) state that characteristic of the first phase are:

- Strength: preserved and numerous natural resources, rich cultural and historical heritage, the number and diligence of rural settlements, the richness of local traditions, traditional hospitality, diversification of the tourist product.
- Disadvantages: inadequate rural infrastructure, "archaic" tourism product, underdeveloped information system, unsatisfactory level of quality of mixing and other services, lack of training programs for farmers to provide adequate quality of services, lack of experience, lack of motivation, undeveloped awareness in rural areas economic and other benefits of rural tourism development.

Second phase of development rural tourism *dedicated development* started 2006. Reason for this precise time defining phase, become for fact that the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia made decision to allocate in a total of 91 580 215 dinars for development of rural tourism in period from 2006 to 2008 and diversification of economic activities in the countryside ("*Analysis of budget support to the development of rural tourism in Serbia and diversification economic activities in the countryside* ", 2009, p.2). In 2008 there were 173 users of these funds (141 registered agricultural producers, 23 associations of citizens, 7 legal entities and 2 agricultural cooperatives). The largest amount of funds was distributed to the region of Western Serbia and AP Vojvodina, while most districts were distributed in Zlatibor district, and the least in the North Bačka District. The analysis of the types of investments indicates that as much as 91% of the funds allocated were directed to the restoration of traditional rural farms (adaptation, upgrading and renovation of buildings, procurement of

equipment, etc.), while 9% were allocated for promotional and educational activities. The number of villages and municipalities involved in rural tourism increased in 2009 (41 municipalities, 119 villages with 164 households with 570 rooms and 1 628 beds). The main weaknesses in the development of rural tourism by 2009 are the non-organization and the lack of networking between promoters of the tourist offer. (Štetić and Todorović, 2009, p.86.) The map of the areas where rural tourism was successfully developed till the 2009 is illustrated in Figure 1, and is based on data presented by the Tourist Organization of Serbia at the "Tourism Fair" at the same year. After that period rural tourism has been starting to develop rapidly. Nowadays in Serbia process of developing rural tourism spread to all territory. In almost all rural areas can be fined farms or some other forms of rural tourism accommodation which implement some type of rural tourism.

**Figure 1.** *Areas of the Republic of Serbia with developed rural tourism in 2009*

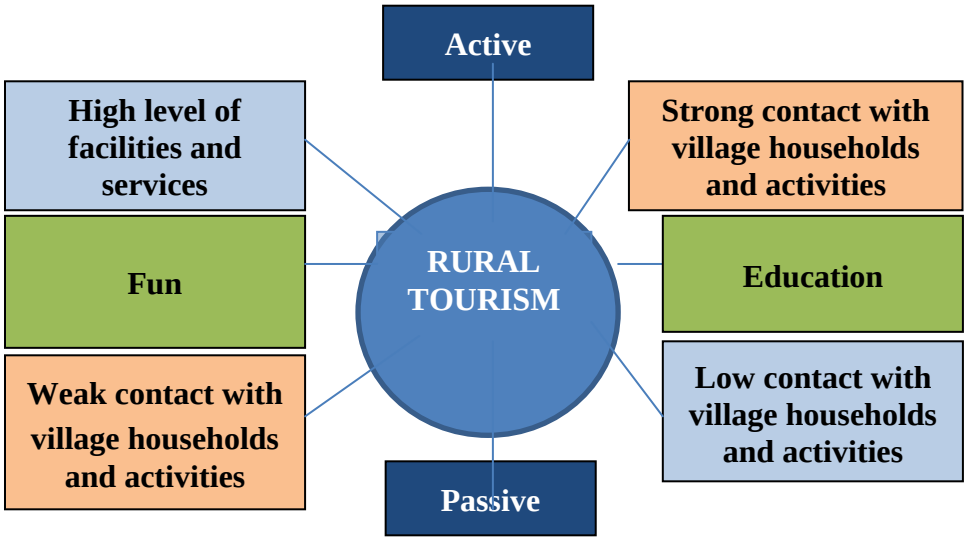



**Source:** Todorivić, M., and Bjelac, Ž., (2009): „*Rural tourism in Serbia as a Concept of Development in Undeveloped Regions*“, p.455. Acta Geographica Slovenica, 49-2. (2009), p.453-473. **Notice:** *Map is based on database of rural tourist destination made and presented by Tourist organization of Serbia on Belgrade tourism fair 2009.*

**Accommodation facilities or rural tourism in Serbia**

The level of exposure, contact, merging of tourists with a rural household and its participation in that household may vary from a high degree of fusion with a high level of contact within the rural household and related activities, to a low level of involvement in the same. The level of rural service can vary from very limited service to highly specialized and customized services. Therefore, rural tourism can be understood in terms of the balance between types of activities and types of accommodation. Rural tourism exists within the framework of these different definitions, whereby it changes and adapts.[7]

**Figure 2.** *Balance of types of activities and types of accommodation in rural tourism*




**Source:** *Master plan of sustainable development of rural tourism in Serbia (2011), UNDP, p. 13.*

Official evidence about rural tourism accommodation by type and number in the Republic of Serbia does not exist. This evidence does not exist in the Ministry of tourism, also in Tourist Organization of Serbia nor in the Serbian Chamber of Commerce and Business. Current list of accommodation facilities are incomplete and do not update regularly. For this reason management and monitoring of rural tourism development in

[7] Master plan of sustainable development of rural tourism in Serbia (2011), UNDP, p. 13.

Serbia has obstacles. Anyway it can be said that some of Internet web suites do monitoring partially. However, this is not official data. This kind of data represents only results of promotion of some local tourist organization which present their rural tourism facilities. In other words, this data represent rural tourism accommodation facilities of local regions.
One of database which summarizes most of accommodation facilities represents results on Internet web presentation www.selo.rs . This data base update periodically. Owner of this data is National association Agro tourism of Serbia. The association was established 2002 by nine local tourist associations. Nowadays association counts more than 500 members.

Promotion of tourist farms and its accommodation facilities is totally free. This association is member in European federation of rural tourism development (EUROGITES). Table 3. shows type of accommodation facilities in the Repuplic of Serbia which are presented on this Internet presentation.

**Table 3.** *Rural tourism accommodation facilities in the Republic of Serbia presented by National Association of rural tourism of Serbia.*

| **Type of accommodation facilities** | **Number** |
|---|---|
| Apartment | 106 |
| Rural household | 91 |
| Guest house | 45 |
| Wooden House | 31 |
| Cottage | 27 |
| Villa | 20 |
| Rooms | 17 |
| Ethno Complex | 10 |
| Tourist Complex | 8 |

**Source:** *National Association of rural tourism of Serbia, www.selo.rs (accessed 21.12.2017)*

However, it can be highlight that some of types of accommodation facilities which are presented on this web presentation are not in correlate with types of rural tourism accommodation prescribed by actual "Rules on conditions and manner of performing hospitality …" (Official gazette of the Republic of Serbia no. 48/2012, and 58/2016).

Đurović, D., i Cvejić, S., (2011)[8] argue weakness of accommodation facilities of rural tourism in Serbia:

- Underdeveloped accommodation capacities and present unsatisfactory level of quality of existing ones;
- Insufficient utilization of existing accommodation capacities;
- Incomplete offer of basic tourist services;
- Small scale economy and low prices;
- Under development of additional services;
- Small investment capacity of households and slow development trend.

Štetić, S. i Todorović, M. (2009)[9] highlight problems on which are burden future development of rural tourism in the Republic of Serbia:

- Insufficient education of rural households concerned about the way of accepting and hosting visitors / tourists;
- Insufficient number of tourist points in the villages who are engaged in this type of tourism and poor connections with municipal, regional and national tourism organization (TOS);
- Insufficient and inadequate social and road infrastructure.

## Influence of rural tourism on process of development rural areas in Serbia

The problem of rural development is present in a large number of countries. Rural areas today are characterized by negative trends in population migration to urban centers, depopulation, aging of the rural population, reduction of macro-economic indicators, etc. The aim is to find solutions in order to stop these negative trends and launch them in the opposite direction. The best results in stopping negative trends have been provided by mechanisms that coordinate the development of agriculture with other economic activities on the principles of sustainable development. Tourism combines with its synergistic character a large number of economic activities aimed at satisfying tourists and with its positive multiplied effects, affects the development of the economy of rural areas.

[8] Đurović, D., and Cvejić, S. (2011): "Rural tourism as a factor in rural development", p. 5-6. SeCons - Group Infectious Initiative, Sustainable Tourism in Function of Rural Development, Joint UN Program in Serbia,web link: http://zir.rs/wp-content/uploads/2015/12/Ruralni-turizam-kao-cinilac-ruralnog-razvoja.pdf

[9] Štetić, S. and Todorovic, M. (2009): "Rural tourism", University of Belgrade, Faculty of Geography, p. 88.

The last four decades intention of the tourism market is to develop all types of tourism perspective in order to maximize the effects of development and strengthen competitiveness. Rural tourism is developing rapidly in Europe, North America, and Australia. Countries that have opted for the development of rural tourism have quickly felt the positive effects, in terms of solving numerous problems of rural areas (economic, social, cultural, etc.).

The reason for such an attitude stems from the fact that rural areas account for more than 80% of the territory and that according to the results of the 2011 census, 44% of the total population live in these areas. Serbia has good natural and social conditions that can be used for the development of rural tourism.

Natural conditions characterized a large geographical diversity of terrain, from the Pannonian flat land located in the north part, highland/hilly areas, which dominates the central part and a very mountainous region that characterized South Serbia region.

Social attractiveness is characterized by a large number of rural settlements with different planning urban organization, numerous cultural and historical monuments, multi-ethnicity that can favor the development of various cultural and artistic content, as well as the richness of traditional gastronomic offer.

One of the characteristics that also can bring benefits to development of rural tourism is relatively good ecological preservation of local environment, which is characteristic for the entire territory of the Republic, with a large number of protected areas (national parks, nature parks, special nature reserves, etc.).

All this resources can give contribution for planning different tourist product. Not only based on different kind of events that can promote local way of life but also different non passion activities that can be implement in rural areas.

In literature there are many classifications of activities that can be implementing in rural areas. One of the most famous is presented in table 4.

**Table 4.** *Additional services that tourist can implement in rural tourist destinations*

| No. | Type of activity | Classification |
|---|---|---|
| 1. | Touring | - Hiking (footpaths, fitness trails, nature parks etc),<br>- Horse-riding,<br>- Motoriyed touring,<br>- Small town/village touring,<br>- Adventure holidazs/wilderness holidazs,<br>- Cycling,<br>- *Cross-country* skiing,<br>- Donkey riding,<br>- Touring in gypsy caravans, wagons. |
| 2. | Water-related activities | - Fishing,<br>- Swimming,<br>- River/canal tourism (houseboats, narrow boats, barges),<br>- Canoeing, kayaking and (whitewater) rafting,<br>- Windsurfing,<br>- Speedboat racing,<br>- Sailing,<br>- Facilities of the ”aqualand” type |
| 3. | Aerial activities | - Kite air sailing,<br>- Light aircraft,<br>- Hang-gliding and micro-light aircraft,<br>- Hot air balloons,<br>- Paragliding |
| 4. | Sporting activities | a) sports requiring rural natural settings:<br>photo safari, free climbing, orienteering, etc.<br>b) Sports requiring modified/constructed settings:<br>tennis, golf, low-intensity downhill skiing, hunting, etc. |
| 5. | Cultural activities | - Archaeology,<br>- Restoration sites,<br>- Rural heritage studies,<br>- Museums,<br>- Local industrial, agricultural or craft enterprises, |

| | | |
|---|---|---|
| | | - Courses in crafts,<br>- Artistic expression workshops,<br>- Folk groups,<br>- Cultural, gastronomic and other routes. |
| 6. | Health-related activities | - Fitness training,<br>- Spa and wellness *resorts*,<br>- Health programs etc. |
| 7. | Passive activities | - Relaxation holidays in rural milieu,<br>- Nature study in outdoor settings, including bird watching,<br>photography,<br>- Landscape appreciation. |
| 8. | Hallmark activities | - Rural festivals,<br>- Agricultural fairs,<br>- Different types of rural events. |
| 9. | Business – related activities | - Meetings;<br>- Small-scale conventions/conferences,<br>- Incentive tourism short-breaks. |

**Source:** *Roberts L. and Hall D., (2003): "Rural Tourism and Recreation: principles to practice", Leisure and Tourism Management Department, The Scottish Agriculture College, Auchincruive, Ayr, UK, CABI Publishing, p. 2.*

The growth of the attractiveness of rural environments as attractive places for the lives of young families is closely linked to the improvement of physical infrastructure, better accessibility of social services, improvement of the social structure and support to the development of entrepreneurship. Disregarding the specific needs of the village and its inhabitants, the lack of systematic and better coordinated activities of various actors, poses a serious threat to the further development of the developmental gap in relation to the city. The accessibility of IPARD funds, the strengthening of social capital and market connections, will strengthen rural environments and contribute to their sustainable development in the future. The great development chances of both agriculture and rural communities lay in the creation of an efficient system of knowledge transfer, technologies and information, as well as innovative ways of using the potentials of cultural heritage and biodiversity.[10]

[10] "The Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024" (Official Gazette of the Republic of Serbia, No. 85/2014)

Analyzing of current situation in rural tourism in the Republic of Serbia was made in few documents (Master plan of sustainable development of rural tourism in Serbia 2011, Strategy of development tourism 2006 and Strategy of development tourism 2016, IPARD II program for the period 2014-2020 etc.). All this documents showed that rural tourism већ доприноси руралној економији и има велики потенцијал за даљи развој. У АП Војводини, западној и централној Србији постоје добри примиери као и значајна искуства у руралаком туризму.

It is estimated that there are more than 32,000 beds (registered and unregistered) available for use for tourism purposes in rural households. It is also estimated that a total of $ 10 billion of revenue comes from rural tourism (5 billion of accommodation services and 5 billion of direct revenues). This represents 16% of the 62 billion RSD of total direct tourism GDP, according to the 2010 World Tourism Organization. It is estimated that overnight stays in rural tourism account for 27% of the total number of overnight stays in Serbia. Therefore, rural tourism already plays an important role in the tourism of the Republic of Serbia.

The document „IPARD II program for the period 2014-2020“ takes the view that the „Strategy of tourism development” takes into account the potential of rural tourism development in the Republic of Serbia, but not as a priority product. Thus, rural tourism in the production portfolio is placed at the bottom of the list of priorities in terms of activity and competitiveness.

However, there are other products that are closely related to rural tourism such as mountains, lakes, spas and wells, sightseeing tours, attractions in the field of special interests and nautics. This assessment of the „IPARD II program for the period 2014-2020“ is given primarily in the document "Strategy of development tourism in Serbia", which was adopted in 2006 (Official Gazette of the Republic of Serbia, No. 91/06).

Also, the same document defines four clusters that are not based on the administrative and local regional boundaries that currently exist within the country, but above all on rational repositories and different forms of economics of experience. These four tourist clusters covering the entire territory of Serbia are: AP Vojvodina, Belgrade, Southeastern Serbia and southwestern Serbia (table 5).

**Table 5.** *Territorial division of clusters in Serbia and prioritization by segment products in tourist clusters according to Strategy for development tourism until 2015.*

| Rural tourism | Tourism clusters | | | |
|---|---|---|---|---|
| | **Belgrade** | **AP Vojvodina** | **Southwestern Serbia** | **Southeastern Serbia** |
| **Rural experience** | ● | ●●● | ●●● | ●●● |
| **I. Activities in nature** | | | | |
| a) Hunting | – | – | – | – |
| b) Fishing | ● | ●●● | ●● | – |
| c) Bicycling | ● | ●●● | ● | ● |
| d) Horse riding | ● | ●●● | ●● | ●● |
| e) Walking in nature | ● | ●● | ●●● | ●●● |
| f) Bird watching – photo safari | ● | ● | ● | ● |
| e) Other | – | ● | ●●● | – |
| **II. Activities related to culture** | | | | |
| a) Cultural Heritage Tours | – | ●●● | ●●● | ●●● |
| b) Religious Heritage Tours | – | ●●● | ●●● | ●● |
| c) Food tourism | ●●● | ●●● | ●●● | ●●● |
| d) Other | – | ●●● | ●●● | – |
| **High priority ●●● Medium priority ●● Low priority ●** | | | | |

**Source:** *Strategy for development tourism in the Republic of Serbia* (2007), Second phase report, p.91. Horwath Consulting Zagrab and Faculty of Economy, University of Belgrade.

The "Master Plan for Sustainable Rural Tourism Development in Serbia" (2011) also insists on a territorial approach. Clusters were developed by

enumerating the factors and attractors present on certain terriers, and then their gurpis according to the already developed master plans for tourism development for certain areas or municipalities. This document suggests the development of 12 clusters of rural tourism (CRT) of Serbia, which represent the potential for tourism development in certain geographical areas (destinations), presented in table 6.

**Table 6.** *Rural tourism clusters developed by territorial approach presented in the Master plan for sustainable rural tourism development in Serbia 2011.*

| **STRATEGY FOR DEVELOPMENT RURAL TOURISM CLUSTERS** | |
|---|---|
| **Group CRT 1: Central and Western Serbia** | CRT 1. Golija |
| | CRT 2. Zlatibor, Zlatar |
| | CRT 3. Kopaonik |
| | CRT 4. Central Serbia |
| **Group CRT 2: South Banat and Low Danube Region** | CRT 5. Low Danube Region |
| | CRT 6. South Banat |
| **Group CRT 3: Eastern Serbia** | CRT 7. Sokobanja |
| | CRT 8. East Serbia |
| | CRT 9. South-east Serbia |
| **Group CRT 4: AP Vojvodina** | CRT 10. Fruška Gora |
| | CRT 11. Upper Danube Region |
| | CRT 12. North Vojvodina |

**Source:** *„Master plan of sustainable development of rural tourism in (2011)“, UNDP, p. 87-88.*

Territorial approach to the development of the CRT shows that Serbia has a large number of resources suitable for the development of rural tourism. What is specifically pointed out in the Master Plan ... is that despite the high concentration of factors and attractors in certain areas, there is a lack of centers for the development of appropriate rural tourism activities.

On the basis of a list of factors and attractors on the entire territory of Serbia, a total of 12 clusters of rural tourism have been identified, which should be developed as priority areas. As in the "Tourism Development Strategy", this document also has a territorial approach. In the “Master Plan ...” clusters are grouped into four spatial-geographic units: 1) Central and Western Serbia, 2) Southern Banat and Low Danube Region, 3)

Eastern Serbia, and 4) AP Vojvodina. It is noticeable that the division is not complementary to the division that was made in the "Strategy ..." as a basic document for the development of tourism in Serbia, which implies no agreement with official Law on Tourism.

The same document showed data which presented fact that rural tourism represent almost a third year number of overnight staying in Serbia, i.e. it already makes an important factor in generating income from tourism at the level of the Republic of Serbia. It is stated that "general tourist nights used for rural tourism" include accommodation in rural areas that can be used by tourists visiting rural areas, but does not indicate the number of overnight stays in "rural households", although the figure is that the village has 10 000 bearings.

Particularly pointed out the problem of the quality of the accommodation offer, and it is envisaged that by 2020 Serbia has around 68 000 places in rural areas, which represents a very ambitious goal, if the development is not accompanied by appropriate marketing activities. Authors of the Master plan (p. 12) highlighted that by combining the three main strategies (for rural activities, for activity centers and for rural accommodation), the formation of an integral strategy of a tourist experience is suggested. This is a good basis for the harmonization of all the elements that are included in the tourist offer and raising its quality. Tourists usually form a unique opinion about the destination they stay in, which can be positive or negative. If the strategies are harmonized, the greater the likelihood is to create a sense of overall satisfaction of tourists by staying in destinations, because the impression of staying in a destination is usually formed as positive or negative.

This attitude on the division of the cluster and the products of rural tourism was abandoned in the new "Strategy for development tourism in Serbia for the period 2016-2025." Namely, it is envisaged to develop certain tourist destinations and within them maximize the utilization of appropriate tourism resources (factors and attractors). Although explicitly rural tourism is not indicated, the principles on which the future development of tourism in Serbia should be based implicitly suggest the possibility of rural tourism development[11]:

[11] Adopted by original text of Strategy of tourism for the period 2016-2025 (pp. 21-22)

1) "*An intense vacation* - most tourists expect to be guaranteed a profitable and completely contented holiday time. These tourists enjoy sharing their vacation experiences and are guided by the idea of "effort to rest", combining visits with more events, celebrations and active holidays, which in particular include an additional benefit when returning home with new skills ... " (Rural tourism provides a large number of opportunities for tourists to spend an intensive vacation in rural areas such as active participation in the normal everyday farm activities on which they spend their vocation, to various agricultural and non-agricultural activities that can be performed outside of the household. It expect that this way of thinking will be – note P.V.)
2) *Try something new* - in the last few years, research shows that many tourists are planning to explore new destinations; more than a third (35%) think they will go on vacation to destinations where they have never been before. Tourists who like to trap hard and reliable destinations also intend to try something new and almost half (48%) will very likely or almost certainly visit other destination. (Rural tourism offers great opportunities for various types of boarding and out-of-boarding house activities related to staying in farms, or in rural areas. In this way, there are opportunities for creating different tourist experiences, which are in line with this paragraph in the Strategy - note P.V.)
3) *To live as locals* - it became a manners that "dipped under the skin" for many tourists. They are looking for more authentic experiences on vacation and many companies now offer tourists the opportunity to enjoy hidden gems alongside traditional tourist attractions. Blogs and social networks are an interesting way to travel to discover hidden hot spots for experiencing stronger authentic experiences;
4) *increase of visits to the most important segments of the mobile* (museums, libraries, archives, galleries), *immovable* (archaeological sites, urban core, protected spatial cultural and historical units, monuments of folk architecture, fortification, battlefields, battlefields) and *immaterial* (visit of event such as: “day of saint Đurđevdan”; museum in the open field, "Staro selo in Sirogojno village" on Zlatibor mountain etc.) *cultural heritage*;
5) *Increase of group visits to significant celebrations and events* - Observed in 2014 and 2015, the number of (19%) group and family visits to significant institutions and cultural monuments, military memorials and places of suffering, as well as areas of

significant events, increased. Groups of tourists are increasingly choosing places of celebration of significant events from world wars, areas of significant battles, areas known for traditional weddings, harvesting and harvesting, departures with families to places that restore memories to attractive places from childhood and youth; (Just rural areas abound in places where happen different events. Almost every rural area in Serbia has its own recognizable manifestation- note P.V.);

6) *Fitness and sports* - according to a survey by the Association of British Travel Agencies (ABTA) (UK), 6% of people plan a sports holiday in 2015, and 5% leave for adventurous or other challenging recreational facilities, also 4% of people plan to travel to abroad to attend major sporting events. This trend that contains fitness and other sports activities and events will have a significant increase among middle-aged people; (Table 4 provides, among other things, a wide spectrum of various sports activities that can be used in rural areas. Some of them require the construction of appropriate tourism and sports infrastructure, thus improving the quality of life in rural areas - note P. V.);
7) *Wellness vocation* - wellness and spa vocation also have a trend of growth that continues in 2015 ... they are especially popular for business people who are looking for full recovery on vacation. Wellness programs are popular with individual travelers. At a price are destinations with natural beauties regardless of the distance ...; (Bearing in mind that a large number of spas in Serbia do not have adequate accommodation capacities, there is a possibility for tourists to use the accommodation capacities of rural tourism and to use spa health resorts, which would contribute to both, the development of spa and rural tourism – note P.V.);
8) *Food tourism* is a new trend of modern tourism. Food tourism is a growing phenomenon, as more than one-third of its consumption goes to food, according to a report from the World Tourism Organization (UNWTO). According to EUROSTAT data, 22% of Europeans say that the main reason for going to vacation is the possibility of consuming quality food.... Food prepared in a traditional manner, of healthy origin is an important factor in terms of quality of rest. One of the most commonly used definitions of gastronomic tourism: gastronomic tourism "is a journey into the region rich in gastronomic resources, which can generate relaxing experiences or entertainment, including visits to primary or secondary producers of gastronomic products,

gastronomic festivals, fairs, events demonstrating food preparation and tasting or any food-related activity "; (Territory of the Republic of Serbia characterized great geographical diversity, also rich anthropogenic heritage, multi-ethnicity, different agricultural products based on natural condition for agricultural production, etc. All this factors contribute to the rich and long culinary tradition. Every region can boast some characteristic food culinary products that have its own characteristic. Combination of traditional rural tourist supply with possibility to choose food prepared on organic and traditional way, can contribute to special tourist experience. Food tourism contributes directly and indirectly for development of agriculture, and also to development of rural areas. - note P.V.).

## Conclusion

Rural areas in Serbia make up 85% of its territory and are inhabited by about 44% of the total population. Rural areas are characterized by great geographical diversity, different levels of economic development, multiethnic, rich cultural - historical (anthropogenic) heritage and economy that relies heavily on primary agricultural production.

Rural areas have been devastated for decades in economic, social, cultural and political terms. This led to negative trends reflected in the migration of residents from rural to urban urban centers, the process of accelerated aging of the population, the decline in macroeconomic indicators, etc. This is not only characteristic for the Republic of Serbia, but it is characteristic for a number of other countries in Western Europe, North America, Russia, etc. The tendency is to find mechanisms to eliminate these negative trends and launch them in the opposite direction. The best results in stopping negative trends have been provided by mechanisms that coordinate the development of agriculture with other economic activities on the principles of sustainable development.

In strategic documents and official statements, the Serbian Government emphasizes the importance of tourism as an economic branch, which with its synergistic effect can positively influence the development of related activities. The expectations are that tourism could help solve a large number of problems that burden the Serbian economy (unemployment, foreign trade deficit, GDP and GDP growth, etc.), and especially the development of rural areas covering most of the territory of Serbia and

where a large part of the population lives of the population. The process of diversification of tourism products, which today is immanent to the tourism market, is favorable for the development of tourism in Serbia, given the limited conditions for the development of massive forms of tourism, that is, a small number of winter ski centers and the lack of natural-geographical outflow of the territory to the sea coast. As one of the products for which there are resuscitative possibilities for intensive development represents rural tourism.

The concept of rural tourism is very wide and does not include only a classic holiday in the countryside, but also a large number of extra-boarding activities that complement the stay of tourists in rural areas. It is precisely this character which can contribute to the development of not only the tourist infrastructure, but also the integration of rural areas, assistance in the employment of a large number of working-age population, and the end of the migration process. In order to achieve greater effects it is necessary that the marketing and management of tourist destinations become significant in practical implementation at all levels from local, regional to national. In this way, the development of rural areas would be planned and strategically guided, and the effects could be expected in the medium and long term.

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# QUANTITATIVE ANALYSIS OF THE DEVELOPMENT ENVIRONMENT OF AGRICULTURE IN THE EU FROM THE ASPECT OF SUSTAINABLE DEVELOPMENT*

*Radojica Sarić, Biljana Grujić*[1]

## Abstract

*An agricultural development environment is comprised of a number of complex factors interacting in space and time. Those are economic, social and ecological factors that define certain conditions for agriculture development from the aspect of sustainable development, and they do so through their simultaneous effect. These factors are made up of different variables, i.e. determinants, the effects of which cannot always be predicted with reliability, yet they can significantly influence the (un)sustainability of a development environment of agriculture. This paper analyses the development environment of agriculture in the EU from the aspect of sustainable development, using the quantitative statistical method called factor method. Quantitative analysis is conducted by using available statistical data from the Common Agricultural Policy of the EU and the statistical data available from the European Commission EUROSTAT. This type of analysis is particularly important in the context of finding suitable measures to improving the agri-economic activity, achieving the agri-social equality and preserving the agri-ecological ambient.*

**Key words:** *development environment, agriculture, EU, quantitative analysis, factor method, sustainable development*

* This paper is a part of research in the project *„Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region"*, No. 46006, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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## Introduction

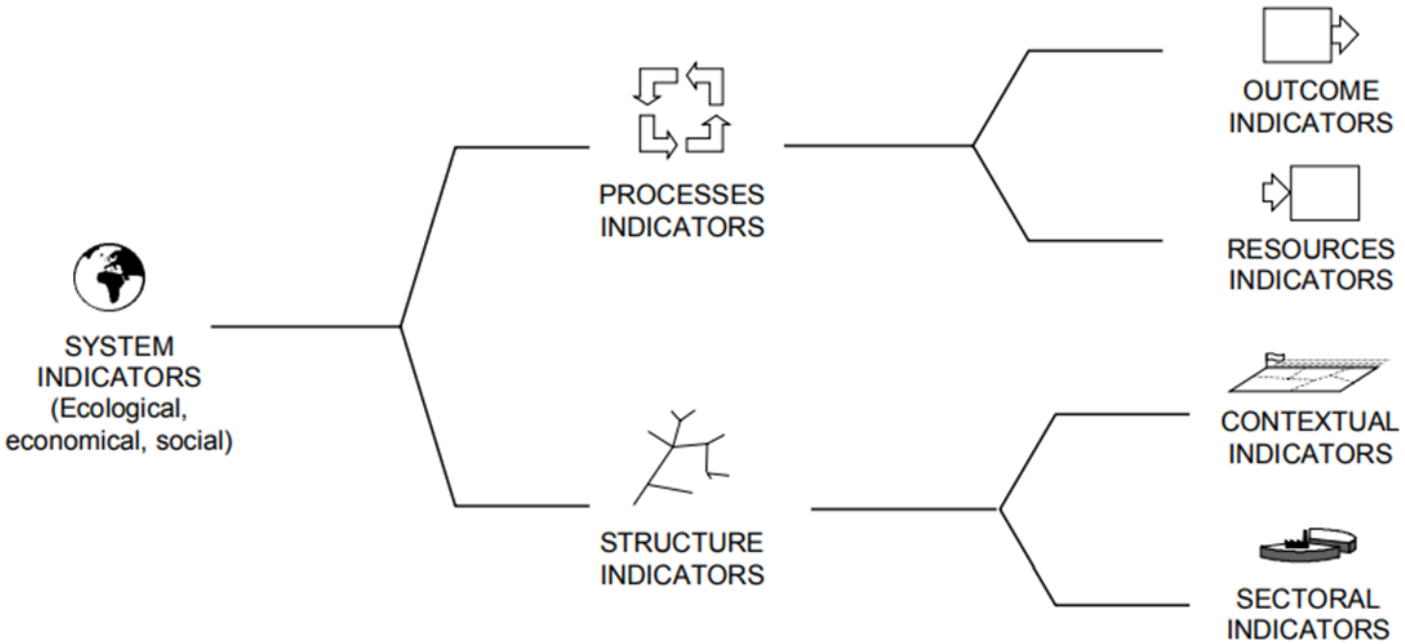
Sustainable development is development balanced between economy, society and ecology, and that makes it possible to satisfy the current and future needs of the population. The concept of sustainable development is widely used in the scientific community through its multidisciplinary approach, and it is therefore applicable in diverse research with the goal of providing a more complete overview of a certain development environment from the aspect of its sustainability.

The development environment of agriculture is fairly complex, and reaching its sustainability requires solving many problems in development, which are closely connected to its most significant characteristics such as durability, dynamics and adaptation. Generally seen, the development environment of agriculture is made of economic, social and ecological factors that work simultaneously to define the appropriate development conditions of agriculture from the aspect of sustainable development. These factors contain different variables, i.e. determinants, the effects of which cannot always be predicted with reliability, and that can significantly influence the (un)sustainability of the development environment of agriculture.

With this in mind, monitoring the development environment of agriculture also demands monitoring multiple different indicators. This is a consequence of the modern approach to agriculture monitoring, based on multifunctionality and sustainability. Multifunctionality is oriented towards developmental activities, while sustainability is oriented towards developmental resources (EC, 2011). Multifunctionality and sustainability are two mutually connected complex processes, because they originate from one another, and therefore they demand defining an appropriate framework, i.e. system of indicators for monitoring the developmental changes in an agricultural environment (image 1).

Developmental functions of agriculture in the domain of economy, society and ecology are interconnected and they mostly depend on the developmental policy conducted on the global, regional, national and local levels. The developmental changes in an agricultural environment must constantly be monitored for the purpose of timely detection of either positive or negative influences on the economy, society or ecology.

**Image 1.** *System of indicators for monitoring developmental changes in an agricultural environment*




**Source:** *EC (2001, p.11)*

That is why monitoring and evaluating the development environment of agriculture through certain indicators from the aspect of sustainable development has crucial significance and demands regular and constant monitoring of inputs, outputs, and the influence of the developmental activities on the set goals (Królczyk & Latawiec, 2015).

Research into the development environment of agriculture in the EU from the aspect of sustainable development, using an appropriate statistical method of quantitative analysis, such as factor method, is of great significance in the context of defining an adequate framework for strategic planning of sustainable development of agriculture in the future, because it can answer two basic questions:

(1) *What does the development environment of agriculture in the EU look like from the aspect of sustainable development?*

(2) *What determinants within the economic, social and ecological factorial dimensions define the development environment of agriculture in the EU from the aspect of sustainable development, and to what extent does a certain factor determine such a state?*

**The basic presumptions of quantitative analysis using factor method**

In the past years, we have witnessed an expanding use of different statistical methods of quantitative analysis in almost all areas of scientific research. There are two main reasons for that. One is the development of computer technology and software, which made possible a relatively simple use of statistical methods of quantitative analysis for data processing. The second is realising the need of a lot of scientific research to analyse simultaneous mutual dependencies of several variables.

Quantitative analysis means finding the adequate structure of data through observing appropriate determinants, in order to determine which factors, i.e. variables best determine the observed structure. In other words, it is necessary to identify those factors/variables that will in the best way possible explain the observed structure and correlations in the data structure, i.e. determine the latent connection between them.

