# ЕКОНОМИКА
## ПОЉОПРИВРЕДЕ
# ECONOMICS OF
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# CONTENT

# THE ROLE OF GLOBAL G.A.P. IN IMPROVING COMPETITIVENESS OF AGRO-FOOD INDUSTRY

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## Summary

*The issues of food safety, standards and food quality represent a challenge for every food company which has to cope with in order to survive. The change in consumers attitudes has considerably been influenced by certain incidents related to food safety which clearly showed that more attention should be paid to food safety. Different actors should work together on this issue, from food producers (primary and final), consumer associations, international organizations, big retailers to the state. The purpose of this paper is to analyze the current situation in implementation of certification schemes for agro-food industry in which GLOBAL G.A.P. has been recognized as a perspective one. A special attention is paid to two directions: (1) Comparison of implementing GLOBAL G.A.P. standard and other Certification schemes and (2) Overview and opportunities for Serbia and neighboring countries, in relation to its EU food law and food safety certification schemes harmonization efforts.*

***Keywords:*** *agro-food industry, certification schemes, GLOBAL G.A.P., competitiveness, Serbia.*

**JEL:** *D24, Q13, Q18.*

## Introduction

In recent years in developed countries a trend related to production of healthy food has

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been developed. European Union (EU) pays a great attention to safe food which can be illustrated by EU Council and Parliament Directions. In Introduction part it is written that (Varga et al., 2006) free flux of safe and healthy food is a crucial element of interior market (EU) which significantly contributes to health and welfare of the citizens as well as to social and economic interests.

Food production, distribution and consumption have a significant influence on the environment (e.g. great energy and material demand, emission of $CO_2$ increased needs for agricultural areas), but they also have a serious social, economic and medical consequences (e.g. health risks, increased obesity, hunger). From the aspect of sustainability, there have been many changes in behavior of people in developed countries which results in increased energy consumption, agricultural areas and other resources. Therefore, the trend is being developed in those countries in relation to food consumption which can be observed through two elements: its influence on the environment and health.

However, beside consumers, food industry as well has begun changing its relationship towards food production. The reasons for such relations can be found in the following trends:

- Changes on food markets which are more and more oriented towards safe and healthy food;

- Greater role of primary food production in the process of safe food production;

- Increased care of the society related to environmental protection through reduction of pollution, energy efficiency increase and usage of alternative energy sources;

- Technological changes in food production which enable better food processing, as well as more secure and safer delivery through logistic chain;

- New legal regulations demanding production of safe and healthy food without using chemical supplements;

- Enlarging wholesale chains which results in increased competitiveness.

In Rural Development Programme from 2014 to 2020 European Union obliged all countries members to finance directly farmers with 30% of incestive funds which would be invested in implementation of sustainable agricultural methods (ecologically acceptable). It means that if you deal with environmentally friendly farming you will not have to change the way of work in order to adjust your methods to environmentally friendly ones. There is also a new support programme for the current farmers who want to move on to ecological farming (within Common Agricultural Policy - CAP). All countries members can offer incentives to environmentally friendly farmers via various types of flexible financial options which will support, for example, cooperation in food production chain for the sake of supporting innovations, development of plans related to quality of agricultural products, making groups or producers' organizations, etc. (Parađiković, 2015).

## Methodology and purpose

Implementation of standards in Agro-food industry is becoming a pre-condition for improved business. The importance of implementing standards in agriculture is increased because they give a feeling of certainty to consumers – they are sure that the food they buy is safe and healthy. Investments in standard implementation, training of employees and creation of business chain which will take care of production in food industry are becoming an important pre-condition for increasing the level of competitive advantage on the global market.

Certification schemes globally are gaining more and more importance. The most prevalent schemes in Serbia and neighboring countries are: ISO 9001, ISO 14001, GLOBAL G.A.P., ISO 22000, BRC Global Standard, Demeter, and PDO/PGI/TSG systems. The GLOBAL G.A.P. has been recognized as a perspective one in this region. With this trend in mind and to compensate for the lack of research in this area, this paper presents an overview of certification schemes in the European agriculture and food industry, especially in Serbia and neighboring countries. In addition, the paper highlights the characteristics of these schemes and concludes with the convergence trends that can be observed throughout the European Union and beyond.

## Main characteristics of GLOBAL G.A.P. standard implementation

There are numerous private food standards and regulations which differ from one another according to the extent of complacency: some of them are voluntary while the others are compulsory. Another difference is in terms of their geographic area.There are also individual standards such as Nature's Choice (Tesco), Filières Qualité, Field-to-Fork and collective national and international standards, Assured Food Standards, Qualitat Sicherheit and Farm Assured British Beef and Lamb as the examples for former and International Food Standard, Marine Stewardship Council, Forest Stewardship Council and GLOBALG.A. pas the examples of the latter.

A variety of quality assurance systems have been adopted to manage particular product attributes. While each firm is unique, industries have established, over time, a similar pattern of quality assurance systems adoption and implementation - several different quality assurance systems are adopted and pieced together to obtain a satisfactory level of control for each of desirable attributes of the product. (Gawron, Theuvsen, 2009.)

The BRC Global Standard, which includes quality management system audits in food processing companies, grew out of the initiative of The British Retail Consortium - the leading trading organization in the UK. It is an international scheme with about 14.469 certificates issued in Europe and about 7.500 in the rest of the world.

Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Specialities Guaranteed (TSG) systems started in 1992. with the support of the European Union. The main objective was to differentiate food products by guaranteeing their region-of-origin or traditional production methods. Consumers are

informed by product labels - the focus here is on product quality. All in all (published, registered and applied), there are 1,437 PDOs, PGIs and TSGs in the European Union. (EU, 2015.)

Demeter standard, one of the first standards which started dealing with organic food,is becoming more and more important in the countries in this region, in which Slovenia and Croatia have a significant number of certified operations. Demeter has about 9,900 members in total.

ISO organization adopted the standard ISO 22000 in 2005. This standard can be implemented independently from other standardized ISO management systems. ISO 22000 integrates the principles of the Hazard Analysis and Critical Control Point (HACCP) system and application steps developed by the Codex Alimentarius Commission. By means of auditable requirements, it combines the HACCP plan