For that purpose, we use factor method, which is a statistical method of quantitative analysis. Factor method presumes that a part of the variability of the observed factors, i.e. variables cannot be explained through data

structure, so it becomes necessary to determine what units those are. Generally seen, factor method is made of two basic phases:

*(1) determining the number of variables to be excluded or left out in the analysis, i.e. checking the possibility of applying the analysis to available data after checking the adequacy of the sample from the aspect of using each variable in the analysis separately, which means testing the whether the observed determinants are linearly connected or not;*

*(2) observing the influence of the variables, i.e. interpreting the factors using a load matrix, which we can get by rotating the appropriate variable transformation matrix.*

Using factor method as a statistical method of quantitative analysis enables us to simply detect and explain the background structure of the development environment of agriculture in the EU from the aspect of sustainable development through the aggregation of influence from the most important development variables from the environment.

**Databases as a starting point for quantitative analysis using factor method**

Defining a database is a starting point for quantitative analysis using factor method. So, in order to perform a quantitative analysis of a development environment of agriculture in the EU from the aspect of sustainable development, it is needed to form an adequate database.

Forming an adequate database is preceded by a detailed and structured research of the available statistical data from the Common Agricultural Policy of the EU and the statistics from the European Commission EUROSTAT from 28 member states (year 2016). This enables us to make a correct choice of indices as development variables within the economic, social and ecological factors that have the most influence on the modern development environment of agriculture. Those are the so-called contextual indicators that reflect the relevant aspects of common developmental trends in the economy, society and ecology, but also have an influence on the implementation, achievements and efficacy of the Common Agricultural Policy of the EU (EC, 2017a).

The research is structured in a way that simplifies the assessment of indicators as relevant factor variables that create the development environment of agriculture in the EU from the aspect of sustainable development. Namely, the influence of certain elements of the development environment of agriculture in the EU from the aspect of sustainable development has been assessed.

The perimeters with a notably positive influence were assessed with a 5, and the perimeters with a notably negative influence were assessed with a 1. It was also noted that a significant number of individual elements within the development environment of agriculture in the EU could influence the achievement of sustainability.

Based on the conducted analysis, we made a reduction of the observed variables for the purpose of finding aggregate factors, in order to identify the latent structure of the development environment of agriculture in the EU from the aspect of sustainable development.

The database as the foundation of the quantitative analysis of the development environment of agriculture in the EU from the aspect of sustainable development is defined through the following crucial changes within the economic, social and ecological factors (EC, 2017b; Eurostat, 2017):

(1) economic growth (mark 1);

(2) unemployment (mark 2);

(3) investments (mark 3);

(4) productivity (mark 4);

(5) income (mark 5);

(6) education (mark 6);

(7) poverty (mark 7);

(8) labour force age (mark 8);

(9) organic production (mark 9);

(10) irrigation (mark 10);

(11) soil quality (mark 11);

(12) renewable energy sources (mark 12);

(13) agricultural areas of high natural value (mark 13);

(14) greenhouse gas emission (mark 14).

**The application of quantitative analysis based on factor method**

For quantitative analysis based on factor method, we used the Statistical Package for Social Sciences 22.0 software. In order to conduct the analysis, it is required to have a positively determined correlation matrix of 14 variables that make the database and determine the development environment of the EU.

Based on descriptive statistics, we can conclude that out of the total number of analysed observations, none of the variables has a significant amount of missing data in the form of an extreme value, which makes the matrix positively determined (table 1). This means that no variables should be excluded from further quantitative analysis. This thesis needs to be backed by determining how well the variability of the variables is explained by the given data structure, i.e. the initial and the extraction communalities of each variable.

This type of approach is very significant, because quantitative analysis takes into account certain variables whose variability cannot be explained by the observed data structure. Variability explained below 20% indicates that the variable must be excluded from further quantitative analysis, because it only faintly explains the observed data structure.

Based on the conducted analysis we can conclude that all of the included variables have a variability explained above 20%, i.e. they are well represented in the analysis, so there is no reason to remove any of the variables from further analysis (table 2).

**Table 1.** *Descriptive statistics of the variables*

| Variable mark | Average | Standard deviation | Missing data |
|---|---|---|---|
| **1** | 2.29 | 2.765 | 1 |
| **2** | 2.02 | 0.877 | 3 |
| **3** | 2.24 | 0.814 | 1 |
| **4** | 2.98 | 0.920 | 1 |
| **5** | 2.10 | 1.035 | 2 |
| **6** | 2.47 | 1.132 | 4 |
| **7** | 2.95 | 0.986 | 2 |
| **8** | 3.15 | 0.899 | 4 |
| **9** | 3.24 | 0.943 | 3 |
| **10** | 2.63 | 1.564 | 3 |
| **11** | 3.12 | 0.937 | 2 |
| **12** | 2.05 | 1.063 | 5 |
| **13** | 2.00 | 0.894 | 1 |
| **14** | 2.95 | 1.005 | 1 |

**Source:** *Author's calculation using the Statistical Package for Social Sciences 22.0 software*

**Table 2.** *Initial and extraction communalities of the variables*

| Variable mark | Initial communality | Extraction communality |
|---|---|---|
| **1** | 0.478 | 0.673 |
| **2** | 0.355 | 0.487 |
| **3** | 0.448 | 0.680 |
| **4** | 0.408 | 0.665 |
| **5** | 0.390 | 0.475 |
| **6** | 0.268 | 0.352 |
| **7** | 0.289 | 0.314 |
| **8** | 0.406 | 0.578 |
| **9** | 0.471 | 0.582 |
| **10** | 0.509 | 0.668 |
| **11** | 0.375 | 0.444 |
| **12** | 0.312 | 0.458 |
| **13** | 0.245 | 0.319 |
| **14** | 0.366 | 0.412 |

**Source:** *Author's calculation using the Statistical Package for Social Sciences 22.0 software*

Considering that there are no reasons to exclude any of the variables from further quantitative analysis based on factor method, we should determine whether the variables correlate with each other.

In other words, we must determine the adequacy of the observed sample from the aspect of using each of the variables individually in the analysis, which means testing whether the observed determinants are linearly connected or not, i.e. if the correlation matrix of the variables is an identity matrix.

If the correlation matrix of the variables is an identity matrix, then it means that the observed variables are not mutually correlated, i.e. that they are not suitable for revealing the background (latent) data structure.

For that purpose, we use the anti-image correlation matrix that measures the adequacy of a sample for each individual variable, by pointing out the variability proportion caused by background or latent data structure.

Besides the positive partial quotients of co-variation, i.e. correlation, the anti-image matrix also contains negative quotients, found everywhere within the matrix, except on the main diagonal, which proves the methodological accuracy of the conducted calculations.

The quotient values found on the main diagonal of the anti-image correlation matrix represent how adequate the sample is for the observed variable. The variables where the adequacy measure is between 0.5 and 1.0 are suitable for quantitative analysis based on factor method.

If we observe the main diagonal of the anti-image correlation matrix, we can conclude that all variables can be used in further analysis in order to determine the final influence of the variables, i.e. adequate interpretation of the economic, social and ecological factors (table 3).

The values of the other quotients that are small or close to zero, and that can be found outside the main diagonal of the anti-image correlation matrix, indicate that the variables from the quantitative analysis based on factor method have been cleared of influence from unexplained correlations.

**Table 3.** *Adequacy matrix for the sample of variables*

| Variable mark | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **0.793** | 0.125 | -0.035 | 0.256 | 0.329 | -0.509 | 0.024 | -0.130 | -0.065 | -0.033 | 0.050 | -0.020 | -0.004 | 0.053 |
| **2** | 0.125 | **0.695** | -0.422 | -0.112 | 0.233 | -0.089 | 0.015 | -0.071 | 0.086 | 0.003 | -0.099 | -0.017 | -0.062 | 0.129 |
| **3** | -0.035 | -0.422 | **0.882** | 0.009 | -0.018 | 0.077 | -0.045 | 0.289 | -0.115 | -0.038 | -0.081 | 0.152 | -0.235 | -0.177 |
| **4** | 0.256 | -0.112 | 0.009 | **0.770** | -0.085 | -0.002 | 0.121 | -0.040 | -0.032 | -0.245 | -0.196 | -0.043 | 0.105 | -0.006 |
| **5** | 0.329 | 0.233 | -0.018 | -0.085 | **0.681** | 0.136 | -0.014 | 0.043 | -0.111 | 0.049 | 0.119 | 0.019 | 0.091 | -0.088 |
| **6** | -0.509 | -0.089 | 0.077 | -0.002 | 0.136 | **0.712** | 0.078 | -0.030 | -0.052 | 0.085 | -0.070 | -0.012 | 0.044 | -0.036 |
| **7** | 0.024 | 0.015 | -0.045 | 0.121 | -0.014 | 0.078 | **0.810** | -0.005 | 0.028 | -0.024 | -0.039 | 0.059 | -0.065 | 0.207 |
| **8** | -0.130 | -0.071 | 0.289 | -0.040 | 0.043 | -0.030 | -0.005 | **0.662** | 0.038 | 0.001 | 0.241 | -0.029 | 0.189 | -0.005 |
| **9** | -0.065 | 0.086 | -0.115 | -0.032 | -0.111 | -0.052 | 0.028 | 0.038 | **0.732** | 0.022 | 0.113 | -0.045 | 0.333 | 0.191 |
| **10** | -0.033 | 0.003 | -0.038 | -0.245 | 0.049 | 0.085 | -0.024 | 0.001 | 0.022 | **0.803** | -0.015 | 0.247 | -0.031 | -0.030 |
| **11** | 0.050 | -0.099 | -0.081 | -0.196 | 0.119 | -0.070 | -0.039 | 0.241 | 0.113 | -0.015 | **0.768** | 0.088 | -0.085 | 0.026 |
| **12** | -0.020 | -0.017 | 0.152 | -0.043 | 0.019 | -0.012 | 0.059 | -0.029 | -0.045 | 0.247 | 0.088 | **0.760** | 0.123 | -0.290 |
| **13** | -0.004 | -0.062 | -0.235 | 0.105 | 0.091 | 0.044 | -0.065 | 0.189 | 0.333 | -0.031 | -0.085 | 0.123 | **0.834** | 0.007 |
| **14** | 0.053 | 0.129 | -0.177 | -0.006 | -0.088 | -0.036 | 0.207 | -0.005 | 0.191 | -0.030 | 0.026 | -0.290 | 0.007 | **0.578** |

**Source:** *Author's calculation using the Statistical Package for Social Sciences 22.0 software*

For observing the final influence of the variables, i.e. for an adequate interpretation of the economic, social and ecological factors, we use the load matrix, which is made by rotating a certain variable transformation matrix, i.e. simplifying it through orthogonal transformation.

Orthogonal transformation simplifies a load matrix of the variables in accordance with the economic, social and ecological factors, which does not influence the level of their explanation or influence from the aspect of determining the development environment of agriculture in the EU in the context of sustainable development.

Factorial loads for each of the variables can be represented in the form of a matrix, where any given value represents the weight quotient of the observed variable for the given factor. These weight quotients are used for interpreting the economic, social and ecological factors of the development environment of agriculture from the aspect of sustainable development.

So, then we speak about interpreting development factors in the environment of agriculture in the EU from the aspect of sustainable development, we use certain weight quotients from the load matrix of variables, that simplify the interpretation of the observed development phaenomenon. The factorial load values are between -1 and +1, where negative values show a negative influence of the observed variable on the development environment, while positive values indicate a positive influence of the observed variable on the development environment. The higher the value of the factorial load, either positive or negative, i.e. the closer it gets to +/-1, the better the observed factor/variable is at explaining the development environment (table 4).

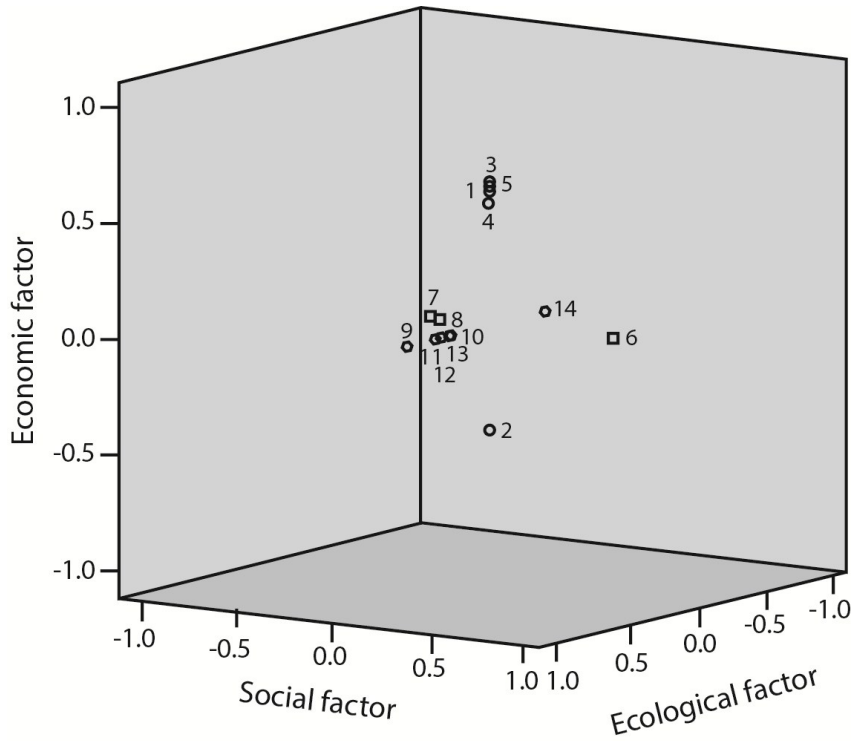
For a simpler overview of the influence of variables, i.e. interpretation of the economic, social and ecological factors as determinants for the development environment of agriculture in the EU, a load matrix can also be visually represented as a three-dimensional graph (graph 1). This type of view is significant because it simplifies the interpretation of developmental factors in the environment, especially if the connection between certain variables that characterize the development conditions is very complex.

**Table 4.** *Load matrix of variables according to the appropriate economic, social and ecological factors*

| Variable mark | Economic factor | Social factor | Ecological factor |
|---|---|---|---|
| **1** | 0.572 | - | - |
| **2** | - 0.485 | - | - |
| **3** | 0.635 | - | - |
| **4** | 0.533 | - | - |
| **5** | 0.601 | - | - |
| **6** | - | 0.574 | - |
| **7** | - | - 0.329 | - |
| **8** | - | - 0.288 | - |
| **9** | - | - | 0.587 |
| **10** | - | - | 0.329 |
| **11** | - | - | 0.425 |
| **12** | - | - | 0.402 |
| **13** | - | - | 0.345 |
| **14** | - | - | - 0.412 |

**Source:** *Author's calculation using the Statistical Package for Social Sciences 22.0 software*

**Graph 1.** *A three-dimensional representation of variables in the economic, social and ecological factorial space – development environment of agriculture in the EU from the aspect of sustainable development*




**Source:** *Author's calculation using the Statistical Package for Social Sciences 22.0 software*

## Conclusion

In general, the level of variable load is not too high, which means that the appropriate structure between them is becoming harder to obtain. This implies that the variables are becoming harder to group and that they are slowly taking the role of independent influential determinants that independently influence the development environment of agriculture in the EU, which is not in accordance with the sustainable development concept. Based on this, we can conclude that the development environment of agriculture in the EU is becoming more and more complex with time, as well as difficult to understand and interpret, due to an increasing number of non-coordinated influences, which can cause its unsustainability on the long run.

Considering how the variables are distributed, the economic factor is the most significant one and it greatly influences the creation of the development environment of the EU. It is within this factor that there are the most variables with relatively high factorial load values as weight quotients, which means that they explain, i.e. determine the development environment in the best way. Investments as a variable within the economic factor have the biggest positive influence, i.e. they most clearly influence the development environment of agriculture in the EU through its positive formation, which improves competitiveness and leads to a profit increase.

The economic factor as a quantitative development determinant can represent a sort of barrier for the sustainability of the development environment of agriculture in the EU on the long run, unless a synergetic effect is made with the social and ecological factors as qualitative development determinants. This point of view is not good from the aspect of the basic postulates of the sustainable development concept, so it becomes necessary to undertake certain measures within the Common Agricultural Policy of the EU. This would lead to harmonization of the quantitative component of the development environment of agriculture with its qualitative component that is defined through the social and ecological aspects of development.

Based on the conducted quantitative analysis of the development environment of agriculture in the EU from the aspect of sustainable development and the assessed economic, social and ecological factors we can conclude that it is necessary to create an adequate ambience for the development of agriculture through creating necessary and measurable development conditions. They would serve achieving sustainable development, i.e. realising triple goal developmental functions: improving the agri-economic activity, achieving the agri-social equality and preserving the agri-ecological ambient.

The biggest influence on the development environment of agriculture in the EU from the aspect of sustainable development in the future should come from creative capital, knowledge, cooperatives and „greening“ of agri-entrepreneurship, in accordance with the new development strategy of the EU „Europe 2020“, which is based on a smart, sustainable and inclusive growth.

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# DETERMINANTS OF FOREIGN DIRECT INVESTMENTS IN AGRICULTURE OF DANUBE REGION

*Radovan Kastratović[1], Zorica Vasiljević[2]*

## Abstract

*The research investigates the determinants of foreign direct investments in agriculture in the countries of Danube region. Pooled model of agricultural foreign direct investment inflows based on the theoretical framework of Ownership Location Internalization paradigm was formulated and estimated by using ordinary least squares method and panel data for the period from 2009 to 2016. The results suggest that the foreign direct investments in agriculture of the region are primarily resource-seeking, although market-seeking investments are also present. There is also evidence of sector-specific impact of certain frequently examined determinants which contradict theoretic expectations and highlight the importance of the sector-level studies of foreign direct investment. The research adds to the limited literature concerning foreign direct investment determinants in the context of agriculture and has significant implications for the agricultural and foreign investment policymakers.*

**Key words:** *foreign direct investments, determinants, agriculture*

## Introduction

Foreign direct investments are often regarded as the potential generator of economic growth and development. Governments realize this potential, which is evident from the increasing competition among them in attracting the investments. This, however, proves to be a challenge as the global financial crisis reduced the global flows of foreign direct investment significantly. After a surge in 2015, foreign direct investment flows dropped by 2% globally in 2016. A modest recovery is expected in

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following years, although the flows will remain significantly below pre-crisis levels (UNCTAD, 2017). Understanding determinants of foreign direct investment is therefore of great importance for the policy-makers aspiring to attract the investments.

Agriculture has an immense growth potential in the Danube Region. Nevertheless, a number of factors that impede tapping of this potential exist in many countries of the region. In Serbia, these factors include low share of irrigated land, too fragmented farmland, low levels of technology, mechanization and know-how (Vasiljević & Kovačević, 2014). Likewise, monopolistic agricultural market structures, insufficiently developed infrastructure, agricultural products foreign trade liberalization and gray economy also pose a threat to the development of this sector (Đurić, Ristić, & Đurić, 2016). Foreign direct investments in the sector could provide the inputs, such as financial resources, technology and managerial, marketing and technical knowledge which could be beneficial for the elimination of aforesaid limiting issues. In addition to that, foreign direct investment represents investment capital which can be used for the developmental projects, without the increase of a country's external debt, helping bridge the investment and technological gap. Furthermore, these investments may boost home country's employment and tax revenues. Next, they could help the introduction and the improvement of the existing quality, sanitary and phytosanitary standards. Another potential benefit of foreign direct investments is the increased international economic and foreign trade integration, which is particularly important benefit for the small open economies of the Danube Region. Supposing monopolistic structures exist in the agricultural markets, multinational companies' entry in the sector could also spur competition, with all the consequential benefits of the increased efficiency. Finally, the presence of foreign companies could be a generator of rural development and global agribusiness value chain integration of local produces in host country (Stojadinović Jovanović & Dašić, 2015).

It should be taken into account, however, that in order for previously described benefits to be realized in host country, a sufficiently developed agricultural sector with the absorptive capacity for the expected spillover benefits and adequate agricultural policies are required. If this requirement is not met, agricultural sector of the host country could face serious risks. These risks include hikes in agricultural land prices, excessive mechanization (causing the loss of employment in the sector), environmental damage due to land degradation, chemical contamination, and overall dependency of the sector on foreign investors (Hallam, 2011).

Equally grave are the risks of crowding out local producers from the market and compromising national food security of host countries (Heumesser & Schmid, 2012). It is therefore important to address the issue of attracting foreign investments cautiously and selectively, paying attention to the motivations of foreign investors.

Even though the problem of foreign direct investment determinants has received much attention from the researches in previous decades, sector-level studies are lacking. In this research, we seek to fill this gap by investigating the key general and sector-specific determinants of foreign direct investment inflows in agriculture. The aim is to gain a better understanding of the motivations behind foreign direct investment in the sector, empirically examine if the general theoretic postulates of foreign direct investment flows hold true in the context of agriculture and eventually to draw the inferences relevant to the policy makers.

To achieve this aim, we formulated and empirically tested three hypotheses, drawing from the methodological framework of Ownership, Location and Internalization paradigm. Our first hypothesis tested in the research is that the increase in agricultural resource endowments increases the net inflows of foreign direct investments in agricultural sector. The second hypothesis is that the countries with larger markets to a certain extent *ceteris paribus* increase net inflows of foreign direct investments in agricultural sector. Finally, the third hypothesis in the research states that lower transportation costs increase foreign direct investment inflows in agricultural sector, all other things being equal.

Having the previously discussed aims and hypotheses in mind, this paper is organized as follows. The first section provides a brief overview of theoretic literature of foreign direct investment determinants and the related empirical literature. The second section outlays the methodology applied in this research, discusses the econometric model and its variables. Results of the research are presented and discussed in the third section. Conclusions based on these results are summarized in the final section.

## Literature Review

Agricultural sector is not considered to be an attractive sector for the inflows of foreign direct investment. Despite that, The United Nations Conference on Trade and Development (*UNCTAD*) considers this sector as the second sector with the largest potential for attracting foreign direct

investments in transition countries in the future. In addition to that, UNCTAD highlights this sector as one of the top ten most restricted sectors for foreign investments (UNCTAD, 2017).

Over the period from 2009 to 2016 all the Danube Region countries recorded low shares of agricultural foreign direct investments in total foreign direct investment inflows. In the case of Serbia, Vasiljević and Kovačević point out the possible reasons for these results are low profitability of agricultural sector, unstable economic and climate production environment and inadequate agricultural policies (2014). Other potentially limiting factors for attracting foreign investments in this sector include inadequate infrastructure, land management systems and the quality of human resources. Globally, however, the increase of foreign direct investment flows in agricultural sector is evident, particularly from developed and emerging economies to developing ones. These recent dynamics could be explained by the increasing investment returns in this sector, caused by the rise in global food prices and expansion of biofuel production and use (Hallam, 2009; Fiedler & Iafrate, 2016). These investments are increasingly resource-seeking, consisting of land acquisition by foreign investors and its use for the production with the aim to satisfy the demand for the inputs of the industry of home country. By employing this strategy, foreign investors are able to reduce risks regarding the input prices volatility, while home countries increase food security and minimize other risks which large agricultural product importers face. Foreign direct investments in this sector are particularly relevant in situations where the economies of scale play significant role. Otherwise, different modes of entry, such as joint ventures and contract farming might be a better solution for the potential investors (Hallam, 2011). The concrete motivation of the foreign investment depends, among other factors, on the type of the foreign investor. The most important foreign investors of the sectors are: multinational corporations, hedge funds, pension funds, sovereign funds and other private equity groups (Heumesser & Schmid, 2012).

In order to attract foreign direct investments in the sector it is important for policy makers to understand what motivates foreign investors to invest abroad and what constitutes the most important determinants of their inflow. There is no consensus in the theory of foreign direct investments regarding the most important factors which determine the flows of foreign direct investments. These flows can be explained by at least one (or more) of the nine theoretic models of foreign direct investments (Faeth, 2009).

One of the most comprehensive theoretic explanations of foreign direct investments is Dunning's eclectic paradigm, which presents a robust grounding for the empirical research of the determinants of foreign direct investment flows (Dunning, 1988). He gave a plausible and exhaustive explanation of the foreign direct investment flows, according to which foreign investors combine spatially transferable factors they have under disposal (such as superior technology, management, marketing and financial resources) with the immobile factors in a foreign country in order to establish a competitive advantage over their rivals and maximize profits. The ownership advantages of the aforementioned transferable factors must fully compensate the increased costs of internationalization of business activity for foreign direct investment to occur. Moreover, spatial market failures, such as trade barriers (which are especially relevant in the case of agricultural sector), can also cause act as a catalyst for the increase of foreign direct investments. The process of regional production specialization could be considered as another important cause of foreign direct investments. In this case transportation costs are a particularly important determinant. Which determinants will play the most significant role in defining the flows of foreign direct investments, depends on the motivations of foreign investors. If the investor is primarily motivated by the market access, the most significant determinants will be host country's market size and trade barriers. If the investment is, on the other hand, motivated by securing production inputs, factor endowment (such as arable land in case of agriculture) proves to be the most important determinant, as well as government incentives and the associated risks. In case of the efficiency-seeking investments the geographic determinants and transport costs become increasingly significant.

The influential theoretic works in the 1970s and 1980s were followed by a vast number of empirical studies which empirically investigated the significance of various foreign direct investments' determinants. As with the theoretic models, consensus regarding the most important foreign direct determinants has also not been reached in the empirical literature. This lack of consensus presents a challenge in defining econometric model of foreign direct investment determinants, as the possibility of model misspecification due to omitting important variables increases (Blonigen, 2005). In most cases, determinants in the model seem to be selected on the criteria defined by the aim of research, rather than a theoretic model. The meta-analysis by Tokunaga and Iwasaki reveals that the most important determinants of foreign direct investments' attraction in the context of transition countries are market size and agglomeration

effect; while the most significant limiting determinants are factor endowment-related (Tokunaga & Iwasaki, 2017).

Despite the vast empirical work done in the area of foreign direct investments' determinants, literature concerning determinants of foreign direct investments in the agricultural sector remains limited. Most of the few studies treating this topic have focused on the general foreign direct determinants, found in other theoretic and empirical body of literature, often failing to address the specific characteristics of agricultural sector. One of the first and most influential investigations of foreign direct investment determinants in agricultural sector is the one of Lv, Wen and Xiong, who focused on the Chinese agricultural sector (2010). Their study revealed agricultural market size as the most significant foreign direct investments' determinant in the sector. Another study, based on the agriculture of South Africa, derived similar results (Idsardi, Cloete, & van Schalkwyk, 2009). Anwar, Saeed, Khan and Shan-E-Ahmad determined a statistically significant impact of market size (measured by gross domestic product) and trade openness on the foreign direct investment inflows in Pakistani agriculture (2013). They were the first to calculate a negative impact of government debt on the investment inflows. Market size was determined as the only significant foreign direct investments' determinant in the agricultural sector of the member countries of The Organization of Islamic Cooperation (*OIC*) (Rashid, Bakar, & Razak, 2016). Similar results were obtained using the sample of 21 Latin American developing countries (Farr, 2017).

## Methodology

In order to analyze the determinants of foreign direct investment inflows in agricultural sector a model was formulated based on the theoretical framework of Dunning's Ownership Location and Internalization (OLI) paradigm, the practice of other empirical studies mentioned in the literature review, the relevance of determinants in the concrete case of the agricultural sector of Danube region countries and data availability. The determinants of the model include: market size, transport costs, European Union membership, agricultural infrastructure, arable land area, macroeconomic stability, agricultural revealed comparative advantage and the quality of legal system. After performing the necessary tests it was decided that the model would best be estimated by employing the method of pooled ordinary least squares on the panel data regarding Danube region countries for the period from 2009 to 2016. The unit of

analysis in this research is defined as the individual countries for the reasons of data structure and availability in the relevant databases of foreign direct investment inflows.

The problem of foreign direct investment determinants in general (and in the sector of agriculture in particular) in the literature is usually posed as a multivariate model estimated by the method of ordinary least squares, least square dummy variable or generalized least squares. The model variables are selected based on the theoretic considerations and the aim of research. In this research, the following model of foreign direct investment determinants in agricultural sector was considered:

$$FDI_{it} = \beta_0 + \beta_1 M_{it} + \beta_2 {M_{it}}^2 + \beta_3 TC_{it} + \beta_4 EU_{it} + \beta_5 AL_{it} + \beta_6 INF_{it} + \beta_7 RCA_{it} + \beta_8 LAW_{it} + \beta_9 I_{it} + u_{it} \quad (1)$$

where $FDI_{it}$ stands for foreign direct investment net inflows in agricultural sector, $M_{it}$ for market size, $TC_{it}$ for transport costs, $EU_{it}$ for European Union membership, $AL_{it}$ for arable land, $INF_{it}$ for macroeconomic stability (measured by inflation), $RCA_{it}$ for revealed comparative advantage in agriculture, $LAW_{it}$ for the quality of legal system and $I_{it}$ for agricultural infrastructure level. Other possible determinants and random disturbances are encompassed by the error term $u_{it}$. Most of the other foreign direct investment determinant studies, especially the ones which focus on agricultural sector, use either linear or linear-logarithmic models. Model (1) uses linear functional form except for the term $M_{it}$ which was included in the model in quadratic form. The reason for this was the observed hint of non-linearity in the influence of this variable, detected by Ramsey Regression Equation Specification Error Test and confirmed by closer data inspection in the preliminary statistical analysis.

The dependent variable in the model (1) is foreign direct investment net inflow ($FDI_{it}$). It is measured by the net inflows of foreign direct investment (FDI) in the sector of agriculture, forestry and fishery (*AFF*), in millions of current USD for every *i*-th country and *t*-th year. Investments in forestry and fishery sectors had to be included in the measure of agricultural foreign direct investment net inflows because the data of national banks are provided in such structure. Despite this, the share of agricultural foreign direct investment in this measure is the largest and for this reason the aforementioned measure can serve as a

relevant measure of agricultural foreign direct investment inflow. Net foreign direct investment inflow is also the most widely accepted dependent variable in the literature of foreign direct investment determinants. Additionally, Tokunaga and Iwasaki indicate that the choice of foreign direct investment flows measure does not have an impact on the statistical significance of the determinants in the analysis (2017). The descriptive statistics for this variable aggregated for the entire observed region is provided in Table 1.

**Table 1.** *Foreign direct investment (FDI) net inflows in the agriculture forestry and fishery sector of Danube region countries, 2009-2016*

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|
| FDI net inflows in AFF sector (mln. USD) | 224 | 164 | 245 | 102 | 100 | 99 | 218 | 122 |
| Total FDI inflows (mln. USD) | 18695 | 18046 | 25625 | 33808 | 15011 | 23928 | -3362 | 11740 |
| Share of AFF in total FDI inflows (%) | 1.20 | 0.91 | 0.96 | 0.30 | 0.67 | 0.42 | -6.48 | 1.04 |

**Sources:** *United Nations Conference on Trade and Development Statistics Division (UNCTADStat) and individual central banks of Danube region countries.*

In the years following global financial crisis, the inflows of foreign direct investments in the region were significantly reduced. There was a noticeable improvement in the years of 2011 and 2012, which was, however, short-lived. In the period 2013-2016 foreign direct investment inflows remained unstable and well below their pre-crisis levels. The foreign direct investment inflows in the agricultural sector were particularly low, maintaining the share of around 1% of total foreign direct inflows, except for the year of 2015. Romania, Hungary and Serbia recorded highest total net inflows of foreign direct investment in agricultural sector in the observed period (652, 252 and 231 M USD, respectively), whereas the lowest inflows were realized in Bosnia and Herzegovina, Czech Republic and Croatia (15, 21 and 22 M USD, respectively).

Dependent variables in the model (1) represent the key determinants of foreign direct investment inflows in agricultural sector. One of the most important such variables, present in all related research is market size ($M_{it}$). It can be measured in several alternative ways: as gross domestic product, size of agricultural market or share of agricultural sector in gross domestic product. In this research we opted for gross domestic product, expressed in millions of current USD for each observed country in every

year. This allows the control of foreign direct inflows for the size of the host country. Furthermore, the described measurement was superior to the size of agricultural sector due to the multicollinearity issues with other agriculture-specific variables the latter faced. This approach in market size approximation was also used by Isardi et al. (2009), Anwar et al. (2013) and Farr (2017). It can generally be expected that the larger the host economy is, the more foreign direct investment it is able to attract, due to a larger market and possible agglomeration effects. However, the preliminary statistical analysis revealed that in this particular case a quadratic functional form would be more appropriate, rather than linear. It can be expected that the market size has a positive impact on foreign direct investments in agriculture but only to a certain extent, after which the direction of the impact is reversed.

Transport costs ($TC_{it}$) are potentially important determinant of foreign direct investment inflows, particularly in the case of the efficiency-seeking investors. This variable is often approximated in the literature as the extent of roads and railroads network. We have opted for a more direct and precise approach, where the transport costs for the foreign investor in agriculture is determined as Cost to Export, a measurement developed by The World Bank. This measurement is expressed in terms of current USD and it accounts for all the inland transport as well as the fees associated with export procedures, excluding tariffs and trade taxes. If the foreign investments in agricultural sector of the observed countries are efficiency seeking, a significant negative influence of transport costs of foreign direct investment inflows could be expected. The lowest trade costs in the observed countries and period were recorded in Slovenia in 2010 and 2011, while the highest costs were reported in Serbia in 2014.

Another determinant included in the model (1) is the membership in the European Union ($EU_{it}$). It was introduced as the dummy variable taking the value of 1 for the country (and periods in the case of Croatia) which is the member of European Union, and 0 otherwise. This was done in order to account for heterogeneity of the observed countries and to reflect the benefits of wider market access for foreign investors. It can be expected that the European Union membership has a positive impact on foreign direct investment inflows.

It is unquestionable that soil is a necessary and the most important requirement for any agricultural activity. This determinant would be decisive for resource-seeking vertical foreign investments. It was included

in the model (1) in the form of arable land area ($AL_{it}$), measured in thousands of hectares. It is expected that the larger arable land area in a particular country is the more foreign direct investments said country is able to attract. Romania and Hungary are the observed countries with the largest arable land area, which coincides with the largest foreign direct investment inflows in agricultural sector.

Macroeconomic stability is also a determinant frequently used to explain the flows of foreign direct investment. In the context if agricultural foreign direct investment it was without exception approximated as the inflation rate. This was applied in this research, and the inflation rate ($INF_{it}$) was measured as annual growth rate of the consumer price index.

Foreign trade and (or) trade openness is yet another determinant often included in the models of foreign direct inflows. These determinants are usually measured as total import value, total export value, ratio of export and import, and share of foreign trade in gross domestic product. Lv et al. (2010) predict that the agricultural import reduces inflows of foreign direct investments in the sector, whereas exports have a positive impact. This stance fails to take into account that larger import values could also be caused by unsatisfied domestic consumption which exists due to low agricultural productivity and low production technology levels. In such described situation, market-seeking foreign investments by multinational corporations with superior technology could in fact be attracted by larger imports. Additional problem is the predicted impact of exports: the causality might not necessarily go from exports to foreign direct investment inflows. Rather, resource-seeking foreign direct investments could have a positive impact on export, as multinational corporations use the production in the host country as input in their production at home (or other) countries. Therefore, we include foreign trade component in the model (1) in the form of relative comparative advantage in agricultural foreign trade. This is a variation of Balassa's ratio of relative comparative advantage, where a share of country's export in world export is divided by the share of country's import (Balassa, 1965). Instead of using total export and import values, in this research we modify the ratio by using agricultural export and import in the calculations in order to determine individual countries relative comparative advantages in agricultural foreign trade ($RCA_{it}$). It can be assumed based on OLI theoretical framework that the higher relative comparative advantage of a country in agricultural foreign trade is, the more attractive it is to foreign investors. The countries with the largest relative comparative advantage ratio values are Serbia, Hungary and Bulgaria, and the lowest value was calculated

for Bosnia and Herzegovina. Indeed, Serbia and Hungary are among the largest receivers of foreign direct investments in agricultural sector out of all the observed countries.

Institutional quality is often regarded as an important determinant of foreign direct inflows in general. In this research it was approximated by the means of legal system efficiency ($LAW_{it}$), concretely measured by the number of calendar days required to settle lawsuits. All things being equal, it is expected that the more efficient the legal system of a country is, the more foreign direct investments it will be able to attract.

Developed infrastructure increases the attractiveness of host countries for foreign investors, which is the reason why many studies of foreign direct investment determinants include some form of infrastructural variables (usually road and telecommunications networks). In case of agricultural foreign direct investment inflows, researchers often use public expenditure for agricultural infrastructure. The problem with this approach is that it is unlikely that the investors take into account these expenditures for the moment in which they invest. It is more likely that they take into account the results of these public investments, which can be measured in terms of development level of agricultural infrastructure. In this research we attempted to use irrigated land area ($I_{it}$) as the measurement of agricultural infrastructure. However, the inclusion of this variable caused the problem of multicollinearity, as it was in almost linear functional codependence with the arable land variable and highly correlated with market size. This resulted in the impossibility of separation of individual variables effects strengths, thus the infrastructural variable had to be dropped from the model. The descriptive statistics of the remaining variables is provided in Table 2.

**Table 2.** *Descriptive statistics of the variables considered*

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| FDI | 61 | 20.87 | 31.49 | -37.37 | 169.70 |
| M | 72 | 91 998 | 63 186 | 16 174 | 227 948 |
| TC | 54 | 1 259 | 251 | 710 | 1 635 |
| AL | 53 | 2 877 | 2 536 | 184 | 9 146 |
| INF | 72 | 1.99 | 2.54 | -1.54 | 11.14 |
| RCA | 63 | 0.97 | 0.45 | 0.33 | 1.87 |
| LAW | 72 | 638 | 231 | 395 | 1 290 |

**Sources:** *United Nations Conference on Trade and Development Statistics Division (UNCTADStat), Food and Agriculture Organization of the United Nations Statistics Division (FAOStat), World Bank, national banks and national statistical offices of the observed countries*

Panel data for the period 2009-2016 regarding variables presented in Table 2 were obtained from multiple sources. Foreign direct investment data were obtained from FAOStat database of Food and Agriculture Organization of the United Nations for the period 2009-2014. Data for the years of 2015 and 2016 were collected from national banks of the observed countries and converted into current USD by applying average annual Central bank exchange rate available in historic exchange rate database OANDA. Arable land data were also obtained from FAOStat database. Data concerning gross domestic product, transport costs, inflation and the efficiency of legal system were obtained from the World Bank database. Relative comparative advantage was calculated by using the data provided by World Trade Organization. There were missing values for all the countries regarding arable land, as this data is collected from surveys which countries provide to Food and Agriculture Organization of the United Nations on irregular basis. As the values of this variable do not vary significantly within the same countries over time, missing values were interpolated by using average values of the available country level data. Similar problem occurred with transportation costs variable and it was addressed by extrapolating missing values using a linear trend. Such procedure was adequate as all of the observed countries displayed significant linear movement of the values over time. The described procedures allowed us to increase the number of observations in the analysis from 53 to 61, increasing the precision of the results and power of statistical tests.

Sample consists of Danube region countries as defined by the European Union in its Strategy for the Danube Region. Germany was removed from the sample because of vastly different economic structure and size, which would distort the results of the research. Austria and Montenegro also had to be excluded because disaggregated data on foreign direct investment for these countries was not available. The countries which remained in the sample include: Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Romania, Serbia, Slovenia and Slovakia.

Software used to analyze the data and perform panel model estimations and tests was Stata 13. Pooled model and respective diagnostic tests were performed using Eviews 8 software package.

## Results and Discussion

The model excluding infrastructure variable was first estimated by applying the method of generalized least squares taking fixed individual effects into account. Low F-test value of 1.36 and respective p-value of 0.2313 indicates that individual effects are insignificant. This was confirmed by estimating random effects model, for which the value of individual effects' coefficient ($\rho$) determined to be zero. It can be concluded, based on these results that the introduction of individual effects in either form of model does not add to the explanation of differences in foreign direct inflows among countries. In other words, variations of agricultural foreign direct investment inflows are adequately explained by the explicitly stated variables alone. Therefore, we opted for the estimation of pooled ordinary least squares model (*OLS*), assuming the heterogeneity among countries is included in independent variable.

Initial estimation of the pooled model resulted in severely skewed distribution of the residuals. The reason was outlier observation (the drop of agricultural foreign direct inflows in Romania in 2013). This was explicitly modeled by the introduction of dummy variable *V*. This way the initial model was transformed into:

$$FDI = \beta_0 + \beta_1 M + \beta_2 M^2 + \beta_3 TC + \beta_4 EU + \beta_5 AL + \beta_6 INF + \beta_7 RCA + \beta_8 LAW + \beta_9 V + \varepsilon \quad (2)$$

Previously described procedure normalized residual distribution, indicated by the value of Jarque-Bera statistic, which is lower than the critical level of 5.99. Relatively large number of observations allowed us to test heteroskedasticity by employing White test. Its statistic value of 50.45 and respective p-value of 0.2 indicate that the assumption of homoskedastic residuals is met. Breusch-Godfrey's LM test did not indicate the existence of autocorrelation of the residuals on 1% level. However, it did show possible autocorrelation of higher significance levels (5%). For this reason, standard errors of the estimates were corrected by applying Newey-West procedure. By applying this procedure and directly estimating asymptotic covariate matrix with Bartlett kernel and Newey-West fixed bandwidth of 4, we are able to obtain estimates and standard errors that are robust to presence of possible autocorrelation. The results of this estimation of model (2) are presented in Table 3.

**Table 3.** *Pooled OLS model estimation results*

Dependent Variable: FDI
Method: Least Squares (HAC standard errors & covariance)
Observations: 61 (after adjustments)

| Variable | Coefficient | Std. Error | t-Statistic | p-Value |
|---|---|---|---|---|
| $\hat{\beta}_0$ | -65.43191 | 26.307 | -2.487243 | 0.0162 |
| M | 0.000918 | 0.000328 | 2.799039 | 0.0072 |
| M^2 | -3.94E-09 | 1.26E-09 | -3.136759 | 0.0028 |
| TC | 0.008854 | 0.015009 | 0.589889 | 0.5579 |
| EU | -32.80509 | 12.56555 | -2.610717 | 0.0118 |
| AL | 0.0184 | 0.001909 | 9.638241 | 0.0000 |
| INF | -0.199217 | 1.317506 | -0.151208 | 0.8804 |
| RCA | -19.59622 | 7.343889 | -2.668371 | 0.0102 |
| LAW | 0.052027 | 0.014329 | 3.630772 | 0.0007 |
| V | -112.7343 | 8.813744 | -12.79074 | 0.0000 |
| Adjusted R-squared | 0.644785 | Wald F-statistic | | 28.58065 |
| S.E. of regression | 24.73235 | Prob(Wald F-statistic) | | 0.0000 |
| Sum squared resid | 31196.15 | Schwarz criterion | | 9.748967 |

**Source:** *Authors' calculations*

It can be noticed that the model explains variability of agricultural foreign direct investment inflows fairly well, as indicated by the value of adjusted R-squared of 64.48%. Value of Wald F-statistic and the respective probability indicates that the regression as a whole is highly statistically significant. Ramsey Regression Equation Specification Error Test rejected the possibility of model misspecification, as the value of test statistic was 2.28 and respective p-value 0.14.

The results presented in Table 3 reveal arable land as the most significant determinant of foreign direct investment inflows in agricultural sector of Danube region countries. As expected, it was estimated that the more arable land a country possesses the larger foreign direct investments in agriculture it realizes. The strength of this impact is, however, almost negligible. It was estimated that each additional 10 square kilometers of arable land on average attracts merely 18.4 thousand additional foreign direct investment inflows, all other things being equal.

On the significance level of 1% the size of the economy (*M*) influences the inflows of foreign direct investments in agricultural sector in a way which can best be described as a concave function. For the countries with gross domestic product less than approximately 116.5 B USD, market size has a positive impact of the inflows. This is in line with all related research of determinants of agricultural foreign direct investment inflows presented in the literature review. What is surprising, however, is the dynamic in the largest of the observed economies, Czech Republic, which

realized modest inflows of foreign direct investments in agriculture sector in the observed period. This is the reason why the concave form of the function might not be generalizable in a larger sample. It is likely that the particular situation in the agricultural sector of Czech Republic skewed the results, and that, in fact, a linear function with a positive slope would be more appropriate generally.

The research results provide evidence that foreign investments in agricultural sector of Danube region are not efficiency-seeking, as the variable transport costs (*TC*) is statistically insignificant. Interestingly, macroeconomic stability does not seem to be a significant factor of foreign direct inflows in agriculture of Danube region, which supports findings of Anwar et al. (2013). This could be due to the fact that sample consists of the countries with mostly similar and stable macroeconomic environment.

Surprisingly, membership in the European Union (*EU*) has a significant negative impact on foreign direct inflows in agriculture of Danube region countries. *Ceteris paribus,* counties outside the European Union receive on average 32.8 M USD more inflows annually than the European Union members. This could indicate that agricultural foreign investments are not primarily market orientated. The obtained results could be explained by the programs of agricultural development envisioned by the Common Agricultural Policy which allow the European Union member to rely less on external sources of financing, such as foreign direct investments. It is also possible that non-member countries offer cheaper inputs for production which attracts foreign investors. Another surprising result is the positive impact of legal system inefficiency (*LAW*) on the foreign direct investment inflows in agriculture. Legal system inefficiency could actually correspond to lower levels of development and overall productivity which could be perceived as an opportunity by foreign investors to maximize profits by investing capital and superior technology to insufficiently productive immobile resources found in the countries with lower institutional quality.

Finally, and also contrary to the expectations, relative comparative advantage in agriculture (*RCA*) is negatively associated with agricultural foreign direct inflows: the increase of this ratio by one percent point is, *ceteris paribus*, followed by a decrease of foreign direct investment inflows of 19.6 M USD. Although higher values of relative comparative advantage demonstrate better suitability of a country for agricultural production, it also shows that the existing local agricultural companies in those countries

are internationally competitive. In such situation, foreign investors might actually avoid such markets, as the increased competitive pressures exist, and the local companies, due to their relative superiority to foreign counterparts might actually become foreign investors in other countries.

## Conclusion

The research investigated some of the most important determinants of foreign direct investment inflows in agricultural sector of Danube region countries. Econometric model was derived from previous theoretical and empirical work, and it was verified by analyzing panel country-level data for the period 2009-2016. The results suggest that foreign direct investments in this sector is mainly resource-seeking and motivated by the possibilities of realizing profit through the control of insufficiently productive immobile resources in host countries, although market represents an important determinant as well. Such results confirm our first and second hypothesis.

Interestingly, some determinants, such as relative comparative advantage, institutional quality and membership in the European Union have the opposite effects to what has been predicted by the theory, which can be explained by the idiosyncrasy of agriculture and the foreign investors of this sector. We did not find significant evidence to support the third hypothesis regarding the influence of transport costs on foreign direct investments flows. This implies that general theoretic models of foreign direct investments do not necessarily hold true in the context of individual specific sectors. Such findings highlight the importance of sector-level modeling and empirical research, which could be pivotal in better understanding and explaining this phenomenon.

The results have important policy implications for Serbian agriculture. Serbia can be described as a favorable agricultural foreign direct investments' location in the region, and stable inflows of the investments could be expected in the future which could be beneficial for the development of the sector. Certain motivations of the investors are, however, troubling, and for this reason Serbia needs to be selective in the choice of foreign investors and demand their compliance to the existing production standards and agricultural policies in order to avoid the potential drawbacks.

Generalizability of the obtained results is somewhat limited by the size of the sample. Future empirical studies should be carried out on a larger

sample and should include more determinants in order to produce a more robust and precise estimates of the effects of the determinants and confirm our findings. There is also need for a theoretical model which could serve as a framework and define the most important determinants for empirical studies, taking into account the specific aspects of agriculture and its foreign direct investment flows.

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# THE ECONOMIC EFFICIENCY OF INVESTMENT IN FRUIT STORAGE

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## Abstract

*The study analysis the economic efficiency of an investment in fruit storage, trying to answer the question whether this activity is feasible or not. The objectives are to identify the profit and the rate of economic profitability. In pursuing this, the expenditure and the revenues of an economic unit witch store fruits are analyzed. The results show that the business is efficient, the profit is 9,890 euro per year and the rate of economic profitability is 9 percent. The model presented can be implemented by farmers who want to develop their businesses in the direction of integrating activities down-stream the value chain.*

**Key words:** *economic efficiency, fruits storage, value chain, investment*

## Introduction

The article investigates the feasibility of investing in activity of fruits storage, trying to find the answer to the questions "how efficient is this activity?" and "what are the levels of its profit, the rate of economic profitability and financial indicators of business achievement?"

In order to answer these questions, economic data regarding investment, production, revenues and expenditure have been analysed and indicators of economic efficiency have been calculated. The research objective is to identify the feasibility of the business which integrates post harvest activities of collecting, storing and selling fruits.

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The need of this piece of research consists in offering solutions to farmers who face difficulties in selling their output to the market.

Fruit growing faces other problems related to the low level of average production per hectare, the non-homogeneity of production (which prevents the marketing of fruit in hypermarkets), the lack of technical facilities, the quality of varieties and hybrids, the lack of collection centers, warehouses and processing factories of the fruits, all generated by the low investment level. This has an impact on the production cost of the fruit, in the direction of increase it, and thus on the increase of the imported quantities (the selling price of the imported fruits is lower compared to the one practiced by the local producers).

The total area occupied by fruit plantations in 2014 was 145,000 hectares. There is a reduction in the area occupied by fruit plantations from 206,000 ha in 2007 to 145,400 ha in 2014. Fruit production increased during the analysed period from 1,085,800 tons to 1,115,200 tons, which means, in the conditions of a reduction in the area, an increase in average fruit production (NIS, 2015).

The apple plantations occupy an area of 57,500 ha, the plum plantations occupy an area of 70,700 ha, and the other fruit species occupy 17,200 ha. The largest production is obtained with apples, over 535 thousand tons. We appreciate that the areas planted with plums in Romania are high compared to the consumption requirements of the population expressed during the harvest period. Plums are very perishable, it is recommended to process them and obtain preserves to capitalize on the production.

The necessity of investing in fruit storage results from their high perishability, the fruits being subjected to continuous degradation processes from the time of harvesting, and seasonality. By storing, the apple harvesting period is prolonged and the fruit market is continuously supplied.

Since the storage of fruit requires investment in the construction of a warehouse with high-value refrigeration, it is recommended that the activity be carried out within a cooperative, so that the investment effort is distributed among its members. These are the reasons for choosing the integrated chain as short chain model.

At the core of the integrated pipe model are the following principles:
- The principle of creating integrated food chains, ie the integration of collection, storage and marketing systems;
- The principle of association within cooperatives or producer groups.

The investment serves its members equally. Each member of the cooperative will have the same rights in the final products. The main advantages that them will benefit are:
- Revenue growth by supplementing them with the equivalent of dividends resulting from the storage and marketing of apples in the off season;
- Relieving the members of the cooperative from the sale of the products, focusing on the fruit-making business, without having to look for outlets to capitalize on.

The project aims:
- Optimal use of labor resources in rural areas;
- Increasing work productivity by performing semi-automated post-harvesting activities with the help of machines and equipment purchased through the project;
- Obtaining higher value added products and sorted and packaged apples, sold in the off season, compared to apples harvested and sold in the season, which have lower prices.

The technical objectives of the project are:
- Setting up a warehouse for fruit storage to extend their shelf life, mitigate the seasonal nature of the fruit supply and obtain higher added value products;
- Setting up a local fruit collection network;
- Provision of temporary storage, sales, bookkeeping and marketing services for cooperative members.

The financial objectives of the project are:
- The purchase of machinery and equipment for the transport, storage and handling of fruit in the warehouse;
- The purchase of land for the location of the warehouse;
- The construction of the warehouse and the cooling cells.
- The building will have storage facilities for fruit, laboratory, offices.

## Materials and methods

This section lists the raw materials used, specific consumption, staffing and equipment requirements.

## Product presentation

Apples are harvested staggered from August to October and stored for three months. Fruit degradation can not be prevented, but it can be greatly slowed down by changing the storage conditions: temperature, humidity, composition of the atmosphere in the store.

*The equipment and facilities required to store apples are*: refrigerated car transport, boxes, cleaning and sorting table, fruit packing machine, lifting and moving baggage.

Installations and equipment provided in fruit stores vary according to the technological process adopted. They allow indoor air conditioning, artificial illumination, transportation and handling of stored products as well as their conditioning. Indoor air conditioning systems ensure microclimate in the refrigerator by keeping the temperature, humidity and air composition within optimal limits. Cooling systems are used for storage for longer periods of time and maintain optimal temperature, humidity, pressure and gas content. Air humidification systems have the role of maintaining the required humidity in the storage cells.

## Material balance for stored apples

**Table 1.** *Inputs and outputs of apple storage (t / cell)*

| INPUTS | | | | OUTPUTS | | | |
|---|---|---|---|---|---|---|---|
| **No.** | **Operation, matter** | **Flow (t/cell)** | **Losses (%)** | **No.** | **Operation, matter** | **Flow (t/cell)** | **Losses (t)** |
| 1 | Fruit reception | 50 | 0.5 | 1 | Fruit reception | 49.75 | 0.25 |
| 2 | Sorting fruits | 49.75 | 2 | 2 | Sorting fruits | 48.75 | 0.99 |
| 3 | Washing fruit | 48.76 | 0.5 | 3 | Washing fruit | 48.51 | 0.24 |
| 4 | Fruit precursors | 48.51 | 0.5 | 4 | Fruit precursors | 48.26 | 0.24 |
| 5 | Fruit storage | 48.27 | 2.5 | 5 | Fruit storage | 47.06 | 1.20 |

**Source:** *authors calculations*

Fruit production: 47 t / cell

## Production schedule

Production is scheduled for months, starting from the time of harvesting the fruit and the storage capacity of a freezer. The harvesting of apples begins in August and it ends in October. Apples are stored for three months.

**Table 2.** *Production schedule*

| Month / Product | VIII | IX | X | Total |
|---|---|---|---|---|
| Apple production (kg / year) | 47000 | 47000 | 47000 | 141000 |

**Source:** *authors calculations*

## Market and marketing program

The fruit market has certain peculiarities resulting from the characteristics of supply and demand. The supply of fruits is seasonal and their production is conditioned by the climate factors in our country, which allow for a single fruit harvest, generally in the autumn months, after the fruit matured by the accumulation of the total number of baking grades. Demand is, however, continuous. Therefore, in order to supply the market and meet the demand for fruit, it is necessary to store a quantity of products. Storage takes place for three months in cold stores. After that period, products lose their organoleptic qualities and become unsaleable at an appropriate price justifying storage costs.

*Supply market.* Fruit suppliers are members of the cooperative and the average distance to collecting raw material is 7.5 km, which means 15 km for a trip. As stated above, the project aims at building a local fruit collection network, which will create opportunities for farmers to capitalize on their production.

The data in Table 4 shows a total supply requirement of 150000 kg per year. Considering that the average yield of apple plantations is 10 t / ha, it means that the need for material resources can be ensured on an area of 15 ha. To ensure this quantity, it is recommended that the associative form be established in a fruit-growing area where there are large areas cultivated with apples, concentrated at the level of 5-10 farms.

*Market outlets*. The main customers are large-scale stores, hypermarkets, supermarkets, discount stores. The marketing program is designed taking into account monthly production and applying the first came in-first out, which means that the production delivered in August is stored in September and October and delivered in November. The sales program and sales revenues are presented in Table 3.

**Table 3.** *The marketing program*

| Product | The production sold (kg / month) | | | | Price € / kg | | | Value of sales (€ / month) | | | TOTAL (€) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | XI | XII | I | Total | XI | XII | I | XI | XII | I | |
| Apples | 47000 | 47000 | 47000 | 141000 | 0.6 | 0.9 | 1 | 28200 | 42300 | 47000 | 117500 |

**Source:** *authors calculations*

## Material Assurance Program

Material resources used are apples, polyethylene bags for packaging, cartons, diesel, electricity and technological water. Designing the insurance requirement with these material resources is based on the production expressed in kilograms and the specific consumption from the resources listed per unit of product. For the design of diesel consumption, it is intended to move the fruit transport means of transport on an average distance of 7.5 km, which means 15 km per shift, and the average interval between two successive supplies.

Table 4 shows the material resources insurance program. Table 5 includes substantiating expenditures with material resources.

Expenditure on material resources is projected to take into account their average prices and consumption. The purchase price of the fruit is 0.45 € / kg. The quantity of apples purchased from the producers generates the largest expenditure in the structure of expenses with the material resources, being 87%. In the structure of material resources expenditures, along with raw material expenditures, energy expenditure is needed to keep microclimate conditions inside the cell (approximate consumption of 80 kW per day per cell), diesel expenditure, packaging, technological water and cleaning products.

**Table 4.** *Material Assurance Program*

| Resource | Unit | VIII | IX | X | XI | XII | I | Total |
|---|---|---|---|---|---|---|---|---|
| Apples | kg | 50000 | 50000 | 50000 | | | | 150000 |
| Diesel | liters | 21.4 | 21.4 | 21.4 | 53.7 | 53.7 | 53.7 | 225.4 |
| Electricity | kWh | 3000 | 5400 | 7800 | 7800 | 5400 | 3000 | 30000 |
| Cardboard boxes 55x55x30 | pcs | | | | 1000 | 1000 | 1000 | 3000 |
| Polyethylene bags | pcs | | | | 15666 | 15666 | 15666 | 46998 |
| Technological water | liters | 5000 | 5000 | 5000 | 100 | 100 | 100 | 15300 |

**Source:** *authors calculations*

**Table 5.** *Expenses with material resources (€)*

| Resource | VIII | IX | X | XI | XII | I | Total |
|---|---|---|---|---|---|---|---|
| Apples | 22500 | 22500 | 22500 | | | | 67500 |
| Diesel | 22 | 22 | 22 | 55 | 55 | 55 | 231 |
| Electricity | 295 | 567 | 838 | 838 | 567 | 295 | 3400 |
| Cardboard boxes 55x55x30 | 0 | 0 | 0 | 111 | 111 | 111 | 333 |
| Polyethylene bags | 0 | 0 | 0 | 1740 | 1740 | 1740 | 5220 |
| Other material resources (cleaning products, consumables) | 45 | 45 | 45 | 45 | 45 | 45 | 270 |
| Ttechnological water | 50 | 50 | 50 | 1 | 1 | 1 | 153 |
| TOTAL | 22912 | 23184 | 23455 | 2790 | 2519 | 2247 | 77107 |

**Source:** *authors calculations*

Out of expenditures with a total diesel consumption of 231 euro per year, 165 euro represents consumption expenditures for the delivery of goods, ie 71%, and 66 euro represents consumption expenditures for the collection of material resources, ie 29%.

Taking into account the monthly production level in kg per year, 47000 kg, and the capacity of the 3500 kg transport means, the number of movements required to deliver the products is calculated. For fruit collection, 15 shifts are required in the first three months, which means an average travel range of 2.2 days. For deliveries, 14 deliveries per month are made at an average of 2.3 days.

Out of the total transport costs, 71% are those with the delivery of the products and 29% those with the provision of the material resources. Although the number of trips is approximately the same, however, the

cost of delivering products is much higher than that of supply because the delivery distance is higher than the supply of material resources.

The basis of the need for crates was made according to the required fruit needs and the capacity of a box (15 kg). There is a need for 3333.3 crates per month, or 10000 crates per year.

**Designing the needs of personnel, machinery, equipment**

The design of the personnel needs (Table 6) is based on the activities taking place in the cooperative, on months, according to the schedule of activities. Cooperative staff consists of permanent staff, manager, and season staff, assistant manager, driver, productive and auxiliary workers.

The permanent staff. A manager is required for administrative activity. During the campaign it will be responsible for coordinating productive activities, and for the rest of the marketing year, maintaining the site, participating in fairs, concluding contracts.

Seasonal staff. The Deputy Manager (or assistant manager) will ensure the proper conduct of supply activities with material resources, assist the manager in selling the products. He will also be prepared for laboratory activities.

The driver will ensure the transport of finished products to the beneficiaries in November, December and January, and the collection of raw materials from farmers in August-October.

For productive activities, a worker is required to ensure the unloading and reception of raw materials during August, September and November and the delivery, invoicing and loading of packed products in November, December and January. A worker will work on the sorting machine and wash fruit in August, September and November and at the fruit packer in November, December and January.

In the productive months, one worker is needed to maintain factory cleaning, office and machinery, equipment, and for loading and unloading in the means of transport.

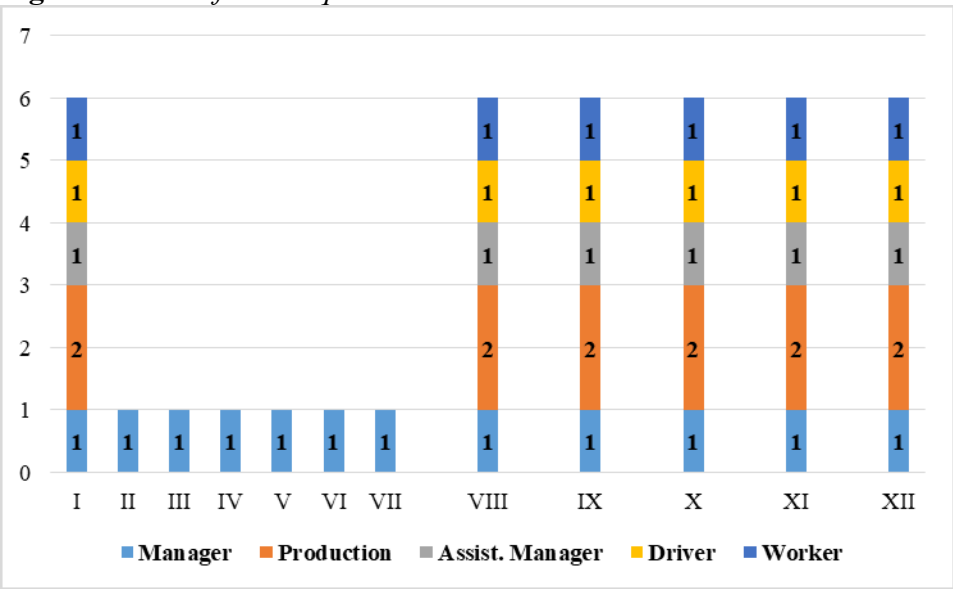
**Table 6.** *Labor force requirements and related salaries*

| No. | Typology | Personal needs | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | Total wages |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Manager | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 2 | Production | 2 | 2 | | | | | | | 2 | 2 | 2 | 2 | 2 | |
| 3 | Assist. Manager | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | |
| 4 | Driver | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | |
| 5 | Worker | 1 | 1 | | | | | | | 1 | 1 | 1 | 1 | 1 | |
| 6 | Salaries | unitary (€/person) | Wage costs (€) | | | | | | | | | | | | |
| 7 | Manager | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 4800 |
| 8 | Production | 322 | 644 | 0 | 0 | 0 | 0 | 0 | 0 | 644 | 644 | 644 | 644 | 644 | 3864 |
| 9 | Assist. Manager | 333 | 333 | 0 | 0 | 0 | 0 | 0 | 0 | 333 | 333 | 333 | 333 | 333 | 1998 |
| 10 | Driver | 322 | 322 | 0 | 0 | 0 | 0 | 0 | 0 | 322 | 322 | 322 | 322 | 322 | 1932 |
| 11 | Worker | 322 | 322 | 0 | 0 | 0 | 0 | 0 | 0 | 322 | 322 | 322 | 322 | 322 | 1932 |
| 12 | Total | | 2021 | 400 | 400 | 400 | 400 | 400 | 400 | 2021 | 2021 | 2021 | 2021 | 2021 | 14526 |
| 13 | Employer contributions | | 22.325 % | | | | | | | | | | | | |
| 14 | Total wages with contributions | | 2472 | 489 | 489 | 489 | 489 | 489 | 489 | 2472 | 2472 | 2472 | 2472 | 2472 | 17766 |

**Source:** *authors calculations*

The need for machinery and equipment to be procured through the project is based on the production to be stored, which in turn depends on the storage capacity. Table 7 presents the machinery and equipment requirements. The amortization that will be included in the production costs is calculated. Fixed asset lifetime and amortization calculation were made on the basis of the Catalog on Classification and Normal Operating Functions of Fixed Assets (Government Decision no.1496 / 2008). The annual depreciation is 13215 euro, the monthly value being 1101.25 euro.

**Figure 1.** *Labor force requirements*




**Source:** *authors calculations*

**Table 7.** *The need for machines, machinery and equipment and their depreciation*

| No. | Machine name | Nr. Each. | Unit Price (€/ piece) | Value (€) | Runtime (years) | Annual depreciation (€/ year) |
|---|---|---|---|---|---|---|
| 1 | Refrigerated car transport | 1 | 27000 | 27000 | 15 | 1800.0 |
| 2 | Fruit transport boxes | 10000 | 4.4 | 44000 | 10 | 4400.0 |
| 3 | Cleaning and sorting table | 1 | 11450 | 11450 | 12 | 954.2 |
| 4 | Packing machine | 1 | 4889 | 4889 | 10 | 488.9 |
| 5 | Pallet truck with electric lift | 1 | 8500 | 8500 | 10 | 850.0 |
| 6 | The refrigeration chamber | 4 | 8260 | 33040 | 12 | 2753.3 |
| 7 | Instrumentar laboratory | 1 | 1111 | 1111 | 10 | 111.1 |
| 8 | Construction | 1 | 73332 | 73332 | 42 | 1746 |
| 9 | Office equipment | 1 | 1111 | 1111 | 10 | 111.1 |
| 10 | Total | - | - | 204433 | - | 13214.6 |

**Source:** *authors calculations*

The duration of the investment is 5 months, according to the chart in Table 8.

**Table 8.** *Investment realization chart*

| Activity / Month | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Obtaining and arranging land, providing the necessary utilities | | | | | |
| Obtaining opinions, agreements, authorizations | | | | | |
| Elaboration of the project | | | | | |
| Construction work | | | | | |
| Constructions and plumbing | | | | | |
| Assembling of technological equipment | | | | | |
| Preparing the operating staff, arranging the building | | | | | |
| Technological samples and tests | | | | | |

**Source:** *authors calculations*

## Results and discussions

In this section, a detailed analysis of revenues and expenses is presented.

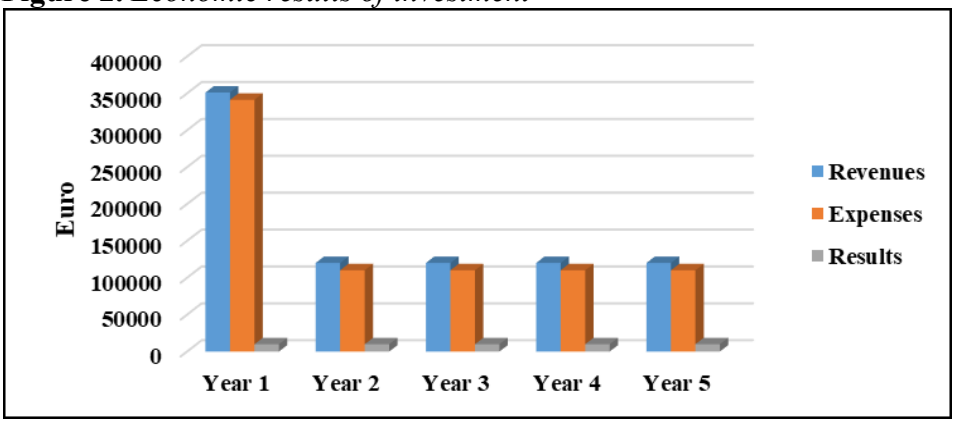
*The economic and financial analysis* is based on the indicators presented in Table 9, which centralize the incomes, expenses and economic results of the apple storage business for a five year forecast. Out of the total expenditure, the materials account for the highest share of 70%. Wage costs account for 16% of total expenditure and wage costs account for 12%.

**Table 9.** *Economic and financial results of the cooperative activity, euro*

| No. | Specification | First Year | Year II | Year III | Year IV | Year V |
|---|---|---|---|---|---|---|
| **I** | Total revenue, of which: | 351147 | 120111 | 120111 | 120111 | 120111 |
| 1 | Sell apples | 120111 | 120111 | 120111 | 120111 | 120111 |
| 2 | Financing the investment | 231036 | | | | |
| **II** | Total expenditure, of which: | 341257 | 110221 | 110221 | 110221 | 110221 |
| 1 | Materials | 77107 | 77107 | 77107 | 77107 | 77107 |
| 2 | Wage | 17766 | 17766 | 17766 | 17766 | 17766 |
| 3 | Depreciation | 13215 | 13215 | 13215 | 13215 | 13215 |
| 4 | Other expenses | 2133 | 2133 | 2133 | 2133 | 2133 |
| 5 | Payments related to the EAFRD project (active purchase) | 231036 | | | | |
| **III** | Results | 9890 | 9890 | 9890 | 9890 | 9890 |
| **IV** | Rate of economic profitability (%) | 3 | 9 | 9 | 9 | 9 |

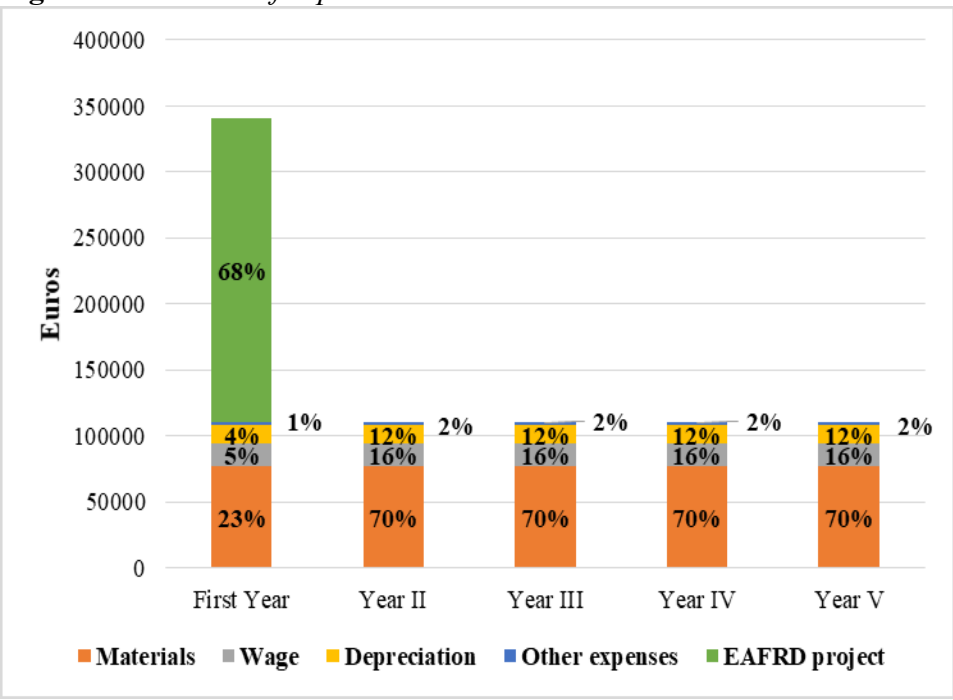
**Source:** *authors calculations*

**Figure 2.** *Economic results of investment*




**Source:** *authors calculations*

**Figure 3.** *Structure of expenditures*




**Source:** *authors calculations*

The apple storage business for three months brings a profit of 9890 euro per year (Table 9). The total investment is 231036 euro (out of which 73332 euro the construction of the deposit), which is found in the structure of revenues and expenditures in the first year. In the years 2-5, the incomes are 120111 euro and the expenses are 110221 euro.

Refrigerated cells also require the expenses of their special endowments amounting to 8260 euro per cell.

### Calculation of Investment Efficiency Indicators

The basis for the calculation is the data in Table 10. The effective operating time was considered to be the normal service life of the machines equal to 10 years. Regarding the normal production capacity expressed in value, it is shown in the annual income.

**Table 10.** *The core indicators of investment, euro*

| No. | Indicators | Value € |
|---|---|---|
| 1 | The value of the investment (Voi) | 231036 |
| 2 | The annual production capacity expressed in terms of value (Q) | 120111 |
| 3 | Annual cost of production (Cop) | 110221 |
| 4 | Annual profit (P) | 9890 |
| 5 | Actual running time, (Rt) years | 10 |

**Source:** *authors calculations*

**Table 11.** *Calculation of investment efficiency indicators*

| No. | Indicators | Value € |
|---|---|---|
| 1 | Specific investment (Si = Voi/Q, euro) | 1.92 |
| 2 | Profit to be recovered (Pr) | 9890 |
| 3 | Total profit (TP = P • Rt) | 98900 |
| 4 | Final profit (FP =TP – $P_r$) | 89010 |
| 5 | Economic return on investment (R = FP/Voi*100) % | 38.53 |
| 6 | The term of investment recovery,Voi/P, years | 23 |

**Source:** *authors calculations*

As a result of the calculations, it can be noticed that, at a total level, the specific investment is 1.92 euro. It is observed that the annual profit ensures recovery of the investment in 23 years. Considering the fact that it is the creation of a complex unit in which storage and marketing activities are combined, and from the idea that the economically demanding constructions are necessary, the business is feasible, although the economic return of the investment is under 100%, ie the total profit (recorded over the whole use of the machines) is lower than the investment.

## Conclusions

This paper presented the economic efficienty of fruits storage, analysing the revenues and expenditure of this activity. The main findings show that the business of storing fruits is feasible because the profit is 9,890 euros per year and the rate of economic profitability is 9%.

The relevance of the results is double-pronged: it lies in their capacity to be implemened by other farmers who wants to develop their businesses and increase their profits, and in advantages to final consumers who will find fresh fruits in the market longer periods of time.

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# DEVELOPMENT OF TARA MOUNTAIN ON THE SUSTAINABLE DEVELOPMENT PRINCIPLES

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## Abstract

*Having in mind that it is about the National Park of Serbia, tourist valorization of natural and cultural values of Tara Mountain requires a careful approach. Tourism of this area must be developed in accordance with legal constraints in approach and usage of natural resources and in accordance with the principles of sustainable development. The aim of this paper is to point to the necessity of applying the principle of sustainable development of tourism on Tara Mountain. Tourist activity is observed as a possibility for social-economic prosperity of this area, while sustainable development is that path to the reduction of negative effects of tourism on environment. The application of the sustainable development principle, as a crucial factor of the destination success implies the participation of different stakeholders whose interests are often rather different. The task of destination management is the coordination and fostering of the cooperation between all destination stakeholders.*

**Keywords:** *sustainable development, Tara Mountain, National park, tourist destination, tourism, destination management.*

## Introduction

As a phenomenon of the second half of the 20th century, sustainable development was, as still is, the subject of numerous discussions in literature. Basically, conceptual definition of sustainability comes from the requirements to harmonize the needs of development, i.e. to consume the resources in a manner that does not endanger the capacity of their

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renewal, but it encourages it and simultaneously provides the prosperity of contemporary society (Milićević, Podovac, Jovanović, 2013). The application of sustainable development principle prevents or mitigates negative effects of tourist activity on the environment.

One of the most popular destinations of modern tourism are the protected natural goods. Planning and development of tourism in destinations of this type require a proactive approach and elimination or minimization of negative effects of this activity on the environment.

Protected natural good of Serbia, National park Tara (NP) Tara, possesses rich biodiversity, as well as numerous cultural and historical values which enables the development of different forms of tourism. The purpose of the paper is to point to the necessity of applying the principle of sustainable development on Tara mountain. Main goals of the paper are:

1) Analysis of natural and cultural values of Tara mountain in order to present possibilities for tourism development;
2) Point to the necessity of careful planning of tourist activities in accordance with the legally defined constraints that are valid for the defined protection zones in NP Tara;
3) Through the analysis of material base of tourism and through the analysis of tourist turnover present current situation of tourism on Tara mountain;
4) Show the guidelines for future development of tourism that will be based on the principles of sustainable development.

## Sustainable development of tourism

Sustainability, as a conceptual creation of the advocates of the theory of environment preservation, is not a phenomenon of the modern age. The sustainability concept in econological sense is mentioned for the first time in 1970's of the XX century (Milićević, Podovac, Jovanović, 2013). However, the idea on sustainability is mentioned for the first time in 1980 in World Conservation Strategy, which was defined by the International Union for Conservation of Nature and Natural Resources (Liu, 2003).

Sustainable development implies the development, which meets the needs of contemporary generations, without endangering the possibility of future generations to meet their needs (Milićević, Podovac, Jovanović, 2013). The concept of sustainable or harmonized development should be understood as a process of harmonization of relations between economic,

social and cultural development, without the impairment of environment (Stefanović, Azemović, 2012). The concept of sustainable development promotes (Maksin, Pucar, Korać, Milijić, 2009):

- Life quality of local population and environment quality,
- Wise/rational usage of general and individual resources,
- Social justice in distribution of resources and goods,
- Possibility of choice of present and future generations,
- Balanced territorial development.

Sustainable tourism happened in the end of 20$^{th}$ century, as a need for establishment of the balance between tourism development, which is in expansion and environmental protection (Hrabovski Tomić, Milićević, 2012). Suddent development of tourism resulted in uncontrolled usage of natural resources, which are limited and many of them are not renewable. For that reason, a drastic turn in tourism development was required. The solution was found in development of sustainable tourism concept (Kostić, Milićević, Vulićević, 2016).

Sustainable tourism is defined as the seeking for a balance between environmental, economic, and sociocultural aspects (Mcintyre, Hetherington, Inskeep, 1993; Vera Rebollo, Ivars Baidal, 2003; Pforr, 2004; Milićević, Kostić, Đorđević, 2016). Ecological sustainability implies compatibility of development with preservation and maintenance of basic ecological processes, biological diversity and biological resources; economic sustainability implies economically efficient development and resources management in the manner that they will be available for future generations to use, while socio-cultural sustainability implies compatibility of development with culture preservation and value system of the people that are affected by that development, as well as permanent preserving, and expressing the local community's identity (Hrabovski-Tomić, Milićević, 2012). World Tourism Organisation, by the term sustainable tourism, implies tourism which takes into consideration the present and future economic, social and ecological impacts, paying attention to the needs of visitors, tourist industry, environment and local population.

The aim of the development of sustainable tourism is to meet the needs of tourists for the stay in naturally preserved areas, with the preservation of identity of the place itself and providing of the benefits for the local community, primarily through the incraese of employment and providing

the conditions for higher quality of life (Milićević, Podovac, Jovanović, 2013). Sustainable development of tourism implies tourism development that meets the needs of present tourists, tourist destinations and all participants in tourism, with simultaneous preservation of natural resources (Pavlović, Radivojević, Lazić, 2009).

World Tourism Organisation and UN Programme for the environment, by sustainable development imply such a development of tourism that meets the needs of tourists, as carriers of demand, tourist destinations as carriers of the supply, with a simultaneous preservation and enlargement of possibilities of future generations to meet their own needs (Hrabovski-Tomić, Milićević, 2012). For tourism to properly contribute to overall development, it is necessary to be planned and managed along with regarding the concept of sustainable development (Popesku, 2011).

Overall sustainability of tourist destination implies achievement of the balance between the type and scope of tourist activities on one hand and the capacity of natural and created resources, on the other hand. Sustainable development of tourism at the level of tourist destination should contribute to the maximization of positive effects, as well as minimization of negative effects for the environment, society, culture of one tourist destination.

## Analysis of natural values of Tara Mountain

Tara is situated in the Western Serbia and belongs to the internal range of Dinarids. The highest peak is Kozji rid with 1.591 m. the surface of Tara is 183 km², and the average height of the entire area is about 1.200 m (Plavša, Savić, Nenadović, Jaćimović, 2005).

In spatial geographic aspect, Tara Mountain stretches directly from Zlatibor. This points to the statement that their vicinity makes this area tourist-complex in a wider sense (Marinoski, Stamenković, Ilić, 2015). Transitivity of Tara Mountain is reflected in its border position between the Republic of Serbia and Federation of Bosnia and Herzegovina. The narrowest contractive zone consists of: Užice, Čačak, Valjevo and Višegrad (Bratić, 2015).

Vast areas of forest of this timid and, in all aspects, wealthy area is rightfully counted as one of the most woody areas in Europe, where some forest complexes are included among the most preserved and most

productive ones, with the highest qualities. Different forest ecosystems cover more than 75% of the total territory of Tara mountain.

On Tara Mountain, there are identified more than 40 herbaceous phytocenosis, herbaceous-coniferous and coniferous phytocenosis, then 1.156 types of vascular flora which makes 1/3 of the total flora in Serbia. Among the present plant species, 76 are endemic species. Among the well-preserved forest complexes, there dominate the forests of spruce, fir and beech (85% of forest complex), while the areals and habitats of Pancic's spruce (Picea omorika) are particularly interesting. This type is considered a living fossil of the world of plants, because it comes from the age of terciary. It was discovered on Tara Mountain by Serbian botanist Josif Pancic, in 19$^{th}$ century. Forest communities of Tara are under the first regime of protection, because they represent nature reservations (Ministry of Public Administration and Local Self-Government, 2014).

According to the results of previous studies, the region of Tara Mountain is inhabited by more than 50 types of mammals, about 140 types of birds, 23 types of amphibians and reptiles and 19 types of fish. Here you can also find the greatest population of the brown bear (Ursus arctos) in Serbia. The best known kind, for which we can say that it is the symbol of the inverterbrates fauna of Tara, is the endemorelite, Pancic's grasshopper (Pyrgomorphella serbica). Among the birds we can especially stress golden eagle, grey falcon, snake eagle, partridge and others. In clear waters of the park there are brown trout and grayling, while on the shores there are numerous mammals. The first attraction are brown bear, chamois, wildcat, otter, alpine scoop and even 12 kinds of bats (Fauna of Tara National Park, 2017).

Wider region of Tara was identified as an area significant for the plants (Important Plant Areas - IPA) and the area significant for the birds (Important Bird Areas – IBA). In addition, since the year 2003, the area of the National park Tara represents a selected area for prime butterflies (Prime Butterfly Areas – PBA), and it is also identified as significant within EMERALD network, European ecological network for preservation of wild flora and fauna and their natural habitats in those countries that are not EU members (PC „National park Tara", 2013).

The region of Tara is characterized by the mosaic of mountaneous elevations and surfaces that cut the valleys of the rivers and their

tributaries. In addition, there are present different geomorphological forms (caves, ravines, sinkholes, gorges, canyons and the like). Karstic relief increases the vividness of mountain space, which is clearly contributed by more shallow and deeper-cut river valleys, particularly gorge-canyon part of the Drina valley with the well-known viewpoint Kozje stene (Stanković, 2002).

The Drina River surrounds Tara from north-west and north side. The color of water is green, it is classified in the II class of soundness and it is classified among the purest water flows of Serbia. The Drina Canyon, 24 km long is probably the prettiest, and after the Colorado Canyon and Tara Canyon it is the deepest in the world.

## Analysis of cultural-historical values of Tara Mountain

On Tara mountain there are two immovable goods: Raca monastery and „Mramorje“ locality in Perucac, which possesses 80 monuments (tombs) which originate from XIV and XV century. „Mramorje“ locality is classified among the most significant and best preserved necropolises in Serbia and for that reason it is protected as a cultural monument of exceptional significance (Institute for the Protection of Cultural Heritage of Serbia, 2013).

On north-western slopes of Tara there is the place Kremna – by far known for Kremansk prophesy and Tarabic family (Ranisavljević, 2011). In the vicinity of Kremna, on the road to Tara, there is a complex “Kremansk Prophesy”, single-room chalet which is a kind of a museum.

In the middle of Tara and Zlatibor, there is ethno village Drvengrad. Drvengrad (Mećavnik) is a film city of the director Emir Kusturica, which was made for filming “Life is a Miracle”. It consists of the church-log cabin of Serbian Orthodox Church dedicated to Saint Sava, as well as houses-log cabins (Todorović, Bjeljac, 2007). The attraction of the Tara Mountain is also museum-tourist complex „Sargan Eight” which belongs to the group of industrial monuments. It is a part of the railway of a narrow track between Uzice and Visegrad, i.e. Mokra Gora and Kremna, through the Sargan hill. This railway has many bridges and 19 tunnels of which Sargan tunnel is the longest: 1660,80 m. by the number of bridges and tunnels and the ascent of 18 promils, Sargan Eight is unique in Europe (The Šargan Eight, 2017).

## Protection zones of the National Park Tara

In order to preserve natural values that Tara possesses, on the 13th of July 1981, the National Assembly of the Republic of Serbia has announced by a special law that this region is the National Park. The care of the park that includes 19.175 ha was given to the public company (PC) "National park Tara".

National park Tara with Zaovine and Mokra Gora is nominated by MAB UNESCO Committee as a potential reservate of biosphere which will have overborder character because it will also include the area of the future National park Drina in Bosnia and Herzegovina (PC "National park Tara", 2013).

Spatial plan of the area of the National park Tara (Official Gazette of RS, no 3/89) defines three zones of protection and the protection zone of NP. In I protection level we determine the prohibition of using natural wealth and we exclude all other forms of using the space and activities, except scientific studies and controlled education. In the II level of protection, there are managerial measures for the sake of restauration, revitalization and total improvement of natural good and traditional activity that have not endangered primary values of space during their development. In the III level of protection, there is allowed selective and constrained usage of natural resources, among other things, through the development of ecological, rural, health, sport-recreational and other forms of tourism (Stojanović, 2011).

Within the borders of this park, we can distinguish (National park Tara – position, announcement of the National park and protection zone, 2017):
a) High Tara, which includes approximately 60% of park territory or 11.562 ha and
b) Flat Tara with 7.613 ha.

High Tara is distinguished as a separate spatial-functional whole because there is a set of the most valuable parks of nature and natural values with the least level of change, more precisely in the I level with about 2.948,75 ha and in the II level of protection about 7.732,39 ha. In this part of the NP, nature protection is the priority and as for the economic activities, forestry is allowed, hunt and traditional mountain agriculture. In this part of Tara there is Predo's Cross which represents a tourist station and the starting point towards all significant localities of this part of NP.

Within the area of the Flat Tara the priority is also nature protection and there are natural values and cultural goods of significance for NP, but in this paer of NP there is a more diverse economic activity. In the regions implied by I (274 ha) and II (1.310 ha) level of activity protection are reduced and strictly controlled, but on the space remaining, except the forestry and tourism which are priority economic activities, there are already constructed facilities in tourist centers Kaludjerske Bare, Sljivovica, Mitrovac, and it is also planned to build new capacities in Oslusa, Sokolona and Krnja jela zone.

**Material base and organization of tourism on Tara Mountain**

On Tara Mountain there are defined 5 development tourist zones (Yugoslav Institute for Town Planning and Housing, 2012):

1. Predo's Cross,
2. Perucac,
3. Kaludjerske Bare,
4. Bajina Basta and
5. Mitrovac.

Predo's Cross is a locality, on 1.075 meters above sea level. It is situated in the most distant part of Tara, in the far west. It borders with the Republic of Srpska by the Perucac Lake and one part of land border. Precisely this remotedness has helped it to preserve its flora and fauna. In this region, there are also 3 nature reservations: Star Mountain, Cranberry and Karaula stula. The best ski courts are in the region of Predo's Cross, with height difference of 500 meters. The length of the track is from 3 to 5 km. There is a well-developed network of forest roads that are suitable for mountain cycling (Predo's Cross - location, 2017). Development zone of Predo's Cross is the most suitable for the development of rural tourism, meeting special interests and short vacations.

Zone „Perućac" is situated at about 12 km from Bajina Basta. It is a well-known tourist settlement with a big place for swimming, restaurants, pools for children, showers, etc. On Perucac, there are hotels „Vrelo" and „Jezero" as well as different private accommodation capacities. Here you can also find the trout fishpond. You have on your disposal a walk or boat or raft trip through Drina Canyon (Perućac Lake, 2017). Development zone „Perućac" has all the conditions to specialize itself and to become the leading fishing destination of Serbia and a destination that offers

different activities and experiences on water, development of summer and winter vacation, as well as shorter stays and usage of rural advantages.

Kaludjerske Bare are 16 km away from Bajina Basta. It is the south-eastern part of Tara as well as the best-known tourist center. There are regulated hiking trails, as well as trails for skiing and sliding, and thus this is a zone suitable for the development of mountain tourism in winter (alpine, Nordic skiing), for walking and cycling in the summer, then health (mountain wellness) and business (conferences, workshops, etc) tourism. Hotel complex in Kaludjerske Bare is situated outside the NP Tara, but it is in organizational, territorial and transport manner connected to the NP. In this zone, there are modern hotels „Omorika", „Beli Bor" and „Javor", and next to them there are private capacities with rooms of diiferent categories. There are 345 beds and dependans „Javor" with 50 beds. Its level of services is categorized with 3 stars. The visitors have on their disposal modern halls, sallons, cabinets for counseling, cinema, library, swimming pool and complete sport-recreation facilities and courts. In this zones there is also horse haras and a horse club „Dora". The activity of horse haras and horse club had an exceptionally positive effect on the improvement of the contents of Tara Mountain, tourism development and sport, primarily because here are perfect conditions for horsemanship (a great number of abandoned meadow, high quality food and other).

Development zone „Bajina Bašta", is a zone of great impact on the implementation of entire concept of tourism related to the potentials of Tara mountain. Here, there are popular tourist manifestations held, such as Drina Regatta, Bridge Fest, Sprout days, etc.

At the height of 1080 m, in the middle part of Flat Tara in the year 1979, there was formed a recreational-tourist center for school children. Having in mind that it is about a flat, grassy depression in the form of a plate which is surrounded by the complexes of coniferous forests, it is actually a real place for vacation and recreation, as well as learning. The complex consists of 7 pavillions of mountaneous type. It disposes with about 700 places, with a complete sport courts and three ski lifts. Within this complex there is also a smaller hunting lodge, post office, shops and about 60 weekend houses. Development zone Mitrovac is a destination characterized by the youth, activity and sport orientation, with constant innovations of the suuply of products and services. From Mitrovac, it is possible to organize interesting trips to all parts of Tara and the greatest

attraction is to visit the Kozja stena, from which there is a magnificent view of the Drina canyon, the lake above Perucac and entire valley down-stream from Perucac (Ristanović, 2005).

For the tourism of Tara Mountain it is significant also to distinguish the localities: Zaovine, Sljivovica, Sokolina, Oslusa. Zaovine is a region of rich biodiversity which belongs to Bajina Basta administratively. Great attraction are the lakes of this part of mountain. Sljivovica is a part located on the road Kaludjerske Bare – Mitrovac. In this region, very significant for the tourism is the information-education center, which was formed by the reconstruction of the abandoned grove house. The purpose of this object is multiple. There are held summer and winter camos for young rangers, where the students of elementary schools from Serbia in ten tours of seven days have a chance to extend their knowledge from ecology, geography, biology, environmental protection and to find out more about this, as well as other national parks in Serbia. This facility is also intended for the journalists who come to write about NP Tara. Center also receives smaller groups of tourists in free terms, who plan to spend several days there. Sokolina is about 8 km from Kaludjerske Bare. It is about the driest part of the Flat Tara, well-sunned and protected by terrain configuration from dominant winds. Above sea height of 1000 m especially contributes to the identification of the Sokoline locality for the development of health tourism.

Oslusa is situated near Mitrovac, above steep slopes towards Drina, directly along Tara's main road. On Oslusa, there is also a take off place for the ones who like paradliding, as well as viewpoint from which there is a great view of the Drina River and Bajina Basta.

On the border between Tara and Zlatibor in Uzice municipality there is also the nature park Mokra Gora, which is specific for the great difference in height between the highest and lowest point.

## Tourist traffic of Tara Mountain

The most visited mountain in the Republic of Serbia in the last five years in Zlatibor, Kopaonik is at the second place, while Tara is on the third. Only in 2016, Zlatibor was visited by 178.620 tourists, Kopaonik by 117.942, while Tara was visited by 63.741 tourists. In the same year, mountain places in Serbia were visited by 511.164 tourists. Based on the

previous, we can conclude that Tara mountain participated with the total of 12,47% is tourist visits of the mountains in Serbia with 34,94%.

On average, this region is visited by about 57.210 tourists. Tara is significantly more visited by domestic tourists than foreign and they stay longer on the average (3,8 nights). The greatest number of visits of foreign tourists is achieved in 2013, 5.376, which in relation to previous years does not represent a significant growth. The greatest number of visits are recorded in 2016, when it also came to the increase in the number of visits of domestic tourists, but simultaneously to the drop in the number of visits of foreign tourists by 11,85% in relation to the previous year (The Statistical Office of the Republic of Serbia, Statistical Yearbook of Serbia 2017).

**Table 1.** *Tourist traffic of Tara Mountain 2010-2016*

| Year | Arrivals | | | Nights | | |
|---|---|---|---|---|---|---|
| | Domestic | Foreign | Total | Domestic | Foreign | Total |
| 2010. | 46.589 | 4.418 | 51.007 | 147.270 | 13.490 | 160.760 |
| 2011. | 51.731 | 3.751 | 55.482 | 186.293 | 12.021 | 198.314 |
| 2012. | 56.249 | 4.211 | 60.460 | 214.333 | 14.367 | 228.700 |
| 2013. | 52.498 | 5.376 | 57.874 | 210.391 | 16.544 | 226.935 |
| 2014. | 48.117 | 4.555 | 52.672 | 194.564 | 12.090 | 206.654 |
| 2015. | 54.140 | 5.096 | 59.236 | 208.953 | 12.514 | 221.467 |
| 2016. | 59.249 | 4.492 | 63.741 | 232.038 | 11.575 | 243.613 |

**Source:** *The Statistical Office of the Republic of Serbia, Statistical Yearbook of Serbia (2011-2017)*

## Guidelines for future development of tourism on Tara Mountain

Specificity in tourism management of Tara Mountain comes from the fact that this region is a protected natural good – National Park. IUCN (International Union for Conservation of Nature) (2017) states that main goal in management of the national parks is: to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation. Others objectives are:

- To manage the area in order to perpetuate, in as natural a state as possible, representative examples of physiographic regions, biotic communities, genetic resources and unimpaired natural processes;

- To maintain viable and ecologically functional populations and assemblages of native species at densities sufficient to conserve ecosystem integrity and resilience in the long term;
- To contribute in particular to conservation of wide-ranging species, regional ecological processes and migration routes;
- To manage visitor use for inspirational, educational, cultural and recreational purposes at a level which will not cause significant biological or ecological degradation to the natural resources;
- To take into account the needs of indigenous people and local communities, including subsistence resource use, in so far as these will not adversely affect the primary management objective;
- To contribute to local economies through tourism.

Tourism development management within one destination implies primarily the determination of crucial stakeholders, their roles and tasks. One of the crucial stakeholders in development of tourist activity of Tara mountain is PC "National park Tara" which has the responsibility for the protection of the region, which implements the tasks of program development and management plans, protection programs; tasks of planning and arrangement of woods; tasks of spatial arrangement; tasks of cultivation and protection of woods; tasks of protection and promotion of hunt and fishing; information technology tasks, tasks of informing, presentation and popularization of values; tasks of tourism and education. Important role in development of the tourism on Tara mountain, in addition to this company also have: Tourist organization of Serbia, Tourist organization of the Western Serbia region, STC "Bajina Bašta", TO Uzice, TO Visegrad, Ministry of Trade, Tourism and Telecommunications, Ministry of Environment and Spatial Planning, Bureau for the protection of nature in Serbia and others. Wishes, attitudes and preferences of local population on one hand and tourists on the other hand can have an important impact on future course of tourism development of each destination.

All the activities aimed towards tourism development on Tara mountain should be harmonized with the National Startegy for Sustainable Development (Official Gazette of RS, no 57/2008), Tourism Development Strategy of the Republic of Serbia (Official Gazette of RS, no 98/2016), Spatial plan of the Tara National Park region (Official Gazette of RS, no 3/89), Management plan of the National Park Tara, Master plan for tourism development with business plan for Tara mountain and its surroundings.

In recent years, there appears ecological trend of hotel business – "green" hotels. Their role is to reduce the consumption of energy and water and emissions of carbon dioxide by the application of innovative methods of the responsable manner of building and managing a hotel; also to take care of the separation of solid waste and increase the recycling of waste matters; to reduce the usage of classical detergent and other chemical agents to the minimum, i.e. replace by "ecological" means; to prevent or reduce the environmental pollution and, wherever it's possible, to affect the preservation of local biodiversities (Milićević, 2016). By the construction of such facilities on Tara, accommodation capacities would achieve better business results and simultaneously they would give a significant contribution to the environmental protection.

For the purpose of sustainable development of tourism on Tara Mountain, there are following suggestions of measures given:

- In addition to zoning, which exists within NP, it is required to determine the carrying capacity, i.e. maximum usage of Tara mountain as tourist destination without causing negative consequences for natural resources, reduction of satisfaction of visitors or causing the opposite effects in relation to local population, society, nature and culture of the specific field;
- Construction of new tourist capacities and renewal and modernization of the existing ones, in a manner that will provide minimum effect on the environment, reduce the energy consumption and other resources required, whose style of construction will fit into the local construction style;
- In order for the sustainable development to be the support to tourism, one of the management options is "to strengthen the location". The most widely present manner of adapting the environment is setting of the protection structures such as concrete walls, promenades, walking trails and facilities for visitors. Such measures prevent the appearance of erosion and infliction of damage to vegetation and they can also be used as a protection measure of wild animal world;
- Force tourist companies to pay taxes for environmental impacts in order to finance the process of recycling, capacity for waste processing, electrical energy, water supply, because tourists also need these services;
- Provide the reports on the impact of tourism on the environment;

- Organize training programs for local population in order to include them in tourism development;
- Develop those forms of tourism, which imply the activities of tourists that will not greatly affect the environment in a negative sense, such as: ecotourism, educational, rural, health, adventure, cultural tourism, photo safari, birdwatching and other.
- Main role in sustainable development of tourism and coordination of interests of all crucial stakeholders should be given to a special organization, i.e. establish Destination management organisation of Tara mountain.

## Conclusion

Tara Mountain is a destination that possesses natural and anthropogenic values that can be used for different forms of tourism. The fact is that Tara is proclaimed a National park already speaks about the wealth of its nature. Rich biodiversity is difficult to exceed with anthropogenic values, due to which natural tourist attractions are still greater in number than cultural tourist activities. Material base for tourism development is insufficiently developed. The number of visits on Tara is significantly less in relation to the leaders in mountain tourism, Zlatibor and Kopaonik. The increase of the number of tourists in 2016 should be observed with caution, having in mind that in addition to positive effects, the increased tourist traffic can also have negative effects on the environment. Main focus of tourism of this destination must not be the attraction of a great number of tourists, but also the creation of a quality offer for a certain segment of tourist demand. The accents should be put on the development of sustainable tourism which will among other things imply a strict control of the number of visitors (creation of tourist tours that will imply a smaller number of tourists). Common task of crucial destination stakeholders is the implementation of different strategies in order for the integrated tourist supply of Tara to be in accordance with the principles of sustainable development. Line ministries and tourist organizations are at the macro level in charge for the planning and implementation of significant investments. PC "National park Tara" has a significant role in implementation and planning of sustainable tourism. For the coordination of many and often conflicted interests of crucial stakeholders, when managing the development of the tourism of Tara mountain, it is required to establish Destination management organisation.

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# THE WORLD OF ORGANIC AGRICULTURE

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## Abstract

*Growers are increasingly turning to certified organic farming systems but it still only represents a small part of the global agriculture. This technology showing some signs of instability in terms of its diffusion and economic sustainability. In addition, demand concentration and standards harmonization remains main obstacles in achieving organic system full potential. A strictly controlled organic system enhanced consumer trust but it acts as a barrier to trade also.*

**Key words:** *organic, standards, trade*

## Introduction

Over the past three decades the organic agro-food system has been transformed from a local network to a globalized system. In all countries shift from natural shops to mass retail sales is continuing and according to some estimations over half of organic sales is done through supermarkets (Sahota, 2016). Global sales increased from US $15 billion recorded in 1999 to over US$80 billion in 2015 (Sahota, 2016). "Thought organic products make up a minor share of the world food market, the proliferation of certified commodities and their increasing availability in mainstream supermarkets have made organics the fastest growing segment of the food industry" (Raynolds 2004). "Many farms in both developed and less-developed countries implement organic practices but are not certified organic. However, growers are increasingly turning to certified organic farming systems as a way to provide verification of production methods, decrease reliance on non-renewable resources, capture high-value markets and premium prices, and boost farm income" (Reganold and Wacher, 2016). "Organic standards include labeling regulations, and also prescribe an independent control

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system (third‐party certification) as a key element. Accredited certification bodies carry out regular audits to inspect whether the standard's requirements are met by all companies along the value chain and whether stringent documentation and traceability are guaranteed… Depending on national regulations, certification bodies can be state operated or private, nongovernmental businesses" (Bernzen and Braun, 2014). "As most certification standards originated in temperate developed countries, they are not always applicable in other regions, especially in less-developed countries" (Reganold and Wacher, 2016). A lack of transparency and effectiveness in the organic food certification system due to involvement of "different actors and stakeholders…in shaping and managing the certification schemes" as well as "different approaches and tools"… and "different emphases" (Moschitz 2011) "has led to an inevitable need of harmonization of organic farming standards"… and thus "international harmonization of the organic standards can be perceived as a reasonable food policy goal" (Kosovska 2013). Considering that, ongoing efforts to establish organic equivalency agreements among different trading partners can be understood as a step forward to a reduction of the trade barriers and establishment of the real international organic market. Given the recent growth in organic trade this article will provide brief history of the organic farming and will examine major challenges surrounding this issues nowadays.

## Organic farming: history

"Rudolf Steiner's 1924 course on biodynamic agriculture sparked the evolution of organic agriculture in Europe" (Reganold and Wacher, 2016). Rudolf Steiner (1861–1925) was Austrian philosopher, social reformer, architect and esotericist. He is founder of the anthroposophy that "postulates the existence of an objective, intellectually comprehensible spiritual world that is accessible by direct experience through inner development. More specifically, it aims to develop faculties of perceptive imagination, inspiration and intuition through the cultivation of a form of thinking independent of sensory experience and to present the results thus derived in a manner subject to rational verification. Anthroposophy aims to attain in its study of spiritual experience the precision and clarity attained by the natural sciences in their investigations of the physical world" (Wikipedia, 2017). Anthroposophical ideas have been applied practically in many areas including education, medicine, ethical banking, organizational development and agriculture. Biodynamic agriculture concept began in 1924 when Rudolf

Steiner gave a series of lectures published in English as *The Agriculture Course.* In his first agricultural lecture dated June 7, 1924 he stated: "For Agriculture especially is sadly hit by the whole trend of modern spiritual life. You see, this modern spiritual life has taken on a very destructive form especially as regards the economic realm, though its destructiveness is scarcely yet divined by many… One cannot speak of Agriculture, not even of the social forms it should assume, unless one first possesses as a foundation a practical acquaintance with the farming job itself. That is to say, unless one really knows what it means to grow mangolds, potatoes and corn! Without this foundation one cannot even speak of the general economic principles which are involved. Such things must be determined out of the thing itself, not by all manner of theoretic considerations" (Steiner, 1924). Further R. Steiner explained that farm is "a kind of individual entity in itself ", and thus "whatever you need for agricultural production, you should try to possess it within the farm itself" in order to reach ideal of healthy farm capable to produce within itself all that it needs (Steiner 1924a).

"Between the two World Wars 'modern', chemical-intensive, technically advanced farming faced a crisis in the form of soil degradation, poor food quality and the decay of rural social life and traditions. As a solution to this crisis, organic farming pioneers offered a convincing, science-based theory during the 1920s and 1930s that became a successful farming system during the 1930s and 1940s. But it was not until the 1970s, with growing awareness of an environmental crisis, that organic farming attracted interest in the wider worlds of agriculture, society and politics" (Vogt, 2007). However, it can be noted that "organic agriculture was established in its own right in the 1930s and 1940s, being developed in Britain by Lady Eve Balfour and Sir Albert Howard, in Switzerland by Hans Mueller, in the United States by J. I. Rodale and in Japan by Masanobu Fukuoka. By the 1970s, organic foods had grown in popularity, prompting the first organic certification standards to be drafted in Europe and the United States, and commencing an ongoing evolution of certifiers that now includes 283 organic certification bodies worldwide operating in 170 countries. This proliferation of certifiers reflects both a complex history of sometimes competing independent standards and the demand for access to certifiers around the world" (Reganold and Wacher, 2016). Before the 1970s, funds for organic research were extremely limited. After that time publicly funded research and allocated budget devoted to organic farming significantly increased. Slabe reported in 2004 that Austria, Denmark, France, Germany, Italy, the Netherlands, Sweden, Switzerland, UK have established a special funding programme, while Estonia, Latvia, Malta, Slovenia with a certain share (10 – 50%) incorporated organic

farming research in more generic projects (Slabe, 2004). The same source stated that Austria devoted at least 1 million euros per year on organic research; Denmark, France and Switzerland about 7 million euros per year; Germany between 7 and 10 million; the Netherlands about 13 million euros; Sweden approximately 6 million per year; Poland 3 million per year; the UK 2.2 million a year. The publicity investment in organic farming research is still underfunded at both European and the US level. "The Netherlands and Belgium devote respectively 3 and 5% of the total agricultural research budget to organic farming. France and Germany lay behind with a share of only 1% for organic farming research" (Baret et al., 2015). "While 2014 Farm Bill expanded its organic research budget to 100 million US dollars over five years, that is just small amount compared to the total 1.2 billion US dollars for all federal agricultural research" (Haumann 2016), Although the investments are low, the abundance and variety of organic research has been performed over the world. "A similar evolution has been evident in the attitudes of policy makers… Many governments that long ignored organic farming now offer farmers subsidies for producing organically… Five countries were represented when [International Federation of Organic Agriculture Movements] IFOAM was organized in 1972; by the late 1990s it had members from over 100 countries. IFOAM's scientific conferences, which until the mid-1980s had been held only in western Europe and North America, have since been held in countries as diverse and dispersed as Burkina Faso, Australia, Hungary and Brazil, among others. Further evidence that organic farming has become truly global is that the UN Food and Agriculture Organization [FAO] has been involved in it starting in 1999, with activities that include networking, market analysis, environmental impact assessments, improving technical knowledge, responding to country requests for assistance, and development of standards through the Codex Alimentarius Commission. Similarly, the United Nations Conference on Trade and Development [UNCTAD] has been involved in several aspects of global trade in organic foods since 2001, particularly in assisting developing countries to increase their production and exports" (Lockeretz 2007).

## Organic agriculture worldwide: current statistics

Global area under organic crops increased almost four fold in 2014 compared to 1999 and is about 43.7 million hectares. This data is not completely precise, since it includes both fully converted areas and in-conversion areas. In addition to organic agricultural land, organic production use wild land for beekeeping, aquaculture, forest and grazing areas in total of 37.5 million hectares. However, the share of areas under organic crop in the

total agricultural land is very low, somewhat about 0.9%. The largest part of agricultural land dedicated to organic production is in Oceania (17.3 million hectares) and Europe (11.6 million hectares) (Table 1).

**Table 1.** *World: Organic agricultural land (fully and partially converted)*

| Region | Organic land (million ha) | % in global organic land |
|---|---|---|
| Africa | 1.26 | 2.9 |
| Asia | 3.57 | 8.2 |
| Europe | 11.6 | 26.6 |
| Latin America | 6.79 | 15.5 |
| North America | 3.10 | 7.1 |
| Oceania | 17.34 | 39.7 |
| Total | 43.66 | 100 |

**Source:** *Lernoud and Willer, 2016.*

The ten countries with the largest areas of organic agricultural land are: Australia (17.2 million hectares), Argentina (3.1) the US (2.2), China (1.9), Spain (1.7), Italy (1.4), Uruguay (1.3), France (1.1), Germany (1.0) and Canada (0.9 million hectares). From the other side, only 11 countries dedicated more than 10% of theirs agricultural land to organic production, as follows: Falkland Islands (36.3%), Liechtenstein (30.9%), Austria (19.4%), Sweden (16.4%), Estonia (16.2%), Samoa (14.3%), Switzerland (12.7%), Sao Tome and Principe (12.0%), Latvia (11.2%), Czech Republic (11.1%), and Italy (10.2%) (Lernoud and Willer, 2016). Many others countries produce organic crops on less than 1% of the total agricultural land. Among other, those are: Brazil (0.3%), China (0.4%), the US (0.6%), Russia (0.1%), Serbia (0.2%), Montenegro (0.6%), Bosnia and Herzegovina (0.02%), and Albania (0.04%) Despite low share of the areas under organic crops in the total world's agricultural land and an unstable diffusion (decrease in the areas was reported in 47 countries) of the technology, significant improvement can be recorded in particular countries. Best examples (countries without oscillations in the previous years) are Fiji, Indonesia, Myanmar and Tonga. Fiji increased its areas for 326% from 2013 to 2014 (from 2,316 ha to 9,218 ha). In the same period Indonesia increased it for 73%, Myanmar for 493.1% and Tonga for 401.8%. "Almost two-third of the 43.7 million hectares of organic agricultural land in 2014 were grassland/grazing areas (27.5 million hectares)", while cropland constitutes 11.9 million hectares (Lernoud and Willer, 2016). Analyzing structure of the land use in different continents (Lernoud and Willer, 2016) it is obvious that in Europe and the US arable land and permanent grassland/grazing areas have almost equal share; they both use arable land mostly for cultivation of green fodder and cereals, while Europe permanent crops (12% of the total agricultural organic land) uses for

olives, grapes, nuts and fruits; in Oceania almost all organic agricultural land is used for permanent grassland; permanent pasture dominates in the use in Latin America, too – coffee, cocoa and tropical fruits dominates in one-tenth of organic agricultural area devoted to permanent crops; Asia almost half of the total organic agricultural land use for cereal production, rice and oilseeds production; Africa almost half of the total organic agricultural land use for cash crops coffee and olives (permanent crops).

About 2.3 million farmers are engaged in organic production; three-quarters of them are from Asia, Africa and Latin America. Absolute leader in number of organic producers is India, with its 650,000 organic farmers; it is followed by Uganda (190,552) and Mexico, Philippines, Tanzania and Ethiopia (between 169,000 and 135,000) (Lernoud and Willer, 2016). In other words, six previously mentioned countries host 63.5% of the organic farmers. From the other side, EU dominates in the number of processors and importers (62,000 processors and 2,900 importers in the world) (data for the US is missing) (Lernoud and Willer, 2016). For comparison sake, India has 930 times more numbers of organic producers than processors or exporters, while Germany has just 2.5 times more producers than processors. Although North America and Europe together participate with about 33.7% in the total organic agricultural land, these two regions "comprise over 90% of organic food and drink sale" (Sahota, 2016). North America alone amounted for 48% or 38.5 billion US$ out of 80 billion US$ of the total retail sale in 2014. European market, led by Germany and French as a second-largest market is valuated at about 35 billion US$ or 43.7% of the global organic market. Asia, as a third-largest organic market is mostly export-oriented. An exemption is China that produces organic crops mainly for domestic consumption. "Over 80% of Latin America's organic output is exported, reproducing the region's historical dependence on agro-export markets and vulnerability to global market fluctuations. Data on export earnings are incomplete, but Mexico appears to lead the way with US$70 million in revenues. In terms of their contribution to the national economy, organic exports are the most significant in the Dominican Republics, where they represent 10% of agro-export and three percent of total export earnings" (Raynolds 2004).

## Standards as a major challenge

"Organic standards are sets of requirements that describe what practices can be considered organic. Typically, organic standards address various aspects of organic production, namely: general farm production

requirements and conversion periods; crop production requirements and requirements for the collection of wild products; animal production requirements (including bee-keeping); processing and handling requirements; social justice requirements; labeling requirements. Organic producers can decide to comply with the organic standard of their choice. However, to access certain markets and be able to call their products organic in those markets, they must often be certified to a particular standard or government regulation. If they want their product to bear a particular private label, they also need to be certified to the corresponding private standard. Certification is the procedure by which operators receive written and reliably endorsed assurance that they are producing specified products in compliance with a particular standard. In the organic sector, to date this has most commonly happened via: individual third party certification by an independent certification body; and Group certification, whereby a group of farmers implement an Internal Control System (ICS) and are certified collectively by a third party certification body, which assesses the performance of this system. A high number of certification bodies offer organic certification services worldwide. Some of those bodies are governmental/public, but the majority are private organizations (IFOAM 2017).

According to Research Institute of Organic Agriculture (FiBL)'s survey 87 countries over the world have adopted organic standards (having national regulations), while 18 countries are in the process of drafting legislation (Huber, Schmid, and Möler, 2016) as presented in Table 2. EU 28, Switzerland, Turkey, Australia, China, India, Israel, Japan, South Korea, New Zealand, Saudi Arabia, Argentina, Canada, Costa Rica, the US and Tunisia where countries that in 2015 have standards officially endorsed by IFOAM. The IFOAM Standards Requirements, also called Common Objectives and Requirements of Organic Standards (COROS), were developed as a joint venture of the IFOAM Organic Guarantee System (OGS) and the Global Organic Market Access (GOMA) Project undertaken by FAO, IFOAM and UNCTAD. According to feedback from the persons interviewed by IFOAM team 7 countries (Azerbaijan, Jordan, Kazakhstan, Philippines, Cuba, Venezuela and Morocco), out of 87 that have adopted organic standards, still "not fully implemented" them. In addition to countries that adopted, fully or partially, organic regulations and countries that are in the process of drafting them, 15 countries have adopted national standards for organic agriculture (Huber, Schmid, and Möler, 2016), but without regulation. Those are Bahrain, Bhutan, Brunei, Hong Kong, Kuwait, Laos, Oman, Qatar, Burkina Faso, Ghana, Kenya, South Africa, Zambia and Zimbabwe.

**Table 2.** *World: Regulations on organic farming*

| Region | Country | Remark |
|---|---|---|
| **Europe** | EU28 | Fully implemented / officially endorsed as organic by IFOAM |
| | Albania | Fully implemented |
| | Iceland | Fully implemented |
| | Macedonia, FYROM | Fully implemented |
| | Moldova | Fully implemented |
| | Montenegro | Fully implemented |
| | Norway | Fully implemented |
| | Serbia | Fully implemented |
| | Switzerland | Fully implemented/officially endorsed as organic by IFOAM |
| | Turkey | Fully implemented/officially endorsed as organic by IFOAM |
| | Ukraine | Not fully implemented |
| | Belarus | Drafting stage |
| | Bosnia & Herzegovina | Drafting stage |
| | Russia | |
| **Asia & Pacific region** | Armenia | Fully implemented |
| | Australia | Fully implemented / officially endorsed as organic by IFOAM |
| | China | Fully implemented / officially endorsed as organic by IFOAM |
| | French Polynesia | Fully implemented |
| | Georgia | Fully implemented |
| | India | Fully implemented |
| | Indonesia | Fully implemented / officially endorsed as organic by IFOAM |
| | Iran | Fully implemented |
| | Israel | Fully implemented |
| | Japan | Fully implemented / officially endorsed as organic by IFOAM |
| | South Korea | Fully implemented / officially endorsed as organic by IFOAM |
| | Lebanon | Fully implemented / officially endorsed as organic by IFOAM |
| | Malaysia | Fully implemented / officially endorsed as organic by IFOAM |
| | New Caledonia | Fully implemented |
| | New Zealand | Fully implemented |
| | Saudi Arabia | Fully implemented |
| | Solomon Islands | Fully implemented |
| | Taiwan | Fully implemented / officially endorsed as organic by IFOAM |
| | Tajikistan | Fully implemented / officially endorsed as organic by IFOAM |
| | Thailand | Fully implemented |
| | United Arab Emirates | Fully implemented |
| | Azerbaijan | Fully implemented |
| | Jordan | Fully implemented |
| | Kazakhstan | Fully implemented |
| | Philippines | Not fully implemented |
| | Bangladesh | Not fully implemented |
| | Egypt | Not fully implemented |
| | Jordan | Not fully implemented |
| | Kyrgyzstan | Drafting stage |
| | Nepal | |
| | Pakistan | |

| | | |
|---|---|---|
| | | Drafting stage<br>Drafting stage<br>Drafting stage<br>Drafting stage<br>Drafting stage |
| **The Americas &Caribbean** | Argentina<br>Bolivia<br>Brazil<br>Canada<br>Chile<br>Columbia<br>Costa Rica<br>Dominican Republic<br>Ecuador<br>Guatemala<br>Honduras<br>Mexico<br>Nicaragua<br>Panama<br>Paraguay<br>Peru<br>Uruguay<br>USA<br>Cuba<br>Venezuela<br>Jamaica<br>St. Lucia | Fully implemented / officially endorsed as organic by IFOAM<br>Fully implemented<br>Fully implemented<br>Fully implemented / officially endorsed as organic by IFOAM<br>Fully implemented<br>Fully implemented<br>Fully implemented / officially endorsed as organic by IFOAM<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented<br>Fully implemented / officially endorsed as organic by IFOAM<br>Not fully implemented<br>Not fully implemented<br>Drafting stage<br>Drafting stage |
| **Africa** | Tunisia<br>Morocco<br>Algeria<br>Egypt<br>Kenya<br>Namibia<br>Senegal<br>South Africa<br>Sudan | Fully implemented / officially endorsed as organic by IFOAM<br>Not fully implemented<br>Drafting stage<br>Drafting stage<br>Drafting stage<br>Drafting stage<br>Drafting stage<br>Drafting stage<br>Drafting stage |

Food consumption requires trust that can be built through standards. For example, more than 70 % of Europeans say they trust organic products not just about quality but also about "protecting the **environment,** providing good conditions for **animals**, and boosting **rural development**" (EC, 2017). Regardless of that, standards for organic products differ among countries and could act as a barrier to trade (Sawyer, Kerr, and Hobbs, 2008). "A recent indication that organic trade potentially can cause trade tensions is the concern raised in the WTO [World Trade Organization] Committee on Technical Barriers to Trade in November 2010 about Korea's proposed requirement that

all imported organic food must be certified by Korean certification authorities or by certification bodies accredited by these… With the potential risk of organic protectionism, the crucial question is whether such disputes can be successfully addressed within the international trading system… In particular three sets of difficulties relating to organic food trade exist within the WTO trade regime... Firstly, organic farming sits somewhat uneasily within the WTO legal framework because the WTO regulatory system is mostly concerned with product characteristics and process and production methods impacting on the physical contents of the end product… Secondly, none of the WTO agreements define organic farming or food, but it is recognised and defined in other private and intergovernmental global institutions, most notably in IFOAM and the Codex Alimentarius Commission. Both of these international organisations have published a set of organic standards…

Thirdly, with few exceptions, domestic organic certification and labelling bodies are private organisations albeit usually they have to comply with government baseline standards and obtain government licensing to certify… It remains unclear whether and, if so, how the WTO legal framework applies in relation to such private standards and certification bodies" (Daugbjerg, 2012).
International Organic Trade Resource Guide founded by the US Department of Agriculture's Foreign Agriculture Service (FAS) which is administered by the Organic Trade Association's Organic Export Program provides a country classification list according to market access (ease of meeting regulatory requirements for importing organic products from the US). Based on certain requirements countries are classified as: restrictive to import, countries with light barriers to import, and countries open to import.

The organic legislation or regulation imposes significant requirements on imported organic products and/or for accreditation of certification bodies in three countries: Brazil, China and Russia, signed as "restrictive to import." China is very interesting for all countries with export tendencies since it is 5$^{th}$ largest market in the world by value of organic packaged food and beverages (in 2015 is US$1,669.4mn.) and country with the strongest year-on-year growth demand in Asia-Pacific region. A growing demand for organic food in China to a significant extent can be attributed to "food safety scandal", especially 2008 melamine scandal that were taken ill about 300,000 babies (Branigan, 2008). Thus, nowadays organic standard milk dominates overall value sales, accounting for near 95% of total market value (GlobalOrganicTrade 2017). China does not allow equivalence agreements with other countries and does not recognize other countries organic standards. For example, US producers, will not be

allowed to use the Chinese term for organic unless they receive Chinese certification. “It normally cost about $3,200 plus airfare and lodging for a product to be certified to Chinese standards and products must be recertified every year” (GAIN, 2012). Thanks to that expensive request China’s domestic public companies dominates in the organic retail sales. The largest company by sales in organic packaged food and beverages is Inner Mongolia Yili (products include liquid milk, ice cream, milk powder, yogurt, and raw milk), which maintains 34.5% of total sales. It is followed by China Mengniu Dairy Co (32.1%) and Inner Mongolia Shengmu (15.4%).

Brazil, the largest market of the organic foods in Latin America and 25$^{th}$ largest market in the world by value (in 2015 is US$79.2mn) (GlobalOrganicTrade 2017) is also signed as a country “restrictive to import.” As of January 1, 2011 all organic products sold in Brazil, including those imported, must be certified by an organization registered at the Federal Agency-National Institute of Meterology, Standardization and Industrial Quality (INMETRO) and the Ministry of Agriculture (MAPA). Surprisingly, organic products have a negative image in Brazil, where most consumers perceive them to taste bad, so the organic packaged food and beverage market is expected to remain a niche market for specialized domestic manufacturers (GlobalOrganicTrade 2017).

Russia is categorized as restrictive to import mostly due to 2016 Decree#305 that extended the ban on certain imported foods from the US, Canada, the EU, Australia, Norway, Ukraine, Albania, Montenegro, Iceland, and Lichtenstein until the end of 2017. The products banned include beef, pork, poultry, fish and seafood products, fruits and nuts, vegetables, and some sausages and most prepared foods. Organic baby food is exempt from the ban (GlobalOrganicTrade 2017).

Light barrier to trade have those countries which organic legislation or regulations includes imported products or importer and/or; Importers are required to register or be certified as organic operators with an authorized government agency and/or; Imported products labeled “organic” or other equivalent designations, such as “eco”, must be certified to the country's organic regulation by a certifier approved by the country's authorized agencies. Argentina, Armenia, Australia, Bolivia, Chile, Colombia, Ecuador, El Salvador, Georgia, Guatemala, Honduras, Iceland, India, Indonesia, Israel, Macedonia, Mexico, Moldova, Montenegro, Nicaragua, Norway, Paraguay, Peru, Philippines, Saudi Arabia, Serbia, Tunisia,

Turkey and Ukraine belong to this group (GlobalOrganicTrade 2017). For example, any food imported to Norway must comply with Norwegian food regulations. Products must originate in a third country whose competent authority assesses that they have been produced using methods such as those in Peru's regulations. Among other requirements in Saudi Arabia, imported products must be certified in the country of production, must be labelled with organic-production-data labels and logos, and the name of the certification body or registration number. If organic products are imported in Serbia, in addition to a certificate issued by the competent body in the country of origin, it is also necessary to obtain recertification from the authorized national body, for which the importer is required to file an application. The competent authorities or institutions in the imported product's country of origin issued an inspection certificate which indicates that they have been produced by a method equivalent to this Nicaraguan Mandatory Technical Standard organic production.

Finally, the third group "open to import" countries are those countries that have a bilateral equivalency agreement with the US; the country's organic legislation or regulation does not address imported products or; the country's organic legislation or regulations have not been implemented or enforced. Such kind of countries are: Bhutan, EU, Burundi, Canada, Costa Rica, Dominican Republic, Micronesia, Fiji, French Polynesia, Guam, Hong Kong, Japan, Kenia, Kiribati, Korea, Kuwait, Marshall Island, Morocco, Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Panama, Papaya New Guinea, Pitcairn Island, Qatar, Rwanda, Samoa, Solomon Islands, Switzerland, Taiwan, Tanzania, Thailand, Tokelau, Tonga, Tuvalu, Uganda, Vanuatu, Vietnam, Wallis and Futuna (GlobalOrganicTrade 2017). Many of mentioned countries, especially small islands and African countries belong to this group because have not yet been implemented or enforced legislation or regulations. Canada, EU and Japan belong to this group because of bilateral equivalency agreement signed with the US. The first such kind of agreement was concluded in 2009 between the US and Canada. Since then, the US has established organic equivalency arrangements with the EU (2012), Japan (2014), South Korea (2014), and Switzerland (2015). EU have signed equivalence agreements with Argentina, Australia, Canada, Costa Rica, India, Israel, Japan, New Zealand, Republic of Korea, Switzerland, Tunisia. Canada currently recognized (apart from the US) the EU, Switzerland and Costa Rica as equivalent system.

However, current agreements did not include full equivalence of the organic standards. "Wine is not included in the agreement, and standards relating to the use of antibiotics are exempted from the agreement… the current situation in the world market is unsatisfactory with more than 500 certification bodies applying more or less divergent standard systems. Equivalent standards in the three major markets for organic produce would lower the administrative and production costs for organic producers, not least in the developing countries, and increase organic trade. This is likely to create improved conditions for further growth of organic farming at the global level" (Daugbjerg, 2012). First indications of market growth are already observed. Jaenicke and Demko (2015) used a "gravity" econometric model to analysed the policy impacts from the organic equivalency arrangements and found that both collectively as a single policy or as individual policies, have a positive impact on organic exports. "When examined as individual policies the Canadian equivalency policy generates a 455 percent predicted increase in annual organic exports. The Japanese equivalency policy generates a 220 percent predicted increase in annual organic exports. The Taiwanese equivalency policy generates a 211 percent predicted increase in annual organic exports. The EU equivalency policy suggests little change on annual organic exports despite US exports to the EU in recent years" (Jaenicke and Demko 2015).

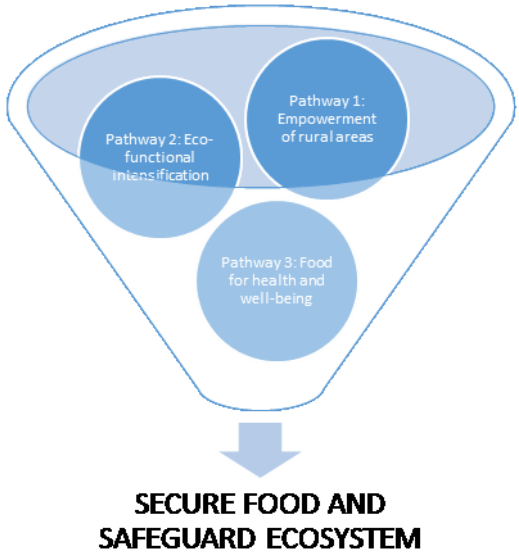
## What will organic farming look like by 2030? A visionary forecast

Many foresight studies emphasize that resources, such as nitrogen, phosphorus and water all important for agricultural productivity will become scarcer and expensive. In addition, ecosystem will continue to be increasingly threatened by agriculture and migration of people from the land to the urban and per-urban centres will continue. In such circumstances, "organic management offers a viable dual strategy for providing 'high quality foods' and 'mainstreaming the best sustainability farm practice', two seemingly contradictory trajectories" (Niggli, Willer and Baker 2016).

IFOAM vision of the future organic agriculture development indicates three main pathways: empowerment of rural areas, eco-functional intensification and food for health and well-being. Stated indicates possibilities that: organic agriculture, food processing and eco-tourism will become important drivers of the empowerment of rural economies; organic agriculture will help stop migrations from the land; the availability of food, the stability of the food supply and access to food

will be noticeably increased; knowledge among farmers will be much greater and they will become models for ecosystem managers, co-researchers and in-and output optimizers; organic farming will cause shift in diet, people will have at disposals more healthy and balanced diet; cooperative and participative models of transport, and safe and traceable food system will prevail, and organic actors will be the most innovative ones (Figure 1) (Niggli, Willer and Baker 2016).

**Figure 1.** *Pathways of future development of organic agriculture*




**Source:** *Niggli, Willer and Baker, 2016.*

However, in order to this vision comes true organic system should overcome the main obstacles. Research effort should be directed to finding practical solutions to make organic agriculture more economically competitive. Trade in organic food and the growth in organic agricultural production should be facilitated by harmonization of the regulations among potential trading partners. Despite the overall positive outlook potential threat that may hinder the future growth of the organic sector is demand concentration. "High demand for organic foods in Europe and North America has resulted in the import of organic foods from large farms in less-developed countries. Although premium prices for exported foods may be beneficial to farmers, the inaccessibility of many of these foods to local consumers raises questions about food security and social equity" (Reganold and Wacher, 2016).

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# RURAL DEVELOPMENT AND LABOUR MIGRATION

*Theo Rauch*[1]

## Abstract

*When asked what is to be done about the "refugee crisis" almost every politician will respond that development cooperation in general and rural development programmes in particular, has to do more towards improving the situation in the regions of origin. And indeed, billions of euros are being allocated to the task of combatting the root causes of migration. The German minister for development cooperation, Gert Müller, is prepared to take up the challenge to contribute towards providing refugees and other migrants from poor countries with the prospect of "a better future in their home regions". This presentation wants to look at whether and how development cooperation in general and rural development interventions in particular can fulfil this expectation.*

**Key words:** *rural development, labour, migration, trend*

## Introduction

Fighting the root causes of migration is a controversial topic. Some political parties argue that, by referring to the causes of migration, governments of EU countries want to detract attention from their failure to manage the refugee crisis.

Critics of development cooperation and sceptics regarding rural development programmes ask, why so many people are still trying to find a future for themselves outside their home areas.

Supporters of migration fear that Official Development Assistance (ODA) is going to be misused for building walls against migrants.

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Migration researchers object that more effective efforts to reduce poverty will even stimulate international migration as the very poor cannot afford to migrate.

Some development cooperation practitioners fear that a reorientation of aid towards migration policy aims will just end up as another relabelling exercise.

So, the question this article tries to explore is whether and by what means rural development efforts can mitigate the causes of migration. The focus is on labour migration, rather than refugees, acknowledging that it is not always possible to clearly separate one from the other.

Another focus is on interventions aimed at the situation in regions of origin, rather than on those aiming at better migration management. And lastly, there is a certain focus on sub-Saharan Africa, as it is our neighbour continent that most of the funds are supposed to go to.

The article will first present an analysis of the major influencing factors on labour migration, followed by observations on the role development cooperation in rural regions has played so far.

It will end with strategy recommendations for reducing migration pressures. Although the major interest of the analysis is international migration, internal and transnational migration will be looked at in context.

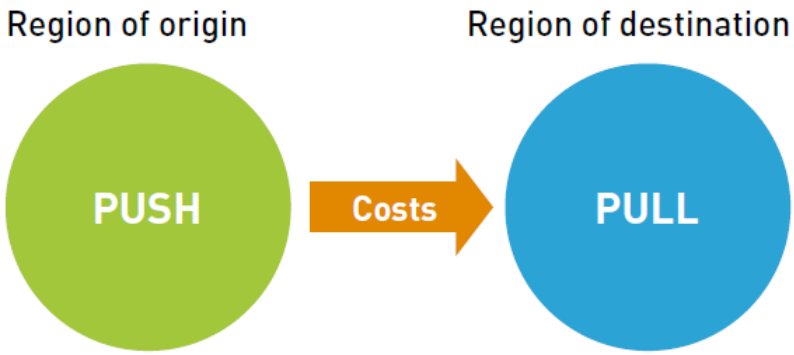
## Migration trends theory

Migration theory tends to explain migration streams by distinguishing between push factors (conditions in the region of origin), pull factors (conditions in the region of destination) and migration costs.

Although this is a somewhat simplistic model (cf. Figure 1), it can be helpful for structuring the analysis of influencing factors.

While addressing root causes of migration relates to the push factors, migration costs also tend to play a role. Push factors for labour migration can be analysed from a macro- and from a micro-perspective.

**Figure 1.** *Migration Model: Push and Pull*




**Source:** *author research*

### Macro-economic perspective: Job-less growth

A macro-economic analysis of global labour markets indicates that the phenomenon of "job-less growth", which is well known to most countries in the Global South, tends to foster migration in search of job opportunities.

While economic globalisation has stimulated international trade and economic growth rates, it has failed to increase global employment, as it has been accompanied by labour-replacing technological progress.

New jobs created by economic growth are matched by the destruction of jobs through automation. While this is a worldwide phenomenon, the impacts on different regions differ greatly. Less competitive regions are the losers. In sub-Saharan Africa, there are fifteen million additional young people reaching working age each year, set against two million additional jobs.

This mismatch has been observed even in periods of high economic growth rates of 5 to 10% per annum. The global nature of the mechanisms causing unemployment indicates that there are limitations for development cooperation when it comes to addressing the root causes of labour migration.

### Translocal livelihoods as a local response to job-less growth

Looking at the micro-perspective, we see a corresponding picture. The majority of African families are securing their living through migration. To be more precise, more than 50% of rural households and approximate-

ly 70% of urban residents in sub-Saharan Africa are part of translocal livelihood systems, according to a recent analysis of a wide range of case studies by Malte Steinbrink and Hannah Niedenführ.

For approximately fifty million rural-based African households, migration of at least one member, mostly young men, has become an economic necessity, as neither rural income sources in the home region nor incomes in the areas of destination can ensure a secure and decent living.

Thus, migration of young people is not just to be seen as an individual decision indicating a preference for an urban lifestyle.

Rather, it can be seen as a well-established part of rural-urban livelihood systems. Most of the migrants are temporary migrants, who maintain social, cultural and economic links to their home areas.

Some migrate on a seasonal basis, some return once a year for festive seasons, some are circular migrants, others migrate for a certain period of their lifecycle, intending to return after they have saved enough money to get married and establish a farmstead.

Where migration has become a deeply rooted part of risk minimising livelihood systems, it will not be easy for development cooperation to provide sufficiently attractive alternatives.

Looking at these push factors in context, we can conclude that: While none of these factors is completely outside of the realm of rural development policy, it has become evident that most of them cannot easily be influenced by rural development programmes in the short run.

## Rural development programmes as a stimulation for international migration?

As far as the role of migration costs goes, they are an impeding factor in particular for long-distance international migration. Research results indicate that there is a clear correlation between the income levels of households and the distance of migration.

In Nepal, for example, the poorest in a village look for jobs in rural areas, the less poor can afford to migrate to Kathmandu, the middle strata tend to establish migration networks to Indian destinations, while only mi-

grants from the more well-to-do farm households manage to find jobs in the Arab Gulf states.

So, the jobs on the construction sites in Qatar, which are considered terrible viewed from our human rights perspective, are among the most attractive destinations for Nepali villagers.

Due to such migration barriers, it is only the comparatively better-off people who manage to get to Europe.

That is why some experts warn that more successful efforts towards poverty reduction might enable more people to venture on the costly journey to Europe. Poverty reduction as a springboard for international migration.

This argument does not stand the test of a more in-depth analysis, however. Such analysis shows that migration often takes place in stages.

Poor people from rural regions migrate to regional urban centres; people who have accumulated a bit of income and experience there may take the next step and move to big agglomerations.

More advanced migrants from those cities may be able to afford the step to more prosperous countries, if competition from the new arrivals in urban labour markets or in informal service sectors becomes too stiff.

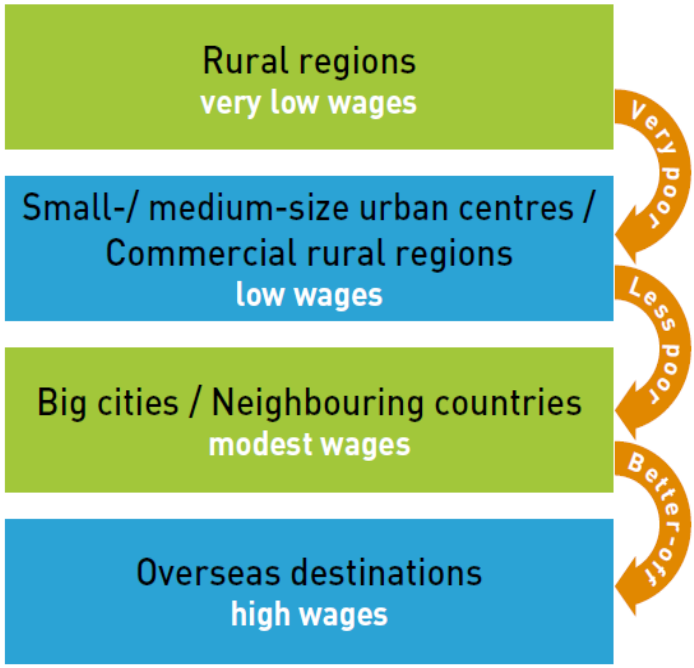
Accordingly, there is an international hierarchy of destinations within the African migration pattern:

While people from Burkina Faso may go to Ghana, Ghanaians tend to go to Nigeria, Nigerians seek their fortune in South Africa or in Europe.

Consequently, the migration pressure from poor rural regions is passed on to better-off people in urban centres who have the capacity to migrate overseas. We can call this a migration cascade (see Fig. 2).

The resulting message for development policies is: Poverty reduction in the rural regions of origin can, by reducing the migration pressure on all levels, help to reduce international migration.

**Figure 2.** *The Migration Cascade*




**Source:** *author research*

**Rural development can reduce migration pressure. But only to a limited extent.**

But what has development cooperation contributed so far? First, we have to acknowledge that there is little statistical evidence for the impact of development policy interventions on migration. It is obvious that out-migration from rural areas has increased. But it is hard to say whether this is despite successful rural development efforts or due to neglect of rural areas during the past two decades or even as a result of rural interventions. The phenomenon of trans-local rural-urban livelihoods is known from dynamic and from marginal rural regions.

Ongoing efforts towards placing "jobs, jobs, jobs" at the top of the agenda of development cooperation with Africa indicate that such efforts were too limited or not very successful in the past. The major achievements in terms of reducing income poverty during the last five decades were made in countries like China and South Korea.

They were based on macro-economic policies with minimum contribution from international development cooperation. Trade policies played a major role in the initial phases. Examples from Zambia and Nepal may indicate the potentials and limitations of rural development programmes in reducing out-migration from rural regions.

In Zambia significant donor-supported efforts were made during the 1980s towards rural development, with the aim of explicitly reducing out-migration in support of the Government's "go back to the land" campaign. These efforts were obviously successful as they were followed by a clear trend of remigration to rural regions. This, however, was not only a result of rural development programmes, but at least as much because of a change in terms of trade between agricultural versus industrial products, i.e. a marked increase in producer and consumer prices for agricultural products.

While trade policies provided necessary incentives for going back to the land, development programmes provided the opportunities and capabilities. In Nepalese hill areas, development programmes helped to strengthen trans-local livelihood systems by improving the income basis of migrants' wives through the promotion of horticulture rather than by seeking to offer local opportunities to the migrating men.

This was a reflection of the limited natural resource potentials and high land pressure. The examples show that rural development interventions can improve income opportunities if accompanied by favourable market conditions for rural products. In doing so, they can reduce migration pressure among the rural poor but are not able to replace income from migration.

## Do no harm and leave no one behind

Taking the limitations of global labour markets and the phenomenon of "job-less growth" in Africa – in association with limited and mostly marginal income opportunities in non-agricultural sectors – into account, development cooperation needs to be aimed at reducing migration pressures in rural and in urban regions. It needs to focus on creating jobs and income opportunities, both for the youth and for all other job seekers. Broad-based, inclusive income generation is the key towards mitigating migration pressure. What can be done to contribute to that goal under the prevailing economic environment in African countries?

As development policies not only have the potential to reduce but also run the risk of intensifying migration pressure, the first set of recommendations follows the principles of doing no harm and leaving no one behind. Interventions need to avoid destroying jobs and income opportunities by avoiding labour-saving forms of technical progress.

They need to avoid displacement of small-scale farmers or herders by large-scale land investors. They should avoid supporting the setting of inappropriate product-related standards, which tend to exclude resource poor producers. They should not be guided by rural transformation models that follow the principle "grow or give way".

**Ten rules for migration sensitive interventions**

Doing no harm is not enough, however. So, what needs to be done differently to promote inclusive job and income promotion taking the adverse competitive conditions of sub-Saharan countries into account? Ten rules need to be considered:

*First and foremost*, jobs are not necessarily created by investments; only by those investments which create a positive *net* employment effect. Many private investments tend to destroy more jobs or income opportunities than they create. Investment promotion therefore needs to be focussed on new, innovative economic activities which replace imports or add processing steps to value chains rather than on replacing existing local activities.

*Second,* economic opportunities need to be analysed with consideration being given to the competitive environment. There are usually pro-poor, i.e. labour-intensive opportunities, which have a good chance to become competitive, but it may need some efforts to identify them based on proper analysis of markets and local resources.

*Third,* this requires a thorough analysis of the – often underestimated – potentials of the poor in order to maximise their inclusion in the labour and commodity markets.

*Fourth,* small-scale producers need to be organised in socially inclusive producer organisations in order to qualify for joint access to services and markets. This is a prerequisite for their access to income opportunities.

*Fifth,* the promotion of appropriate technologies needs to follow the guideline "as labour-intensive as possible while as efficient as necessary". Any promotion of "technical progress" per se will intensify migration pressure. On the other hand, productivity often needs to be increased in order to overcome labour bottlenecks or to become competitive. A tractor can replace 20 labourers in certain cases or it can help to create 20 jobs in other cases. In any case, the employment effect of technological change needs to be given the utmost attention.

*Sixth,* trade policies need to be adjusted in order to protect promising labour-intensive trades.

*Seventh,* land reforms need to be designed in such a way as to ensure that poorer smallholders cannot be impelled to sell their land in the event of an emergency.

*Eighth,* socially inclusive promotion of natural resource management – including soil rehabilitation and climate change adaptation – is a necessity in order to prevent environmental migration.

*Ninth,* labour-intensive public work schemes for establishing and maintaining infrastructure should be promoted.

This can help to improve seasonal job opportunities on a broad scale in the short run. *Last but not least,* skills development should be focussed on fields related to existing income opportunities. Any training that is not related to available job or income opportunities will stimulate rather than reduce migration.

## Conclusion

Rural Development can contribute. But needs to be supplemented by off-farm employment programmes and a regulated system for circular migration. We can conclude that rural development efforts can contribute to reduce migration pressure if oriented towards creating a positive net-employment effect within and outside of agriculture and if accompanied by targeted trade policy adjustments.

Those contributions of rural development are necessary but most likely not sufficient. They need to be complemented by promotion of labour-intensive urban employment opportunities in manufacturing and services

sectors. As those tend to face stiff international competition and as they require some time to create significant impact on the labour markets, the support for labour-intensive public employment programmes is crucial in order to provide additional short-term income opportunities for the low-skill labour market segment in rural regions.

In addition, better regulated opportunities for temporary circular migration to EU countries for the unskilled labour-market segment should be created. This can give more people a chance for benefitting from temporary migration opportunities. Moreover, it would fit to the trans local livelihood systems of many rural families.

In the long-run, however, only a different global and national macro-policy environment will create sufficient jobs in the West-Balkan countries and elsewhere.

# STINGING NETTLE AND COMFREY – PRODUCTION TECHNOLOGY AND COST BENEFIT ANALYSIS[1]

*Vladimir Filipović[2], Vladan Ugrenović[3]*

## Abstract

*The use of stinging nettle and comfrey for medicinal purposes has long been known, as confirmed by numerous studies in this field. Because of a significant content of certain chemical elements, these two species are increasingly used in ecological production systems. One of these is organic production, in which a large number of domestic and foreign producers already use stinging nettle and comfrey as a raw material for preparation of biopesticides, liquid and solid fertilizers, compost and for mulching. A good part of raw materials used for this purpose is collected from nature, and the rest (for the time being a small part) is obtained from cultivated plants. In this regard, it is necessary to improve existing cultivation technology, rationalize production costs and make it more accessible to general public. This paper presents the author's knowledge of the production technologies of these two medicinal species, their use and the cost benefit analysis estimate showing investments made during their cultivation.*

**Key words:** *stinging nettle, comfrey, production, cost benefit analysis*.

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[1] The paper represents a part of the research results within the Projects of Integral and Interdisciplinary Research No. 46006 "*Sustainable Agriculture and Rural Development in the Function of the Accomplishment of Strategic Objectives of the Republic of Serbia in the Danube Region*" and No. 46005 "*New products and pseudo cereals from organic production*", financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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## Introduction

In the Republic of Serbia market, demand for nettle leaf (*Urticae folium*), nettle root (*Urticae radix*), nettle seeds and comfrey root (Symphyti radix) is getting higher each year. Further into this paper, we will try to clarify the reason for the above statement, where the most important data regarding these two species will be shown.

## Stinging nettle (*Urtica dioica* L.)

Stinging nettle (*Urtica dioica* L.) belongs to the nettle family Urticaceae. Commonly known by the names of: common nettle, big nettle, nettle, dogberry, pitted nettle, dog nettle, burning nettle (although this name usually refers to „small nettle" - *Urtica urens* L.). Stinging nettle is first mentioned in 1st century. It was used for body cleansing and in states of general weakness. The Greeks used stinging nettle against rheumatic pains. Stinging nettle has been applied since ancient times, and is still used in folk medicine today. Dried leaf (*Urticae folium*), root (*Urticae radix*), occasionally whole overhead part (*Urticae herba*), and in recent years seeds, too (*Urticae seeds*), have been in official use. Stinging nettle is one of our most gathered medicinal plants (Filipović & Popović, 2014). Today, it is grown, more and more, as a textile plant - as„organic" stinging nettle, and it is anticipated that it will to a great extent replace cotton and flaxseed. An example for this is found in Italy where stinging nettle eco-fibers are used extensively in the fashion industry (Bacci et al., 2009). Stinging nettle is used in pharmacy, food industry, textile industry and agriculture (especially organic). In organic production, it is used as a biopesticide and a liquid and solid fertilizer of organic origin. As a solid fertilizer it is used individually or as an ingredient of compost mixtures (Filipović & Ugrenović, 2013). In making compost, stinging nettle has multiple roles. First of all it makes one of the most used raw materials for making compost, on the other hand it makes a component for making compost teas that are used to inhibit microbiological properties of compost piles. Stinging nettle can be seen, especially in organic or traditional gardens, on their edges or on cultivated plots and it is increasingly used for human consumption in addition to making preparations (Vasić, 2012). Unfortunately, the stinging nettle, which we can buy at our local markets, is collected from spontaneous flora.

**Morphological characteristics.** Stinging nettle is a perennial herbaceous plant, with height from 30 to 150 cm. It is distinguished by the powerful

and ramified root system with multitude of long rhizomes. Its stem is simple, quadruple, upright with many bristles or long stinging hairs called trichomes, located on leaves and stems. The leaves are mostly located contrary to one another. They are lance-shaped or egg-shaped, jagged along the edges. The flowers are small, greenish, grouped in a blossom of a tassel appearance. The flowering tree carries only male or only female flowers. Male blossoms are upright, and female are hanging. It Blooms during spring, until the month of June. The fruit is small, flattened, lenticular achene. The seeds are very tiny, brown to dark colour. The weight of 1,000 seeds is 0.14-0.15 g, i.e. 7,000-7,500 seeds/g. The seed becomes technologically mature in the period from August to September.

**Agroecological conditions.** A cosmopolitan species that grows around houses, along roads, landfills and nitrogen rich habitats. It is found in meadows, pastures, forests, mainly in forests cleanliness along the river valleys and on other damp habitats. Stinging nettle grows as a wild plant on neutral, gentle, fertile, humus soil, rich with nutrients of which the most prevalent is nitrogen (Tucakov, 2014). In this regard, stinging nettle is considered an indicator of neutral soils with high humus content. It has adapted itself to anthropogenic lands and is often found in urban settlements, and in the villages where it first conquers abandoned courtyards and arable land where it purifies the traces of humans and animals. It is also found in significant amounts on ruderal habitats. Thanks to its structure and composition it never falls down, and it is very resistant to drought and low temperatures. During the winter period, it can handle extremely low temperatures (up to -30 °C) during the hibernation phase. There is no big demand for light. It is successfully developed in semi-shade and shady habitats, so it also appears in forest communities, and can be cultivated between fruit trees. However, for potential cultivation it requires sunny places without shade. As mentioned above, it is a herb that can only succeed in soils extremely rich in mineral substances (Kojić et al., 1999). Fertile, humus-rich soils with higher percentage of phosphorous, are suitable for its undisturbed growth and development. It is best managed on chernozem, meadow hummus, brown forest soil, and other high-productive soils. On poor and in extremely dry soils the nettle does not come through. In climates with 600-800 mm of precipitation and with an average annual temperature of more than 6.5 °C, the nettle achieves maximum yields.

## Production technology

**Crop rotation.** As a perennial species, the stinging nettle does not enter into crop rotation. As a precondition it is necessary to use species that leave the land without weeds because they are a major problem in stinging nettle cultivation during harvesting. Hardy annual grain legumes, stubble cereals and crops that leave the soil early should be cultivated as a good pre-crop for stinging nettle. Corn and other crops of later vegetation are not good precipitates because they are harvested late and leave a pesticide residue behind, which can endanger the production of nettle since it is very sensitive to the presence of residues. Therefore, on the soil where maize was previously, nettle can only be grown after two to three years.

**Soil tillage systems.** Basic processing depends on preconditions. In case of stubble wheats or some plant species that leave the field early, immediately after harvest shallow plowing is done, at 10 to 15 cm depth. At the end of September or October, it will be full of depth tilling, which should not be less deep than 40 cm. Pre-sowing preparation is done immediately before the nettle planting, which above all should provide a loose surface layer up to 15 cm deep. This will create better conditions for root development.

**Fertilization.** Given that this is a perennial culture, it is necessary to pay special attention to nutrition. As it stinging nettle is cultivated on rich humus soils, a part of the necessary nutrients is already fulfilled at the very beginning. The other part is provided by use of organic and mineral fertilizers. Stinging nettle as a nitrophile plant needs to be provided with about 150 kg N/ha when established, and in supplemental feeding 30-40 kg N/ha is added after each harvest. In addition to nitrogen, it also has a high demand for potassium (200 kg $K_2O$/ha). Phosphorus is used in the amount of 60-80 kg $P_2O_5$/ha. These are the average quantities that can be increased or reduced for each individual case depending on the fertility of the soil. The best organic fertilizers, are those that have prolonged activity, above all manure, composted if possible. It is introduced before deep plowing, and it should measure from 30 to 50 t/ha of well-burnt manure. Green manure, compost and liquid manure (for supplemental feeding only) can be used. Stinging nettle best responds to combined fertilization with organic and mineral fertilizers.

**The assortment.** In our country, only one cultivar of stinging nettle called „Domaća (Domestic)“ is registered, which possesses satisfactory agro-technical, pharmaceutical and nutritional characteristics. There are several registered varieties of stinging nettle with good production properties in the world, but at least for now they, in our country, have not found a wider application.

**Sowing / seedling.** According to the method of reproduction, nettles can be formed: direct sowing, seedling planting and the crown division (people use different names: stolons, rhizomes or roots). Due to slow emergence (12-20 days) and „choking“ aggressive weeds, direct sowing is most often avoided. If it is managed through direct sowing, seed should be sown on the surface of the soil because the stinging nettle seed does best germination in the light (Jankowska-Blaszczuk & Daws, 2007). In some dioecious cultivars of stinging nettle, higher seed germination is achieved with constant darkness (Radman et al., 2015). If sowing is direct, it takes about 4 kg/ha of seed. For seedlings raised in this way, in the first growing year, yield is small, because the plants develop slowly. The full yield of this kind of production is obtained only in the second and following years. It is most commonly grown from seedlings, which can be produced in summer and spring. For a square meter of garden bed, it takes 2.0-3.0 g/m$^2$ of seed of good germination, and an average of 200 to 300 seedlings. For production of seedlings it is necessary to use 0.3-0.5 kg/ha of seed or 45.000 - 65.000 seedlings. Sowing in garden beds is done during May and nourishing is done over the summer. It's transplanted out during the autumn. Stolons are taken from a plot that has been previously selected for this purpose. It is taken immediately before planting. Good planting material is healthy stolons with the most thicktuft and with lots of leaves. The removal of the stolons is done by the undercutting machines or by the potatoes extraction machines. The removed stolons are cleaned from the above-ground old and rotten parts which are the most common transmitters of pathogen. After cleaning, the stolons should be used as soon as possible for planting with the least sun and wind exposure possible. Planting is done in autumn or spring. Autumn planting has many advantages, because the plants use soil water better and have a more intensive spring growth, which provides the possibility of obtaining a higher yield of biomass. Spring planting is carried out if for any reason it could not be done in autumn (for example, dry land). Autumn planting can begin in the second half of September, if the soil contains optimun moisture. However, if the soil conditions are not favorable planting should be done later, in the second half of October or in November. In

order to keep the stolons from freezing, they should be covered with a layer of soil 8-10 cm. The stolons planted this way resist frosts up to -10 °C without damage. The stinging nettle is planted manually or mechanically on well-prepared soil in furrows 10-14 cm deep (open plow) at 70 cm spacing between rows and within rows at spacing of 30 cm. The cleaned stolons, 10 to 20 cm in length, are placed horizontally at the bottom of the furrow, at a distance of 15 cm between the stolons and covered by the soil. For successful planting, depending on whether it is manually done or with a machine (vegetable planters), requirement is from 1,000-1,500 kg of stolons per hectare.

**Care.** The care the stinging nettle is similar to the care of other perennial crops and consists of inter-row cultivation, hoeing, nutrition and irrigation. In the vegetation period, 1−2 treatments of inter-row cultivation or hoeing are necessary in order to avoid crust formation and weed growth. As a rule, after each mowing, the feeding should be carried out, i.e. mowed plot should be fertilized with some of the liquid fertilizers and, if necessary, use irrigation. Stinging nettle is extremely responsive to irrigation. Longer dry periods have a negative effect on yield and quality. When it comes to pests, except a few butterflies, i.e. their caterpillars, there are no natural enemies. From the butterflies living in our areas, the red admiral is one of those that lay eggs on nettle leaves, which later becomes food for black caterpillars. From the pathogen stinging nettle gets inhabited by, no serious cause of disease has been recorded.

**Harvest.** In the spring, during the "awakening" of vegetation in just a few days, the first harvest of the nettle can be made. Mowing or harvesting is done when plants are about 30 cm high at the moment before flowering. In our conditions this is the end of April and the beginning of May. After the first, another mowing is due in about three weeks. During a year there can be up to 8 harvests. The day after mowing, the bulk mass should be left on the plot to wither, in order to reduce the "stinging". If the stinging nettle is grown for underground organs, root harvest is done by shallow plowing of roots, and collected manually and at the same time, cleaned from above-ground and damaged parts. Root extraction takes place during autumn, after termination of vegetation. Mowing of the above-ground part and extraction of the underground part is done manually and mechanically.

**Drying.** After the harvest, the withered mowed mass is transferred to a dryer, where it is dried at temperatures of up to 40 °C. If the root is

harvested, the root is washed and then dried. Drying is done exclusively in dryers at temperatures up to 50 °C. If it is naturally dried, drying should be done as soon as possible, forming a thin layer, at a drafty place, with frequent flipping for the purpose of obtaining the best quality drug. From 6 kg of fresh leaves, about 1 kg of dry leaves is obtained, while this ratio for roots is 3 to 4 kg for 1 kg of dry roots.

**Yield.** From one hectare plantation of full yield, 10 - 15 t of raw or 2 - 3 t of dry weight can be obtained. Plantation in the first year of cultivation, it yields somewhat less yield, and it depends primarily on the way and the time of its forming. In addition to the nettle leaves, the root can be exploited. In this case, they should be renewed and a yield of 8-10 t of raw or 2.5-3.5 t of dry root can be obtained. If there is a higher root demand in the market then it can be yielded at the end of the second year of planting.

**Packaging and storage.** This dried drug is packaged in jute bags or bags of multiple thick paper layers and kept in a clean, dry and drafty place. Drug *Urticae folium* should be green in color, with its own scent and a bit bitter and salty taste. The root (*Urticae radix*) should be gray, brown, fragrant and fragile when bent. Nettle seeds when sealed and stored at -18 °C, can keep germination rate for up to 8 years. These drugs should not be stored with some very aromatic drugs.

**Cost benefit analysis of stinging nettle.** In the following section are given Tables 1-3, which show the indicative cost benefit analysis of production of stinging nettle, designed for an area of one hectare.

**Table 1.** *Cost benefit analysis of stinging nettle production in the first year of cultivation, for an area of 1 ha*

| **Production value leaf (€ ha$^{-1}$):** | **1413** |
|---|---|
| Quantity (kg ha$^{-1}$) | 1200 |
| Leaf price - *Urticae folium* (€ kg$^{-1}$) | 1,2 |
| **Variable production costs (€ ha$^{-1}$):** | **2653** |
| 1. Basic material | 450 |
| Mineral fertilization: starting and in the supplemental feeding | 345 |
| Seed (0,5 kg ha$^{-1}$) | 105 |
| 2. Machinery operation | 793 |

| | |
|---|---|
| Ploughing to 30 cm | 82 |
| Harrowing (disking) | 40 |
| Mineral fertilizer dissolution 5x | 73 |
| Presowing treatment | 21 |
| Watering 5x | 130 |
| Inter-row cultivation 2x | 32 |
| Moving 4x | 80 |
| Collecting 4x | 58 |
| Transport 4x | 63 |
| Drying 4x | 240 |
| 3. Seasonal working labor | 1410 |
| Seedling production (2 seasonal workers x 30 days x 10 € daily wage) | 600 |
| Loading and unloading seedling (1 seasonal worker x 10 € daily wage) | 10 |
| Seedling planting (20 seasonal workers x 10 € daily wage) | 200 |
| Hoeing, weeding, watering, feeding, filling up empty spaces, drying ... | 600 |
| **Gross financial result (€ ha$^{-1}$)** | **-1240** |

**Note:** The middle exchange rate of NBS on: September 20, 2017 it was 118.9350 dinars for 1.0 euros (Euro). Mechanical services are given on the basis of the price list of the Cooperative Association of Vojvodina for 2017. Part of the data presented was obtained from the production part of the Institute for Medicinal Plant Research "Dr Josif Pančić" from Belgrade, located in Pančevo.

**Table 2.** *Cost benefit analysis of stinging nettle production in the second year of cultivation, for an area of 1 ha*

| | |
|---|---|
| **Production value leaf (€ ha$^{-1}$):** | **2943** |
| Quantity (kg ha$^{-1}$) | 2500 |
| Leaf price - *Urticae folium* (€ kg$^{-1}$) | 1,2 |
| **Variable production costs (€ ha$^{-1}$):** | **1720** |
| 1. Basic material | 51 |
| Mineral fertilization: in the supplemental feeding | 51 |
| 2. Machinery operation | 1069 |
| Mineral fertilizer dissolution 2x | 73 |
| Watering 3x | 80 |
| Inter-row cultivation 2x | 32 |

| | |
|---|---|
| Moving 8x | 160 |
| Collecting 8x | 117 |
| Transport 8x | 127 |
| Drying 8x | 480 |
| 3. Seasonal working labor | 600 |
| Hoeing, weeding, watering, feeding, drying ... | 600 |
| **Gross financial result (€ ha$^{-1}$)** | **1223** |

**Note:** The middle exchange rate of NBS on: September 20, 2017 it was 118.9350 dinars for 1.0 euros (Euro). Mechanical services are given on the basis of the price list of the Cooperative Association of Vojvodina for 2017. Part of the data presented was obtained from the production part of the Institute for Medicinal Plant Research "Dr Josif Pančić" from Belgrade, located in Pančevo.

**Table 3.** *Cost benefit analysis of stinging nettle production in the third year of cultivation, for an area of 1 ha*

| | |
|---|---|
| **Production value (€ ha$^{-1}$):** | **8072** |
| Production value leaf (€ ha$^{-1}$): | 3531 |
| Quantity (kg ha$^{-1}$) | 3000 |
| Leaf price - *Urticae folium* (€ kg$^{-1}$) | 1,2 |
| Production value root (€ ha$^{-1}$): | 4540 |
| Quantity (kg ha$^{-1}$) | 3000 |
| Root price - *Urticae radix* (€ kg$^{-1}$) | 1,5 |
| **Variable production costs (€ ha$^{-1}$):** | **1966** |
| 1. Basic material | 51 |
| Mineral fertilization: in the supplemental feeding | 51 |
| 2. Machinery operation | 1194 |
| Mineral fertilizer dissolution 2x | 73 |
| Watering 3x | 80 |
| Inter-row cultivation 2x | 32 |
| Moving 8x | 160 |
| Collecting 8x | 117 |
| Root harvest | 50 |
| Transport 9x | 143 |
| Draing 9x | 540 |

| | |
|---|---|
| 3. Seasonal working labor | 720 |
| Hoeing, weeding, watering, feeding, root collecting, drying ... | 720 |
| **Gross financial result (€ ha$^{-1}$)** | **6106** |

**Note:** The middle exchange rate of NBS on: September 20, 2017 it was 118.9350 dinars for 1.0 euros (Euro). Mechanical services are given on the basis of the price list of the Cooperative Association of Vojvodina for 2017. Part of the data presented was obtained from the production part of the Institute for Medicinal Plant Research "Dr Josif Pančić" from Belgrade, located in Pančevo.

As can be seen from the presented tables, the largest share in the cost of stinging nettle production is the seasonal workforce and drying costs. Reducing the number of workers and introducing a larger share of machinery services and cheaper fuels when drying would result in higher profits.

**Chemical composition and the use.** According to its chemical composition, the leaf of stinging nettle (*Urticae folium*) contains: chlorophyll, carotinoids, minerals, vitamins C, B and K1, amines including histamine, serotonin and cholin (in hollow stinging hairs), formic acid, acetic acid, glycokinin, etc. Stinging nettle seed (*Urtica semen*) contains: fatty oil with carotenoids, proteins, abrasives, etc. The root of stinging nettle (*Urticae radix*) contains: sterols (ß-sitosterol, scopoletin, ...), lignins, 3, 4-divanillyltetrahydrofuran or short divanil. It is extremely rich in various useful ingredients: proteins (5.5%), fats, minerals, carbohydrates, vitamins (up to 140 mg of vitamin C in young plants, A, $B_2$ and K), chlorophyll, tannin, silicic acid, riboflavin (vitamin $B_2$), pantothenic acid (vitamin $B_5$), tocopherol (vitamin E) and others. The highest content of vitamins is in young leaves. In its composition, nettle also contains provitamin A (beta carotene), up to 20 mg/100 g, more than spinach, bliss and cabbage. It also contains antioxidant, acetic acid and tartaric acid, cellulose (up to 3%), phytosterol, lecithin, mucus and wax. In nettle bristles there is acetylcholine and histamine, which already in the amount of 1/10,000 mg burn and sting. Trichomes are injecting histamine and other chemicals that produce stinging sensation when touched by humans and other animals. The presence of glycokinin could explain and justify the use of the stinging nettle when fighting diabetes. Nettle contains different secondary metabolites. Carotenoids can be found primarily in the leaves, where different forms of lutein, xanthophyll and carotene. Some carotenes are precursors of vitamin A (retinol), their retinol equivalents RE or retinol activity equivalents per g dry weight are 1.33 for mature leaves and 0.9 for young leaves (Lutomski et al., 1983).

Nettle contains much less than carotenes and retinol than carrots, which contain 8.35 RE per g fresh weight. Depending on the batch and the leaves and stem content, the nettle contains only traces of zeaxanthin or between 20 - 60 mg/kg of dry matter. Minerals (Ca, K, Mg, P, Si, S, Cl) and trace elements (Mn, Cu, Fe) contents depend mainly on the soil and the season (Filipović et al., 2006b, Filipović et al., 2011). Stinging nettle is used as a medicine for cleansing blood, against hair loss, rheumatism, fever, excessive urination, tuberculosis of the lungs, bronchitis, joint diseases, kidney stones, for healing wounds, against radiation, anemia, stomach ulcer, insomnia and nervousness. Tea from the whole plant separates the mucus from the lungs, cleanses the stomach, liver and bowels, and is also an excellent remedy for the treatment of anemia, jaundice, malaria and all other fevers, which, mostly by urine, releases bad juices from the body. Mixed with other plants it treats ulcers on the stomach and intestines, cleanses the blood, promotes digestion, reduces anxiety and insomnia. It is a good remedy against aquatic diseases, gout, liver, kidneys and fainting. The nodule strengthens the adrenal glands, relieves anxiety, relieves the feeling of fatigue, increases durability and restores vitality. The nettle leaf is used in cases of increased menstrual bleeding and haemorrhoid bleeding, in elevated level of blood sugar (Tucakov, 2014). The stinging nettle root is used in cases of benign and malignant prostate adenoma. In last decades, it has been used for fertilization and care preparations and as a raw material for production of high-quality organic fertilizer - compost. The results obtained from the middle of the last century showed that the nettle leaves and the chlorophyll obtained from it have very remedial properties. The need and demand for root, leaf and nettle seeds in the world market is high. This is also supported by numerous researches, involving a wide range of scientists from different fields of expertise. Scientists from Germany, Austria and Japan have made the greatest efforts in research on copra for the best quality production, processing and application technology. The largest consumers are high-standard countries (EU, North America and Eastern Asia) which, in addition to recognizable quality control standards, require raw materials which, with minimum processing, will maintain their medicinal and nutritional value. Large processoing companies and drug manufacturers are still interested in raw materials originating from these parts. There are more companies and individual manufacturers in our market that have included the nettle in their business.

## Comfrey (*Symphytum officinale* L.)

Comfrey (*Symphytum officinale* L.) belongs to the comfrey family Boraginaceae. Commonly known by the names of: black comfrey, big comfrey, root for broken leg, hammer, weddings, vela consolida, ox tongue. The origin of the Latin name *Symphytum* (derived from the Greek word *symphis* = to grow, to heal and *phyton* = plant). In modern phytotherapy, the use of comfrey is limited. The most used is dried comfrey root (*Symphyti radix*) while comfrey leaves are less used (*Symphyti folia*). Recent studies have shown that the internal (consumption) use of comfrey is associated with health risks, and it is recommended only to be used externally. For farmers, it represents weeds that are difficult to eradicate (due to the length of the root). There are about twenty kinds of comfrey, some of them are grown to be used for animal feed.

**Morphological characteristics.** Comfrey is a perennial herbaceous plant, with height from 20-100 cm. It has strong, thick, about 2.5 cm fleshy root which isdark brown to blackish on the outside and white to light yellow color on the inside. From it grows a hollow, rough hairy stem, whose lower leaves are large and long with a pedicle, and rough hairs. The leaves on the stem are alternately arranged, with rough hairs. The flowers are pinkish red or purple, forming axillary blossoms between the upper top leaves and stem, which are bell-shaped, facing downwards. The flowers grow from axillary buds of the upper leaves. Blooming happens during spring. The fruit is a furry egg-shaped nutlet, 4.5-5.0 mm in length. On the inside it has sharp edges, and on the outside it is smooth, gray-brown. The seed has low germination rate and the absolute weight of 1,000 seeds is about 9 g.

**Agroecological conditions.** Comfrey is growing all over Central Europe. It grows in fields, in plains, in humid forests and meadows, on the banks of rivers and creeks, in ditches along roads and canals. It can be found up to 2,000 m above sea level. According to heat needs it is not particularly demanding and can easily survive winter in our agroecological conditions. It grows well in sunny and semi-shady places. It prefers moisture and can spend a certain period of time underwater. For successful development of comfrey, the most suitable are medium-fertile soils. It tolerates acidic soils, even below pH = 5.0. With proper fertilization, it also thrives on very nutrition poor soils. It is not fit for heavy soils, as well as porous land (sandy soils).

## Production technology

**Crop rotation.** Although it is a perennial species, comfrey is cultivated as annual. Since it does not tolerate monoculture, it can only be successfully cultivated in a one-year, rarely two-year biocycle. It regrows on the same surface only after four to five years. Good precursors are fertilizing arable crops, and they can be grown after stubble wheats.

**Soil tillage systems.** The soil for comfrey growing should be plowed in autumn, as early as possible. The depth of ploughing should not be less than 40 cm depth, because this plant develops a strong root that penetrates deep into the soil, so it is necessary to process an arable layer as deep as possible. If it is sown or planted in the autumn, the plowed field is immediately surface treated, furrows are left open during winter and preparation is done early in the spring, before planting.

**Fertilization.** If this medicinal plant needs to be fertilized, that should be done with phosphorus and potassium nutrients, not a manure. It is also important to take into account the amount of nitrogen introduced, because the excess can accelerate the rise of the above-ground part for the price of the root growth. It is best to add nitrogen during vegetation stage by performing the supplemental feeding.

**The assortment.** There are no registered cultivars of comfrey in our country, but we have used domesticated populations and several foreign varieties. The most used cultivar, which is created in the last century, during fifties , called Bocking 14, and somewhat less grown are Rubrum and Variegatum.

**Sowing / seedling.** Comfrey is exclusively reproduced using the root heads. Direct sowing is rarely done because the germinatione is difficult in field conditions. Comfrey is sown directly in late March and early April. It is sown in continuous rows at a distance of 50 cm with a quantity of 8 to 10 kg/ha. The production of seedlings is more common and 8-10 g of seed/$m^2$ is used for this purpose. Root head planting is the way of reproduction most used in practice. Planting is also performed in the third decade of March at 70 cm spacing between rows and 30 cm in rows (Filipović et al., 2006a). For this mode of reproduction, about 1,700 kg/ha of root heads are required.

**Care.** When it comes to nursing measures during the comfrey vegetation, inter-row cultivation, hoeing, nutrition and irrigation are done. Supplemental feeding is done with some of the nitrogen fertilizers. During the growing season, plants should, if necessary, be irrigated. Irrigation is desirable during dry months, because it is known that the comfrey plant is suitable for wet habitats. Protection of comfrey from the causative agents of plant diseases and pests, is carried out for the suppression of rust, downy mildew and flea beetles, as necessary. In practice, preventative treatment in the emergence phase is most often used to prevent disease occurrence. For the control of flea beetles, the crop is treated with some of the bioinsecticides intended for that use.

**Harvest.** Above ground biomass (leaf and flower) is collected before and during flowering, from May to August, which depends on the year. The root, which is the most used, is gathered in autumn or early spring. This is done in dry weather, when the soil is medium moist. The most convenient way to extract a single-root (non-branched) root is by extraction with modern and high efficiency root harvesting machines and potato digger. Using the plow with plow board off the root is oundermined, but it does not come out, and this is what the field workers do. On smaller surfaces extraction can be practiced by hand with a showel. The root should be cleaned, cut into sticks or cubes sized up to 2 cm and dry in a warm and drafty place or in a dryer.

**Drying.** After harvest, the withered mowed mass is transferred to the dryer, where it is dried at temperatures up to 40 °C. After cleaningthe root is dried in dryers at temperatures up to 50 °C. If it is dried in a natural way, drying should be done as soon as possible, in a thin layer, at a drafty place, with frequent turning for the purpose of obtaining the best quality drug. The ratio of fresh and dry leaves is 8-10: 1, while the ratio for roots is 3-4: 1.

**Yield.** From one hectare plantation 1.0 to 2.0 t of dry leaf and 2.5-3.0 t of dry root can be obtained. If there is a higher demand for the root on the market, then it can be harvested in spring, with the soil being undermined previously in order to facilitate easier spring extraction.

**Packaging and storage.** Drug *Symphyti folium* or dried comfrey leaf should be natural green color. The dried root (*Symphyti radix*) should be black on the outside and from the inside of a yellowish-white color. The root is packed in natron bags and leaves in layered paper, jute or PE bags.

The drug is successfully stored in clean ventilated warehouses on wooden pallets. Care must be taken so it wouldn't come into contact with aromatic drugs such as lavender flower and valerian root, because in this case, comfrey drugs take on the smell. The height of the stored goods must not exceed 2 meters and there should be no way of access for harmful rodents and insects.

**Cost benefit analysis of comfrey.** In the following section given is the Table 4, which shows the indicative cost benefit analysis of comfrey production for an area of one hectare.

**Table 4.** *Cost benefit analysis of comfrey production for an area of 1 ha*

| **Production value (€ ha$^{-1}$):** | **7146,8** |
|---|---|
| Production value leaf (€ ha$^{-1}$): | 1891,8 |
| Quantity (kg ha$^{-1}$) | 1500,0 |
| Leaf price - *Symphyti folia* (€ kg$^{-1}$) | 1,3 |
| Production value root (€ ha$^{-1}$): | 5255,0 |
| Quantity (kg ha$^{-1}$) | 2500,0 |
| Root price - *Symphyti radix* (€ kg$^{-1}$) | 2,1 |
| **Variable production costs (€ ha$^{-1}$):** | **2436,1** |
| 1. Basic material | 798,7 |
| Mineral fertilization: starting and in the supplemental feeding | 379,1 |
| Sreparations in plant protection | 62,3 |
| Seedling material – root heads (1700 kg ha$^{-1}$) | 357,3 |
| 2. Machinery operation | 507,4 |
| Ploughing to 30 cm | 81,9 |
| Harrowing (disking) | 12,3 |
| Mineral fertilizer dissolution 3x | 43,8 |
| Presowing treatment | 21,4 |
| Watering 3x | 80,1 |
| Inter-row cultivation 2x | 31,7 |
| Moving | 20,0 |
| Collecting leaf | 14,6 |
| Harvesting root | 50,0 |
| Transport 2x | 31,7 |
| Drying 2x | 120,0 |

| | |
|---|---|
| 3. Seasonal working labor | 1130,0 |
| Preparation root heads (20 seasonal workers x 10 € daily wage) | 200,0 |
| Loading and unloading root heads (1 seasonal worker x 10 € daily wage) | 10,0 |
| Root heads planting (20 seasonal workers x 10 € daily wage) | 200,0 |
| Hoeing, weeding, watering, feeding, filling up empty spaces, collecting roots, drying,... | 720,0 |
| **Gross financial result (€ ha$^{-1}$)** | **4710,6** |

**Note:** The middle exchange rate of NBS on: September 20, 2017 it was 118.9350 dinars for 1.0 euros (Euro). Mechanical services are given on the basis of the price list of the Cooperative Association of Vojvodina for 2017. Part of the data presented was obtained from the production part of the Institute for Medicinal Plant Research "Dr Josif Pančić" from Belgrade, located in Pančevo.

**Chemical composition and the use.** The main and most important ingredient of the comfrey root is a purine derivative of molecular formula $C_4H_6N_4O_3$, alantoin (Fonseca Castro et al., 2001), with 0.6-4.7%, comfrey contains 18 amino acids, vitamins A, C, vitamin B complex, auxin, triterpenoids, tannins, rosemary and elagic acid, steroidal saponins, inulin and pyrrolizidine alkaloids. Comfrey is able to extract and accumulate large quantities of potassium (about 7%) and to a lesser extent phosphorous (about 1%), calcium (about 3%), magnesium and other trace elements. Since comfrey is potassium-rich, potassium-loving plants are often supplied with its preparations. From fresh leaves of comfrey, a liquid fertilizer is made, which is suitable for supplementation of fruit and vegetable species, and is an excellent addition to the composting process. It is believed that allantoin, elaginic and rosemary acid have a central role in its pharmacodynamic effects in pharmacological activity (Andres et al., 1989, Staiger, 2012). Alantoin helps in creation of new cells, which makes use of comfrey in the treatment of wounds, even not well cared purulent wounds (Hills, 2011). It treats all types of injuries: bruising, cuts, bone fractures, outbreaks of blood, and the like. For external use against gout and bone ache, the freshgrated root of comfrey is used to cover the areas ailed with gout. When there is no fresh plant available, the comfrey tincture is used (Tucakov, 2014). Tincture was also excellent in the treatment of inflammation of the nerves wherever the body developed painful areas. In the last few years, the comfrey root is not recommended for internal use because it contains traces of pyrolysine alkaloids that can damage the liver. It is used as a raw material for the production of extracts which are part of gels and other products used in swelling, hematoma, fractures, sports injuries and post-traumatic conditions. In folk medicine, it is used: externally as a mash to line around bone fractures, tendon

inflammation, inflammation of the joints, sprains, thrombophlebitis, for the treatment of wounds that are difficult to heal and ulcers. It is also used as tea in case of colitis, diarrhea, stomach ulcer and duodenal ulcer and as pulmonary tea. Comfrey preparations must not be applied to the injured skin, as well as during pregnancy and lactation, and their use is limited to 4-6 weeks during one year. All the preparations made from comfrey must not be made or kept in iron or tin containers.

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# SOME ASPECTS OF SMART TECHNOLOGY APPLICATION IN AGRICULTURE OF THE REPUBLIC OF SERBIA[1]

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## Abstract

*The application of smart technology in agriculture is a kind of third green revolution in the development of agricultural production. The authors believe that agricultural production must be organized in a modern way. The application of smart technology in agriculture represents the future of production. This attitude is quite acceptable if one takes into account that smart agriculture meets modern food production trends that require great efficiency in the use of all elements involved in production. It is precisely the efficiency of agriculture that is viewed through the achieved level of productivity, which is observed through the ratio of the number of employees and the volume of arable land, but also through the use of modern technologies used in production. In this sense, smart agriculture is a modern technology that can respond to current problems that exist on the world and are related to food production. The application of intelligent technology in agriculture is carried out through an Internet system through essential sensory networks through which applications are administered to various agricultural systems such as irrigation, fertilizing, spraying, etc. Climate change affects the change in agricultural production as well as food production, which certainly influences the transformation of the entire agriculture. Climate change, on the other hand, supports the development of smart precision agriculture, because precise agriculture can be adequately addressed. At the end of the paper, the authors gave results of research related to the knowledge and possibilities of applying smart technology in agriculture in the Republic of Serbia. The aim at the research is to gain insight into how many agricultural producers know about the benefits that smart technology provides in with production.*

**Key words:** *application of modern technology in agriculture, Information and communication technologies in agriculture, climate change, production, Serbia.*

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[1] Paper is a part of the research at the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishment of strategic goals of the Republic of Serbia within the Danube region, and project TR-31051 - Improvement of biotechnological procedures as a function of rational utilization of energy, agricultural products productivity and quality increase, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia, for the project period 2011-2014.

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## Introduction

Modernization and advancement of agriculture in many respects depend on the introduction of new working methods. In the first place, they are industrial assets, industrial labor organizations, and the application of new technologies such as smart agriculture. This leads us to believe that the development of agriculture and its production is dictated by factors outside of agriculture. Agriculture is basically just a base and a starting point for economic development, and the impetus for development comes from the modern industry.

Agriculture should be viewed in two respects. On the one hand, agriculture is important as the primary producer of food and other plant and animal products and this importance is undoubtedly increasing. On the other hand, agriculture is the basis of initiating economic development. How much agriculture will serve as a basis of a faster economic development depends not only on the natural basis of agriculture, but also on social, economic and political and other moments.[4]

In this respect, the development of the concept of smart agriculture, which represents the application of modern Information and Communication Technologies (ICT) in agriculture, should be considered. By applying these technologies, it can be freely said that the so-called, third green revolution.

Following the cultivation of plants and the genetic revolution, this third green revolution takes over the agricultural world with a variety of ICT solutions such as precision machines, internet-related "things", such as interconnected machines, devices, objects to animals and humans, and actuators, system geo-positioning, large data analysis (Big Data), unmanned aircraft, drones, robots and the like. From the perspective of agricultural producers, smart agriculture should provide added value of the farmer through decision support or through more efficient use of resources. Therefore, the Smart-AKIS Network includes three interconnected narrow-band technologies of smart agriculture:

- Information systems management: Systems for collecting, processing, storing and distributing data onto the appropriate format in order to make the business on the property faster and more efficient;

[4] Simonović, Z., Jeločnik, M., & Vasić, Z. (2012). Economic Position of Serbian Agriculture in the Transition Period. *Economics of Agriculture, Institute of Agricultural Economics*, 536-546.

- Precision agriculture: Manage both spatial and time variables in order to improve economic return on investment, with reduced use of input raw materials and reducing environmental pollution. This includes Decision Support Systems at the level of the entire property aimed at optimizing the return to investment, with an unchanged level of investment. This is facilitated by the widespread use of GPS, GNSS, terrain shots by cameras set on throats, the latest generation of hyper temporal photos made by Sentinel satellites, which create map maps showing all relevant factors that can be measured (for example: land yield, characteristics terrain / topography, favorability for organic production, humidity level, nitrogen level, etc.);
- Agricultural automation and robotics: The process of applying robotics, automated control and artificial intelligence at all levels of agricultural production.

## Methodology and data sources

We think that our work has a research character, and this was a subordinate method. In the research of the application of smart technology in agriculture, we applied several methodological approaches. 1) The research had to rely on foreign and domestic literature. This literature was important to studying the application of smart technology in agriculture today in the world. 2) Author's research in the thematic field was used. 3) At the end of the research carried out by the Institute of Agricultural Economics and its associates in the previous period.

In general, the research relied primarily on foreign literature. As far as domestic sources are concerned, they are scarce and insufficient for a more comprehensive examination of the problem of smart agriculture. We believe that not only in the world but also in our country there is an increased interest in researching the application of smart agriculture from various modern aspects: from the aspect of sustainable development, production of healthy - environmentally sound food, from the viewpoint of proper use of agrarian resources, water, the natural environment at all. Foreign literature on these problems was used. That is why it was one of the tasks of this research to study and present the latest insights on this issue. Internet information that is numerous and important should also be mentioned.

Special attention is paid to periodicals (scientific journals) and to scientific consultations (Chamber of Labor), as the current problems that influence the development of smart agriculture is better observed.

## A brief overview of the development of smart technology in agriculture in the world

Through the application of modern technology, agriculture has undergone major changes in the past century. The emergence of concentrated agricultural production characterized by the intensive application of new inputs for production, such as electro-mechanical motor-driven devices, agro-chemicals and the use of new and modified plant and animal materials (such as highly widespread breeds and varieties). This new agricultural practice led to the application of better farming management techniques, all in order to meet the growing consumer demands for reliable supply of consistently high quality, safe, diversified and nutritious food products.[5] The situation in agricultural production, which strives for continuous advancement and improvement of technologies and techniques, certainly influenced the development of smart agriculture.

The premise of the application of smart technology in agriculture is based on a large number of precise information's necessary for decision making. Direct comparison of the long-term parameters obtained from the plot enables optimal use of the means of operation, minimizing environmental risks, increasing the quality of products and, above all, increasing the profitability of production and / or profits.[6]

It should be noted that the application of smart technologies in agriculture is not a completely new concept. In fact, the application of these technologies has its beginnings as far back as the 1960s, when farmers of developed countries for the first time started to use laser-controlled controls for precisely leveling or irrigating large agricultural areas. Cloud,[7] with work on the computer and the Internet of Things (IOT) are

[5] Opara, L. (2004). Emerging technological innovation triad for smart agriculture in the 21st century. Part I. Prospects and impacts of nanotechnology in agriculture.

[6] Marković, D., Pokrajac, S., Simonović, V., & Marković, I. (2013). Ekonomska evaluacija GPS tehnologije u poljoprivredi Srbije. *Škola biznisa*, *3-4*.

[7] The idea of the Cloud technology is based on the fact that all the information that is necessary for the user (whether it's applications, documents, hardware, or anything else) is available at all times, of course with the pre-requisite that an internet connection is previously

two actual concepts. They together represent the hard core of the next generation information technology industry. Shortly after President Barack Obama proposed the concept of the "smart planet" in 2009, Chinese Prime Minister Vane encouraged the development idea of China's feeling, which mainly emphasized the need for the development of IOT and strategic new industries. IOT is closely related to Cloud and computer workmanship in the way that IOT acquires powerful computer tools through cloud-based work on the computer and cloud computing on the computer the highest quality IOT-based channel. China is a typical agricultural land with the production of rice, pork, fruits, freshwater products and many other types of foods that are being sold worldwide. Agriculture, rural areas and farmers are particularly important when it comes to reforming the modernization.[8]

Although the term "internet of things" was skewed in 1999, IOT-enabled technologies, such as sensor networks, existed since the 1990s. Due to the advancement of sensor and cloud technology (Cloud), processing and storage capabilities and reducing the cost of sensor production, the growth of sensor application has increased over the last five years.[9] The European Commission has predicted that by 2020 it will be connected to 50 to 100 billion devices with the Internet.[10] There are three IOT components that enable smooth operation of such systems. Those are:

1. Hardware - composed of sensors, actuators and embedded communication hardware
2. Tools - for data storage and computer tools for data analysis and
3. Presentation - new easily understandable visualization and interpretation tools that have great access to different platforms and can be designed for different applications.[11]

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established. So, cloud in some way represents the service of delivering services instead of the product itself.

[8] Tong Ke, F. (2013). Smart agriculture based on cloud computing and IOT. *Journal of Convergence Information Technology*, *8*(2).

[9] Perera, C., Zaslavsky, A., Christen, P., & Georgakopoulos, D. (2014). Sensing as a service model for smart cities supported by internet of things. *Transactions on Emerging Telecommunications Technologies*, *25*(1), 81-93.

[10] Sundmaeker, H., Guillemin, P., Friess, P., & Woelfflé, S. (2010). Vision and challenges for realizing the Internet of Things. *Cluster of European Research Projects on the Internet of Things, European Commission*, *3*(3), 34-36.

[11] Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of Things (IoT): A vision, architectural elements, and future directions. *Future generation computer systems*, *29*(7), 1645-1660.

Management in smart agriculture is related to a specific location. The basic idea is to do everything right, in the right place, at the right time. This idea is as old as agriculture, but during mechanization of agriculture in the 20th century, there has been a strong economic pressure on treating large fields with the application of unique agricultural practice. Precision agriculture provides a way of automating a specific location, using information technology, thus managing the management of a specific site practically in commercial agriculture. Smart agriculture encompasses all those agricultural production practices that use information technology or adapt the input to achieve desired outcomes or monitor these outcomes (egg Variable Speed Application (VRA), yield monitor, remote sensing).

Lovenberg-DeBoer and Svinton (1997) define the management of a specific location as an electronic control and control that is used to collect data, process information, and support decision-making for time and spatial distribution of inputs for crop production. They point out that the focus is on agronomic, but the arguments relate to agricultural crops and to electronic labeling of cattle.[12] But not only that, but also agricultural machinery used in agricultural production.[13]

In smart agriculture technology, the wireless sensor network is used to obtain different information about supervised objects of the collaboration with various integrated miniature sensors. With the built-in information process and random only organized wireless networks, the information is sent to the user terminal. Based on the characteristics of automation, organization and data concentration only, the wireless sensor network can be applied to obtain land moisture data in the field, and then the data is fused and transmitted automatically to provide a high efficient platform for downloading data on humidity of the field the most optimal irrigation would take place.

Wireless sensor networks are the basis of a smart irrigation control system. In particular, important sensory knots are used by researchers and farmers to collect field data. In addition, for the purpose of implementing smart irrigation, only the moisture content in the soil is obtained from the sensor

[12] Bongiovanni, R., & Lowenberg-DeBoer, J. (2004). Precision agriculture and sustainability. *Precision agriculture*, *5*(4), 359-387.

[13] Primicerio, J., Di Gennaro, S. F., Fiorillo, E., Genesio, L., Lugato, E., Matese, A., & Vaccari, F. P. (2012). A flexible unmanned aerial vehicle for precision agriculture. *Precision Agriculture*, *13*(4), 517-523.

nodes, but it does not contain any amount of water. However, the amount of water is a very important factor of the growth and development of this technology. The smart irrigation control systems mentioned are commonly used for wire communication and a centralized control scheme. The efficiency of such an organized system is small. Taking into account the price, wireless sensor network cannot be temporarily applied to agriculture. For this reason, the smart irrigation control system is developing not fast enough. At this stage of smart agriculture development, it is necessary to reduce the cost of wireless sensors, devices for controlling irrigation and maintenance of hardware and software.[14]

But despite all of the foregoing, in the last few years research in the field of wireless sensor networks has experienced an expansion due to lower prices of sensors and radio transceivers (RPP - radio transceiver) for communication at small distances, so today it is possible to make relatively cheap mote, devices that are equipped with sensors, processor, RPP and independent power supply. By networking these devices, it is possible to make BSM, which can monitor the phenomenon from a distance and transmit the information about an arbitrary location on a global network, the Internet, a device for controlling irrigation and maintenance of hardware and software.[15]

## The impact of climate change on the development of smart agriculture

Today agriculture is facing great challenges. The fact is that almost one billion people go to bed every day. It is also predicted that by 2050 humanity will be increased by just over two billion people.[16] In addition, food consumption standards are changing as the average person in the world becomes richer and consumes more food and more meat. There is increased competition of soil, water, energy and other inputs in food production. Climate change poses additional challenges to agriculture, especially in developing countries. At the same time, many current agricultural productions are detrimental to the environment and represent the main source

[14] Xiao, K., Xiao, D., & Luo, X. (2010). Smart water-saving irrigation system in precision agriculture based on wireless sensor network. *Transactions of the Chinese Society of Agricultural Engineering*, *26*(11), 170-175.

[15] Zogović, N., & Dimić, G. (2008). Zahtevi i tehnološke mogućnosti komunikacionih sistema u preciznoj poljoprivredi.". In *Konferencija TELFOR, Beograd*.

[16] Lipper, L., Thornton, P., Campbell, B. M., Baedeker, T., Braimoh, A., Bwalya, M., ... & Hottle, R. (2014). Climate-smart agriculture for food security. *Nature Climate Change*, *4*(12), 1068.

(19-29%) of emissions of anthropogenic emissions of greenhouse gases.[17]

Climate change influences the change in agricultural production and food production, and certainly also affects the transformation of entire agriculture, with the aim of supporting global food security and poverty reduction. Climate change introduces greater uncertainty and risk among farmers and creators of agrarian policies, but on the other hand they do not have to lead to a paralysis of production.[18] Technology in smart agriculture should be integrated and transformed into a clear approach to addressing food safety issues and must be in line with climate change. It must be established at all levels from a local to a global level. It should be based on research, aligning agricultural policy of the state of the field and must provide investment in agriculture. All this should be established through private and public sectors of civil society in order to achieve the level and rate required for the changes. With the right practice, policies and investments, the agricultural sector can move to smart agriculture, which can result in a decrease in food insecurity and poverty in the short term. On the other hand, it will contribute to reducing the impact of climate change and the risks associated with food safety in the long term.

**Possibilities of applying smart technology in agriculture in Serbia**

Serbia has favorable natural conditions for the development of diverse agricultural production. As it is known, it is located in a favorable area of northern latitude characterized by four seasons and four climate zones. That is why various plant and animal production can be developed: cereals, industrial plants, fruits and vegetables, seeds and planting material, medicinal herbs, large and small cattle. In addition to climate, land is the most important natural condition for the development and distribution of agriculture. Soil fertility is subject to change and is directly influenced by climate, hydrological and biological changes, as well as people's activities.
According to the current documents and Strategies of the Government of Serbia, it can be concluded that agriculture represents an important segment of Serbia's economic development. The importance of agriculture for the national economy is that in addition to the economic one, it has a social and ecological component. On the basis of everything exposed, we can conclude

[17] Vermeulen, S. J., Campbell, B. M., & Ingram, J. S. (2012). Climate change and food systems. *Annual Review of Environment and Resources*, *37*, 195.
[18] Vermeulen, S. J. et al. (2013). Addressing uncertainty in adaptation planning for agriculture. Proc. Natl Acad. Sci. USA 110, 8357–8362.

that Serbia's agriculture has the necessary level that is necessary for the production of food. However, despite the high potential in the agricultural production sector resulting from favorable climatic conditions, natural characteristics of the land and available water resources, it has not yet been sufficiently exploited.[19]

Scientific research work in our agriculture takes place in scientific research organizations or institutes. Also, in almost all agricultural faculties, departments or departments of a scientific unit are formed within the institutes dealing with scientific work.

The public interest in greater production of agriculture would be further complemented by the engagement to appropriate scientific institutions. These institutions would contribute to a good mastery of technical and technological achievements, or better use of new machines and technological procedures for cultivating new varieties of plants and animals. In the application of smart agriculture these institutions would become irreplaceable.

In this context, the Government of Serbia is 02.10.2017. in cooperation with the BioSens Institute opened the Center of Digital Agriculture of Serbia.

The Center is one of the first results of the joint work of the Government of Serbia and the researchers of the BioSens Institute on the introduction to information technologies in agriculture. The Center is an example of the practical application of innovative IT solutions and digitization in order to increase the efficiency and competitiveness of domestic agriculture.

During the opening of the Digital Agriculture Center of Serbia, the AgroSens digital platform will be putting into operation, whose basic services are free of all farmers. The platform enables the mobile phone to become a tool through which timely, geographically precise and relevant information on agricultural production activities is exchanged. These are data that have practical application: satellite monitoring of crop conditions, localized weather data, and digitized data on chemical and mechanical composition of the land, the activity record on the plot, the catalog of seeds and chemical preparations, and a catalog of state-of-the-art technological solutions for precision agriculture.[20] In this way, Serbia

[19] Simonović, Z., (2014). Upravljanje agrarom Srbije u tranziciji, Institut za ekonomiku poljoprivrede, Beograd, str. 124-132.
[20] http://www.agrosmart.net/vesti/otvara-centar-digitalne-poljoprivrede.html

joined the creation of conditions for the development of smart agriculture.

## Questions related to the application of smart agriculture in Serbia

We are keen to find out how much our agricultural producers know the possibilities of applying smart technology in agriculture. We asked our farmers a few questions. The first question relates to informing farmers about the possibilities of using smart agriculture. As Table 1 shows, only 4% of the third party claims that it knows a lot about the possibilities of applying smart technology in agriculture.

**Table 1.** *Informing agricultural holdings about the possibilities of using smart technology in agriculture?*

| answers of respondents | number of respondents | participation in % |
|---|---|---|
| quite familiar | 4 | 4.44 |
| medium | 18 | 20.00 |
| little | 39 | 43.33 |
| not known | 29 | 32.22 |
| in total n=90 | 90 | 100.0 |

**Source:** *Calculation of the author based on the survey.*

Nearly two-thirds of respondents did not have or heard little about smart technology in agriculture. This tells us how much this topic is new and how little or no it is talked about. The next question we asked the bearers was whether you would use smart agriculture in your agricultural production.

**Table 2.** *Would you use smart technology in your production?*

| answers of respondents | number of respondents | participation in % |
|---|---|---|
| yes | 31 | 34.44 |
| no | 42 | 46.67 |
| no answer | 17 | 18.89 |
| in total n=90 | 90 | 100.0 |

**Source:** *Calculation of the author based on the survey.*

We got interesting answers to this question. Over 46% would not use smart agriculture, while using 34%. Based on this answer, we can conclude that there are many farmers that do not know the benefits of applying smart technology in agriculture. There is also lack of interest in introducing new technologies in agricultural production.

And on the basis of the next question, we can notice that the percentage structure of the respondents is moving in the large ignorance of the topic by the respondents. Just 60% of respondents did not even want to answer this question. Only slightly more than 5% see their interest in investing in smart agriculture.

**Table 3.** *Do you know that investments in smart technologies create conditions for cheaper production?*

| answers of respondents | number of respondents | participation in % |
|---|---|---|
| yes | 5 | 5.56 |
| no | 7 | 7.78 |
| partially | 24 | 26.67 |
| no answer | 54 | 60.00 |
| in total n=90 | 90 | 100.0 |

**Source:** *Calculation of the author based on the survey.*

Better introduction to our agricultural producers with this issue would certainly be useful and productive for our agricultural production. Serbia's agriculture has to respond too many of the challenges that a wait on the road to the EU. It is precisely in this sense that our reformed agricultural policy must be organized, which would rely on the application of technical, technological and ecological standards in agriculture, which should be able to form modern models of agricultural producers and entrepreneurs, which would be equal to the agrarian entrepreneurs in the European Union.

Perhaps the solution to our agricultural producers is their joint organization of the form of cooperatives or other associations for agricultural producers, with the aim of making it easier to procure funds that are necessary for the application of smart agriculture. At present, cooperatives in Serbia are practical organizations. Most of the cooperatives in the modern way of doing business tend to think about fulfilling their current obligations. This way of thinking influences that the cooperative movement properly looks at the way to the future. The Cooperative Movement is today focused on pragmatic inclusion, responding to the given opportunities in order to adapt to the changes.[21]

[21] Simonović Z, Mihailović B, Milovanović Z. Cooperatives and farmers association as a model of entrepreneurship in Serbian agriculture regarding the case of Nišava district. Ekonomika poljoprivrede 2016; 63(2):699-712.

## Conclusion

The application of smart technologies in agriculture has great potential that can advance agricultural production, primarily based on more precise and efficient use of resources. Many countries like the United States have done a lot to develop this technology. To mention that the percentage of agricultural producers using smart-technology technologies ranges from 20-80%, in Europe this share ranges in a modest range from 0 to 24%. And the Republic of Serbia is entering this European average. And other countries in the world like China and India are increasingly investing and developing this kind of agricultural production. On the basis of everything ahead, we can freely say that smart agriculture represents the future.

The reasons for the accelerated development of smart agriculture technologies should also be sought in the fact that climate change has a significant impact on the current way of agricultural production and food production. In this way, they certainly influence the transformation of the entire agriculture. The ultimate goal of developing smart agriculture would be to support global food security and reduce poverty and hunger.

Smart agriculture technologies should not be targeted exclusively to large, developed agricultural farms, but could be a factor that will support the development of other forms of farming. We think primarily of small family farms and organic production in agriculture. The application of smart agriculture technology could improve the reputation for agricultural producers in European consumers, society as a whole, and adapt them to market conditions. Smart Agriculture can bring benefits in terms of environmental protection, by reducing water use or by optimizing the use of different pesticides.

At the end of the paper, the authors gave a survey on the possibilities of applying smart technology technologies to the holders of agricultural holdings in the Republic of Serbia. They found that farmers in Serbia are not sufficiently familiar with the possibilities and benefits of applying smart agriculture in their farms. We believe that Serbian agricultural producers should be more active and more involved in projects that imply the implementation of smart agriculture. The state could do a lot to facilitate the implementation of smart agriculture, because in this way, Serbia's agriculture is preparing for the upcoming times, which, in all likelihood, will increasingly be conditioned by climate change. This could be done primarily by subsidizing the production and use of systems used in smart agriculture.

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# STRATEGIC GOALS OF DEVELOPMENT OF AGRICULTURE AND RURAL AREAS IN BOSNIA AND HERZEGOVINA

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## Abstract

*The strategic goals of the development of agriculture and rural areas in Bosnia and Herzegovina have been defined in the medium term, by 2020 i.e. 2019, in both of its entities (the Republic of Srpska and the Federation of Bosnia and Herzegovina), and they have not been established at the level of BIH yet. Current development goals came down to ensuring the stability of agricultural producers' income; raising the technical and technological level and productivity in agriculture; increasing competitiveness; sustainable management of natural resources and adaptation to climate change; improvement of quality of life in rural areas, and improvement of the institutional and legislative framework, i.e. providing systematic support to the agriculture sector. As in many other cases, there is gap in a more serious systematic analysis of the implementation of strategic documents, so the conclusions are based on personal observations and preliminary analysis of available data and occasional reports. The conclusion, after the analysis of the content of strategic documents and the results achieved, by the combination of rapid assessment, analytical-synthetic methods and benchmarking, is that the set of strategic goals has been implemented, but to a much lesser extent than planned. The reasons are, in most cases, difficulties to find appropriate solutions and responses to challenges such as: free trade, competitiveness, diversification, subsidy policy, depopulation of rural areas, climate change, knowledge transfer, EU integrations, institutional and legislative environment, etc. In the function of developing agriculture and rural areas should be used by establishing a stronger link between planned strategic documents and concrete activities undertaken, including periodic analysis of the achieved results in the function of affirmation of the management by the goals.*

**Key words:** *Bosnia and Herzegovina, strategic goals, agriculture, rural development*

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## Introduction

There is a practice in Bosnia and Herzegovina to define the strategic goals of agriculture development in documents called the strategy or strategic plan. It is on the line of the scientific approach, according to which there is a hierarchy of planning documents that start with defining policies, continues to define strategies, which are further elaborated trough programmes and plans (Novković at al., 2015). The administrative structure of Bosnia and Herzegovina (BIH) is the state consisting of two entities (the Republic of Srpska (hereinafter referred to as RS) and the Federation of Bosnia and Herzegovina (hereinafter referred to as FBIH)) and one district (Brčko district BiH (hereinafter referred to as BD)), that have a high level of autonomy and competences, including agriculture and rural development. Each of the two entities has its Government and Ministries of Agriculture, and the District has its Government and Department for agriculture. Within the Federation of BIH, there is an additional lower administrative level, 10 cantons and there are also cantonal governments (and often, they also have additional strategies of agricultural development). At the state level of BIH, there is no ministry of agriculture, and part of responsibilities from that domain are entrusted to the Ministry of Foreign Trade and Economic Relations. The previously described administrative structure results in the strategic planning and programming of the development of agriculture and rural areas in BIH at several levels, which are not consistent and do not comply, i.e. the goals, measures and periods which they cover are different. In the process of strategic planning in BIH, there are time vacuums occasionally occurring in which there are no strategic/program documents for specific area or they exist, but they are no officially adopted.

In the Republic of Srpska in the beginning, there were two separate strategic documents. One was the Strategy of Agriculture Development of the Republic of Srpska until 2015 (MPŠV RS, 2006) and the second one was the Strategic Plan of Rural Development of the Republic of Srpska for the period 2009-2015 (MPŠV RS, 2009). Before the expiration, the Strategic Plan of Development of Agriculture and Rural Areas of the Republic of Srpska for the period 2016-2020 was prepared and adopted (MPŠV RS, 2015).

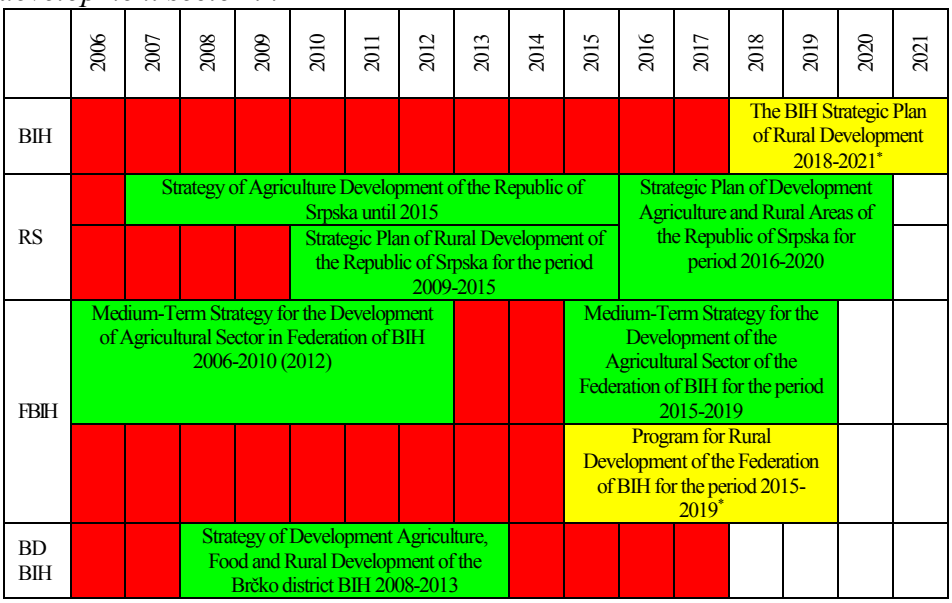
In the Federation of BIH, the Medium-Term Strategy for the Development of Agricultural Sector in Federation of BIH 2006-2010 was adopted, with extended validity until 2012 (FMPVŠ, 2006). After that, two separate strategic documents where prepared, the Medium-Term Strategy for the Development of Agricultural Sector of the Federation of

BIH for the period 2015-2019 (FMPŠV, 2015) and the Program for Rural Development of the Federation of BIH for the period 2015-2019, of which the first was adopted, and the second was not adopted.

Brčko District BIH in the period 2008-2013 had the Agriculture, Food and Rural Development Strategy of the Brčko District of BIH (BD, 2006), and upon the expiry of its validity, there was a period without any strategy, until the new strategy draft with the identical title was adopted (although it was followed to a certain degree). Currently, the preparation of the rural development strategy of the district is ongoing.

At the level of BIH, drafting of the BIH Strategic Plan of Rural Development began in 2016, which is finalized, but has not been adopted yet.

**Diagram 1.** *The strategic documents in the agriculture and rural development sector in BIH*




The foregoing considerations lead to conclusion that Bosnia and Herzegovina, its two entities and Brčko district don't have continuously valid strategic documents that verify the valid goals of the development of agriculture and rural areas. The fact that these goals are determined for certain parts of the territory and for different periods makes their comparison and analysis more difficult.

* draft, not addopted.

## Material and methods

The aim of the paper is to present development of the main strategic documents regulating the development of agriculture and rural areas in Bosnia and Herzegovina and its entities/district, listing and comparing the main development goals and analysing relevance and achievement of these goals, i.e. identifying the main challenges that have direct influence on the development of agriculture and rural areas. The data analysed are data contained in valid strategic documents, as well as data from relevant secondary sources. The methods used during the research are rapid assessments, methods of analysis and synthesis, benchmarking, comparision, and logical conclusion. In the end, the opinions and the conclusions were made based on personal expert opinion.

## Results of the research

The results of the research of existence and degree of implementation of the strategic goals of the development of agriculture and rural areas in BIH are presented in the form of: (1) a concise presentation of the current situation in agriculture and rural areas, as a starting point for strategic planning; (2) identification of strategic goals as a response to the stated situation and (3) discussion of the challenges that are encountered during the implementation of the identified strategic goals.

### The current situation in agriculture and rural areas as a starting point for strategic planning

In Bosnia and Herzegovina there is no systematic and serious analysis of the achievements of the goals of the agriculture and rural development defined in strategic documents, both by the governmental and by the non-governmental sector, as foreseen by the strategic management process (identifying → diagnosing → conceiving → realizing, De Wit and Meyer, 2004). Such activities are usually approached only as part of the preparation of new strategic documents.

There are three main indicators pointing out the level of development of agriculture in BIH – the value and share of agriculture in GDP, the level of agricultural employment and the position of agricultural and food products in the foreign trade balance. All three indicators were analysed at the level of BIH and its two entities and BD.

The gross value added of agriculture (which is monitored at sector A level, together with forestry and fishery) is in relative terms decreasing, which is characteristic tendency for developing countries, but remains high (6.2%). Its importance is significantly higher in the RS, than in the FBIH, due to a different resource base and different contribution of other sectors. In absolute terms GVA of agriculture varies between 1.6 and 1.8 billion BAM.

**Table 1.** *Gross added value of agriculture, forestry and fishery (sector A) in BIH, entities and Brčko district in the period 2006-2015 (current prices)*

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| **billion BAM** | | | | | | | | | | |
| RS | 855 | 916 | 971 | 917 | 876 | 883 | 836 | 916 | 838 | 856 |
| FBIH | 707 | 765 | 814 | 788 | 798 | 837 | 743 | 870 | 742 | 857 |
| BD | 47 | 50 | 52 | 48 | 47 | 51 | 29 | 46 | 38 | 69 |
| BIH | 1,614 | 1,736 | 1,837 | 1,753 | 1,722 | 1,771 | 1,609 | 1,832 | 1,627 | 1,781 |
| **%** | | | | | | | | | | |
| RS | 13.1 | 12.5 | 11.4 | 11.1 | 10.5 | 10.2 | 9.7 | 10.4 | 9.5 | 9.3 |
| FBIH | 5.4 | 5.2 | 5.0 | 4.9 | 4.8 | 4.9 | 4.4 | 5.0 | 4.2 | 4.6 |
| BD | 9.8 | 9.1 | 9.0 | 8.6 | 8.4 | 8.6 | 4.8 | 7.5 | 5.9 | 10.0 |
| BIH | 8.1 | 7.7 | 7.2 | 7.1 | 6.8 | 6.8 | 6.1 | 6.9 | 6.0 | 6.2 |

**Source:** *RZS RS (2016). Statistički godišnjak broj 8; FZS (2015). Bruto domaći proizvod u Federaciji BiH, Statistički bilten, broj 245; AS BiH (2011; 2016). Nacionalni računi, bruto dodana vrijednost i bruto domaći proizvoda za Brčko distrikt, bilten br. 10; 8; AS BIH (2017). Bruto domaći proizvod prema proizvodnom, dohodovnom i rashodovnom principu 2015, Tematski bilten br. 1.*

Officially registered employment in the agricultural sector is very low (about 1%) since most of the work spent in agriculture is not recorded as formal employment. The second indicator which is closer to real employment in agriculture is the one obtained by labour force surveys.

**Table 2.** *Employment in agriculture sector according to labour force surveys in BIH, entities and Brčko district in the period 2006-2015*

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| **thousands** | | | | | | | | | | |
| RS | 93 | 106 | 110 | 112 | 104 | 106 | 99 | 90 | 93 | 91 |
| FBIH | 72 | 61 | 72 | 68 | 61 | 53 | 66 | 64 | 44 | 53 |
| BD | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 3 |
| BIH | 167 | 168 | 183 | 182 | 166 | 160 | 167 | 155 | 139 | 147 |
| **%** | | | | | | | | | | |
| RS | 32.2 | 31.2 | 31.3 | 32.6 | 31.5 | 32.6 | 31.7 | 29.1 | 30.4 | 29.1 |
| FBIH | 14.3 | 12.2 | 13.7 | 13.5 | 12.2 | 11.0 | 13.5 | 12.7 | 9.6 | 10.6 |
| BD | 15.6 | 11.0 | 10.3 | 16.1 | 9.2 | 10.4 | 17.7 | 15.1 | 13.8 | 24.6 |
| BIH | 20.6 | 19.8 | 20.6 | 21.2 | 19.7 | 19.6 | 20.5 | 18.9 | 17.1 | 17.9 |

**Source:** *Own data processing based on the Labour force surveys, Agency for Statistics of Bosna and Herzegovina (2008, 2011, 2013, 2016).*

Agricultural employment, registered by labour force surveys, indicates that about a third of population is in some way engaged in agriculture, which is extremely high and is not the result of agriculture development of, but it is rather reflection of fragmentation of agricultural production and absence of alternative sources of income for rural population.

**Table 3.** *The share of agro-food products in total foreign-trade of goods of Bosnia and Herzegovina in the period 2006-2015*

| | Total export | Agro-food export | | Total import | Agro-food import | | Trade balance | Agro-food trade balance | |
|---|---|---|---|---|---|---|---|---|---|
| | million BAM | million BAM | % | million BAM | million BAM | % | million BAM | million BAM | % |
| 2006 | 5,164 | 270 | 5.2 | 11,389 | 1,924 | 16.9 | -6,225 | -1,654 | 14.0 |
| 2007 | 5,937 | 336 | 5.7 | 13,898 | 2,221 | 15.9 | -7,961 | -1,875 | 15.2 |
| 2008 | 6,712 | 425 | 6.3 | 16,293 | 2,581 | 15.8 | -9,581 | -2,156 | 16.4 |
| 2009 | 5,531 | 466 | 8.4 | 12,355 | 2,366 | 19.2 | -6,824 | -1,900 | 19.7 |
| 2010 | 7,096 | 564 | 7.9 | 13,616 | 2,467 | 18.1 | -6,520 | -1,903 | 22.1 |
| 2011 | 8,222 | 621 | 7.6 | 15,526 | 2,745 | 17.7 | -7,304 | -2,124 | 22.6 |
| 2012 | 7,858 | 621 | 7.9 | 15,253 | 2,789 | 18.3 | -7,395 | -2,168 | 22.3 |
| 2013 | 8,381 | 685 | 8.2 | 15,169 | 2,725 | 18.0 | -6,788 | -2,040 | 25.1 |
| 2014 | 8,682 | 662 | 7.6 | 16,200 | 2,729 | 16.8 | -7,518 | -2,067 | 24.2 |
| 2015 | 8,987 | 840 | 9.3 | 15,852 | 2,862 | 18.1 | -6,865 | -2,022 | 29.4 |

**Source:** *Own data processing based on the database of Foreign Trade Chamber of Bosnia and Herzegovina.*

High foreign trade deficit of BIH in the trade of agro-food products is the "sickness" of its agriculture, or its inability to produce enough food to feed 3.5 million of inhabitants. A lot of food is imported because of a liberalized foreign-trade policy, and domestic agricultural production stagnates because of not being competitive in relation to imported products. In recent years, the deficit stagnated at around 2 billion BAM, and the coverage of import by export has improved, mainly due to a faster increase in export.

## Goals as strategic responses to the stated situation

In all recent strategic documents related to the development of agriculture and rural areas in BIH, the necessity of turning point to the approach of the development of these sectors and the gradual (or rapid) acceptance of EU Common Agricultural Policy inheritance and its acquis communautaire is emphasized. The strategic goals should be "milestones on the development road", sources and initiators of positive changes. In accordance with the fact that in BIH there are two valid strategic documents that define goals of agriculture and rural areas development

and one which is expected to be adopted, the following are showed RS and FBIH agriculture development goals, i.e. proposed for BIH level.

**Table 4.** *Current strategic goals for the development of agriculture (and rural development) in BIH*

| | BIH | RS | FBIH |
|---|---|---|---|
| 1. | Strengthening competitiveness of agriculture, forestry and rural areas through increasing the level of investments and improving the transfer of knowledge and promotion of innovation | Increase in the volume and productivity of agricultural production and ensuring the stability of agricultural producers' income | Providing conditions for stronger generating stable income in the agricultural sector and |
| 2. | | Strengthening the competitiveness of the agricultural sector through increased investment | Development of agriculture and related sectors with the increase of technical and technological level, more efficient use of available resources, and respect for the requirements of modern markets |
| 3. | Improving marketability of agro-food products by increasing value-added activities, improving quality and safety standards and strengthening linkages within the value chains | Increase in the level of marketability and finalization of agricultural products | |
| 4. | Sustainable management of natural resources and climate change adaptation | Sustainable management of natural resources and mitigation of the effects of climate change | and Sustainable management of natural resources and adapting agriculture to climate change |
| 5. | Improving the quality of life in rural areas through new income generating sources and improvement of physical infrastructure, social inclusion and accessibility of public services | Balanced integral rural development | Providing conditions for improving the quality of life in rural areas |
| 6. | Improving institutional systems and capacities and harmonization of the legal framework in agriculture and rural development, at all governmental levels with the aim of gradual approximation to the EU CAP | Systematic support for development of agriculture and rural areas | Adaptation the institutional-legal framework and agricultural policy with EU CAP considering the level of development of the agricultural sector of the FBIH |

**Source:** *Own data processing base on the review of strategic documents.*

The goals of the development of agriculture (and rural areas) in two BIH entities are rather compatible, and but the timeframe differs (in RS 2016-2020, in FBIH 2015-2019, and on BIH level 2018-2021). The common goals are as follows: to ensure the stability of agricultural producers' income; to increase technical and technological level of agriculture productivity; to strengthen the competitiveness; sustainable manage natural resources and to adopt to climate change; to improve the quality of life in rural areas, i.e. to develop rural areas; and to improve the institutional and legislative framework, i.e. to ensure systematic support to the agricultural sector. Determined (but still not adopted) goals in the Strategy of rural development of BIH largely coincide with goals defined in entity strategies. These goals

are also in line with the Common Agricultural Policy for the period 2013-2020 (European Commission 2013).

In accordance with the usual hierarchy of goals, from the strategic goals lower-level goals have been defined, as well as specific or operational objectives and measures/sub-measures.

**Table 4.** *The hierarchy of strategic goals and measures in BIH*

| Hierarchy level | RS | FBIH | BIH |
|---|---|---|---|
| Strategic goals | 5 | 4 | 6 |
| Policies/Areas | 3 | 9 | - |
| Specific/Operational objectives | 16 | 37 | - |
| Measures | 52 | 37 | 11 |
| Sub-measures | - | - | 67 |

**Source:** *Own data processing based on the review of strategic documents*.

The work space doesn't allow entering more detailed elaborate of specific/operational goals and measures/sub-measures.

The essence of management by goals is to take actions to achieve these goals. Two, or three, years elapsed since the beginning of the implementation of the entity strategies, and the third strategy has not yet been adopted. Considering the remaining validity of current strategies, a mid-term review of success of their implementation could be done, which would involve a detailed and studious approach and overcome the capacity of one researcher. So, in the context of the analysis of the strategy of agriculture (and rural) development in BIH, it is decided to analyse ten challenges that the implementers of the strategy faced with.

## Challenges of achieving strategic goals

After the harmonization and adaptation of strategies, and strategic goals, the activities and measures contributing to the achievement have been taken. Although all adopted strategic documents have quantified targets by years, in BIH there are, as a rule, no analysis of achieved strategic goals in agriculture and rural development. Commonly, there are prepared annual information or reports on the achievements and progress, but not compared to what was planned. Thus, the Ministry of Foreign Trade and Economic Relations, for the past ten years, has been preparing annual reports compiling data of results achieved in entities and BD (last

MSTEO, 2017), and it is discussed at the Council of Ministries of BIH sessions. And in FBIH, there are annual reports (so-called "green reports") which are adopted by Federation of BIH Government, but also they report on the achievements in preceding three years (last, FMPŠV, 2017). In the Republic of Srpska, there are annual reports on the situation in the agricultural sector, adopted by the RS Government, but they are generally inaccessible to the wider public. Bearing previous in mind, it can be concluded that the analysis of achieving the planned goals (in this case strategy goals) are missing or they are quite superficial. Below are the personal observations of challenges that have influenced the achievement of certain strategic goals.

**1. Challenge – Increase the volume of agricultural production**

In the last year, some positive development has been evident, but less area of arable land is cultivated in the long run in BIH (without any sanctions for non-cultivation, and some incentives for cultivation). There is declining trend in total volume of agricultural production in almost all agricultural products. The number of heard decreases, and positive trends are evident in poultry production and beekeeping. A perennial survey has shown that increase in unemployment (which is quite high in BIH) did not result in a statistically significant decrease in uncultivated land (Vaško et al., 2013), which suggests that agriculture is not a social buffer for generating alternative income.

In FBIH, 2.7% more areas were sown in 2015/16 than in the previous year, and approximately it is the same area as ten years ago. 50% of potentially arable land has not been cultivated (FZS, 2016a). The number of cattle, sheep and goat in FBIH has stagnated in the last three years, the number of swine and poultry decreases, and only the number of bee hives grows. In long term (ten-year in average) the number of all livestock decreases, expect poultry and bees (FZS, 2017b).

In the Republic of Srpska, 2.3% more land was sown in 2015/16 than year earlier, but 10% less than ten years ago. 45% of potentially arable land has not been cultivated (RZS RS, 2017a), although there are justified reservations toward data according to total potentially arable land. The number of cattle and sheep stagnates, the number of swine decreases, and number of goats, poultry and bees is growing slightly (RZS RS, 2017b). In the long term, the number of cattle and swine decrease, while sheep, poultry and bees increase. *The volume of agriculture production stagnates and varies under the influence of*

*natural and market conditions.* The reasons for a living plant and livestock production are dominance of small holdings (the scale of production varies from only 1 ha to hundred hectares per farm, but the most dominant type of the farm is the farm of 2-5 hectares divided in several (2-5) parcels; FAO, 2012), the lack of competitiveness of domestic products produced in this way in comparison with imported ones; depopulation of rural areas and free import of cheaper products.

## 2. Challenge – Increase and reform subsidies

The financial incentives (subsidies) for development of agriculture and rural development is one of the continuous measures of agricultural and rural policy in BIH in the last twenty years. Although, from the point of view of budgetary expenditure of its entities and BD (subsidies are allocated at that level) these incentives are significant, at the same time. they are modest if they are in a ratio with value of agricultural GDP and compared with other countries. In BIH, subsidies per hectare of utilized agricultural area was only 60 EUR in 2015 and among the lowest in the region (Volk at al., 2017). The structure of these payments is such that 90% is allocated to market support and direct payments. The most of funds are used for direct payments related to products, out of which majority of funds goes to the milk premiums. In valid strategic documents, it is planned to give up direct products related payments and switch to payment per hectare systems and per livestock unit, which is partially implemented in FBIH and BD, and in RS it is postponed.

Support to rural development has been neglected. Although higher allocations are planned in strategic documents for these purposes. However, that has not happened until now and has been prolonged to some future times. In that regard, the subsidies for agriculture development are mainly going to the current production, and financing the investments in the expansion and modernization of production capacities is left to agricultural producers to do it from their own funds (which are insufficient) or from credits (which are inaccessible and expensive), almost without any subsidizing of investment costs. The foreseen give up of the direct payment system is lacking, and the most funds are still spent on payments of output quantities (for example, purchased quantities of milk, wheat, tobacco, vegetable, fruits), and partly and inputs quantities (such as subsidized diesel in RS). The subsidies of investment cost are in relative terms small, and stagnate in absolute term.
EU pre-accession funds for agriculture and rural development, among which the most important is IPARD, were not available to BIH and seems

it will remain for some time. *The available funds for subsidizing agriculture are among the lowest in the region and Europe, and the change in the system of financial incentives for agriculture is postponed.* The reasons for low budgetary allocations for agriculture are generally low budgetary revenues and high public expenditure (for example, in the RS about 4% of its budget are allocated for agricultural subsidies, which was about 7% of agricultural GVA, Vaško at al., 2016), the approval of subsidies above available funds, is caused by late payments, with and outdated way of subsidy distribution and delay in the provision of EU pre-accession funds.

## 3. Challenge – Increase productivity of agricultural production

The average yields in plant and livestock production in BIH are low compared to the neighbouring countries and EU average. BIH has the lowest yields in production of cereals, industrial crops, vegetable and most fruits, and average yield is competitive only in the case of raspberry. Sometime, it can be found that the lowest and the highest yields are recorded in two consecutive years, which confirms that plant production is highly dependent of climate impact. Illiquid agricultural producers, left to an unstable market, often apply a strategy of minimizing costs, resulting in low yields. In the predominance of small holdings and liberal market mechanisms, the application of new knowledge and technologies are voluntary and insufficient. Agriculture extension service in B&H is fragmented, differently organized and insufficiently professional, mostly focused on the implementation of the government support measures, rather than technology development and improving productivity (Rokvić and Vaško, 2016).

All data on actual average yields in FBIH and RS, and accordingly in BIH, indicate that there is space and need for increasing productivity in agricultural production. The fact that 17% of labour force is working to produce 6% of GDP, confirms thesis of generally low productivity in agriculture.

As it was once noted (Vaško and Mirjanić, 2013), a significant number of population in BIH deals with agriculture, rather due to necessity, than from a rational orientation that would be consequence of special natural conditions of favourable competitive position. *Increase in average yields has no long-term continuity, slowly developing and it is greatly influenced by natural phenomena.* The reasons are as follows: insufficient technical equipment (low level of investment), high dependence of nature influences (limited irrigated areas, anti-hail and anti-frost systems etc.),

low level of knowledge (lack of education and training) and motivation for increase of productivity.

**4. Challenge – Increase competitiveness on local and international market**

BIH has a liberal regime in the foreign trade exchange of agricultural and food products. It is a member of the CEFTA and EFTA, and not yet a member of the WTO. BIH has signed an amended Stabilization and Association Agreement with EU, and during transitional period it has remained without majority of autonomous preferences.

If the foreign trade balance in agro-food products is taken as the main indicator of competitiveness, it is still negative (about 2 billion BAM) and does not decrease. The net export index is negative for all the first 24 heads of custom tariffs, and the smallest deficit is in fish, milk, fruit and vegetable. There are no protection mechanisms, so that agricultural producers in BIH are exposed to brutal free trade, there are almost no restrictions for food import, subsidies are on much lower level than in case of their competitors, and there are many export non-tariffs barriers.
Nevertheless, BIH must be a part of free market area. Analysis show that in case of the CEFTA that BIH gradually improves its foreign trade position with agricultural products, although it constantly records the deficit (Ćejvanović at al., 2014). *The foreign trade deficit on food is decreasing, but BIH agriculture is still a hostage to fast liberalized foreign trade, and the increase of technical and technological equipment, production volumes, productivity and quality of agricultural products don't provide assumptions for export and are not a barrier for food import.* The reasons behind are the fact that imported products are cheaper due to lower production unit cost and higher subsidies, while domestic products are more expensive due to lowest yields and subsidies, and higher transaction costs, whereby there are no protective mechanisms of domestic production in domain of foreign trade, and financial compensation mechanisms are weak.

**5. Challenge – Climate change and environment protection**

Agriculture production is under significant influence of natural conditions and climate changes. The climate change in BIH is manifested through increase of mean temperature and decrease in rainfall. For the past hundred years temperature has increased by an average of 0.8°C with a tendency of acceleration, so the mean decade temperature in the decade 200-2010 was the hottest in the last 120 years (INC BIH, 2009). The spatial and temporal distribution of rainfall was quite uneven. It is

estimated that impact of climate change through an increase of average temperature and decrease in average precipitations, will have a greater negative influence on agricultural production in the future, so irrigation will become more and more necessary.

Agricultural yields are very sensitive to the quantity of rainfall and temperature fluctuations. In the last ten years there have been several years with extreme drought (2012; 2013; 2015; 2017) and extreme rainfall and floods (2010 and 2014), and hail and frost are appearing the more frequently. These were the reasons for a significant reduction in the volume of agricultural production and loss of interest for continuing production by some producers. Some measures have been taken to adopt agriculture to new climate conditions, investing in prevention measures (irrigation, drainage, anti-hail nets etc.), but the dynamics of these investments are slow. While in some agriculture development goals sustainable management of natural resources is emphasized, environmentally friendly ways of dealing with agriculture in BIH are still rare (use of good agricultural practices, organic agriculture, IPM, etc.) are mostly the result of personal choice, rather than organized efforts. Prevention the degradation of environment by dealing with agricultural production is more left to the sanctions, than by prevention. There are almost no examples of cross-compliance, i.e. introduction of conditions of responsible attitude toward nature in the subsidies approval procedures.
*Agriculture production is significantly vulnerable to the negative impact of nature, whose extreme manifestation is more and more frequent, and there is no given enough attention to protect environment during agriculture production.* The climate changes, which are explained by scientists as "glass house" effect, also have impacts to agriculture. Agriculture is not sufficiently adopted to climate changes, mainly due to lack of financial resources for paying high investment cost of mitigation. Reduction of glasshouse gas emission ($N_2O$, $CH_4$, etc.) from agriculture is a low-ranking priority, and applying of good agricultural practices is voluntary and not stimulated enough.

## 6. Challenge – Application of the rural development concept

In BIH, there is no official territorial demarcation into urban and rural areas (some attempts have been made by Vaško et al. (2016) for the territory of the Republic of Srpska), so there is no clear spatial dimension where it comes to rural development. According to the latest census, BIH had 624 thousand non-urban households (Agency of statistics of BIH, 2016) of which a slightly more than half were agricultural holdings.

Regardless of administrative level, it is not defined who is responsible for rural development. The ministries of agriculture are dealing partially with rural development, mostly those related to financial support for investments in agriculture and diversification of the activates of agriculture holdings. However, the funds allocated for these purposes have been very modest in recent years, so role of the ministries of agriculture has become more declarative, and less realistic. Other issues of rural development, environment protection and improvement of quality of life, and partly diversification of activities are under authority of numerous other institutions and organizations. As a result, the rural development is not managed integrally, then partially (guided and funded by the state, entities, cantons, municipalities and international institutions/projects). At the same time, there are good examples of well-managed policies and financing, but there are also examples of neglected villages, which is an additional motive for depopulation. Ten years ago, the team of experts from academic community (Mirjanić et al., 2010) proposed more intensive partnership between the public, private and civil sectors and proposed certain institutional solutions (establishing rural development council and establishing a rural development agency), which unfortunately, has not been implemented. With political and the growing economic crisis, support for rural development has been very modest in the recent years, and has a tendency of further decline. *Rural development is not enough recognized as a development concept, and it is not managed integrally, then partially.* The reasons are in insufficient understanding or rural development concept, lack of coordination activities implemented in the domain of rural development, and insufficient financial resources.

## 7. Challenge – Establishment of functional system of institutional support for the development of agriculture and rural areas

All administrative levels in BIH have recognized establishment and improvement of the institutional and regulatory framework as an important priority and have included that in their strategic goals. The previous system of support of agriculture and the countryside in BIH was destroyed in three bases: disintegration of the former state (SFRJ), war and transition. The new epoch and circumstances required to re-establish institutional and legal system for support to agriculture and rural development and that is an ongoing process. It is built because of its own needs, and if BIH has ambitions to become the part of the EU, reforms in the field of establishing and improving institutions and regulations must be much faster and more efficient. Key issues of the accession process in the field of agricultural policy are as follows: application of the IPARD,

harmonization of the legislative framework, institutional capacity building and implementation of reforms towards the CAP approach. The legislative framework is in the process of permanent adoption or harmonization, the financial framework is incomplete, and the human and material institutional capacities are insufficient. The registers of agricultural holdings are incomplete, and animal registries are outdated. BIH has not yet carried out an agricultural census, there are no consensus on how to establish paying agency/agencies, there is no integrated administrative and control system (IACS), there is no FADN system, there is no LPIS, there is no market information system, there is no ANC classification (an overview of the available data and criteria was made by Pandi et al., 2017) ... The systems of financing agriculture are not adjusted to needs, agricultural insurance is underdeveloped, the foreign trade system and the protection of domestic agricultural production are ineffective. This does not end with identification of the necessary system support measures, but it is also mentioned enough to point out importance of this area and dimension of this challenge to ensure adequate conditions for the development of agriculture. This type of system support is often neglected, although it is essential and necessary for achieving all other strategic goals. *The institutional and legislative framework for the agricultural and rural development are underdeveloped and require significant reforms.* The reasons for that are the necessity of establishment a completely new system (establishment of a new state and breakdown of continuity with the old one), the constant changes in the regulations and the ways of implementation, the need of cooperation and harmonization with international and regional institutions.

## 8. Challenge – The depopulation of rural areas

As BIH has not defined what constitutes rural area, it is not possible to determine how many rural population there is. In 2013, UNDP estimated that 61% of the population live in rural municipalities, thereby classifying it as one for the most rural countries in Europe (UNDP, 2013). The number and age structure of the rural population is an important factor of achieving strategic goals. Regardless of the absence of exact data only for rural areas, demographic statistics is inexorable. The population growth rates of the Republic of Srpska are negative for all previous ten years, and in Federation of BIH they have become negative since 2013. The intensity of village-town and village-abroad migrations increased, and age structure of rural population is becoming increasingly non-favourable. The situation would be even less favourable if there it the alternatives to employment outside agriculture. In such a situation, the number of those who are

seriously engaged in agriculture is constantly lower, and the number of elderly households are increasing. The elderly households are less interested and oriented to intensive agricultural production, a significant part of their income consists of non- agricultural incomes, primarily pensions. In the rural areas of Bosnia and Herzegovina more and more pensioners live, who are exclusively engaged in agriculture for food production for their own use (Vaško and Figurek, 2013). *The younger generations leave the rural areas, and mostly elderly households are in the villages, that are not capable and not interested in dealing with intensive agricultural production*. The reasons for that are the dominance of small households, low profitability of agricultural production, disconnected value chains and worse living conditions in rural compared to urban areas.

**9. Challenge – Integrate agricultural producers into value chains**

The most of agricultural land and livestock in BIH are owned by family agricultural households. By itself, the total production of certain agricultural products in the country is the sum of production of a thousand (sometimes even hundreds of thousands) small producers. Earlier relations of cooperation between small producers and processing or trading sector were interrupted. Agricultural cooperatives have lost their role, and increasingly numerous agricultural associations are not an adequate replacement. The trade of food and processing raw materials of agricultural origin are concentrated in the hands of smaller number of private (domestic or foreign) entrepreneurs, which are not particularly socially responsible. Food trade moved to hypermarkets, and the direct selling of agricultural products becomes rare. The capacities of food processing industry are privatized and often closed, and imports have become more profitable than production. There are positive cases of business linking of agricultural producers with processors and traders exist, but nature of these relations is uncertain and does not guaranty long-term stability. *Domestic agricultural production is generated by many small producers, price and other market fluctuations are significant, a smaller part of production is pre-contracted, and most producers are not organized and interconnected.* The reasons are as follows: inherited ownership structure, still actual transitional processes in the agribusiness sector, dominance of large intermediaries in trade of food, animosity of agricultural producers toward common organizing.

**10. Challenge – The accession to the European Union**

The process of BIH integration into the EU is going slowly. BIH has the status of a potential candidate and despite of the slogan that the candidate

status is "goal of all goals" there are no consensus on the fulfilment of these conditions for BIH to obtain that status. BIH still doesn't have access to IPARD funds, but even if it gets it, there would still be remaining problems with intuitional mechanisms of these funds, which would be distributed to end users (the issues of organizing a payment agency, managing authority etc.). There is a long way that BIH needs to pass in harmonization primary and secondary legislation (called acquis communitaure) and the building of institutions that would allow the common agricultural and other policies to be applied in BIH as well. With political and administrative arrangements as it is currently, BIH will cross that road much slower than many other counters that become or are now in the process to becoming a member of the EU. *Agriculture is one of the most demanding areas in the process of accession to EU and BIH will need a lot of time and resources to meet these conditions.* The reasons are low level of agricultural development, complex political and administrative system, absence of a consensus on the EU accession, lack of human and material capacities, and misunderstanding of integration processes.

## Conclusion

In accordance with the political and administrative constitution of Bosnia and Herzegovina, the issues of determining and adopting agricultural and rural policy are within the competence of two Entities and one District. This means that goals of agricultural development are formulated in several strategic documents at different administrative levels and for different periods of time. Currently, the both entities have established agriculture development strategies, but Brčko District has not established it. There are intentions to adopt Framework strategy of rural development at the level of BIH. Regardless of the different places of their formulations, the goals of agricultural development are quite similar in the both entities and the process of their implementation is under way.

When it comes to the level of accomplishment of the set goals, it would be easier to conclude that these goals are not realized on a planned scope than to give answers to the questions about the ways why this is so. Therefore, this paper was devoted to the analysis of the challenges that stand at the road of achieving defined goals of agricultural and rural development in BIH and reasons that make their implementation difficult. Without the pretensions that the definitive list has been made, ten challenges have been identified: (1) Increase the volume of agricultural production; (2) Increase and make reform to subsidies; (3) Increase

productivity of agricultural production; (4) Increase competitiveness on local and international market; (5) Climate change and environment protection; (6) Application of the rural development concept; (7) Establishment of functional system of institutional support for the development of agriculture and rural areas; (8) The depopulation of rural areas; (9) Integrate agricultural producers into value chains; and (10) The accession to the European Union.

The list of the challenges itself points out to the complexity of the process of managing agricultural and rural development, because for each of these challenges, different measures must be found and implemented, and at the same time, they must be combined in a way that together they contribute to the achievement of certain goals. If this is done in a country such as Bosnia and Herzegovina, with its older and newest historical heritage, than the task of managing agricultural and rural development is even more challenging and difficult.

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CIP - Каталогизација у публикацији -
Народна библиотека Србије, Београд

631(082)
338.434(497)(082)
502.131.1(082)
338.23:631(082)

SUSTAINABLE Agriculture and Rural Development in Terms of the Republic of Serbia Strategic Goals Realization within the Danube Region : support programs for the improvement of agricultural and rural development : thematic proceedings / [editors Jonel Subić, Boris Kuzman, Andrei Jean Vasile]. - Belgrade : Institute of Agricultural Economics, 2018 (Novi Sad :
Sajnos). - X, 644 str. ; 24 cm : graf. prikazi, tabele

"Thematic Proceedings includes selected papers presented at the International Scientific Conference - Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region: Support programs for the improvement of agricultural and rural development, which was hold in Belgrade on 14-15th December 2017." --> preface. - "The Thematic Proceedings was prepared as the result of the scientific research on the integrated and interdisciplinary project no. III 46006: Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region." --> preface. - Tiraž 300. - Napomene i bibliografske reference uz tekst. - Bibliografija uz svaki rad.

ISBN 978-86-6269-061-6

a) Рурални развој - Зборници b) Пољопривреда - Одрживи развој - Зборници c) Аграрна политика - Зборници COBISS.SR-ID 257428748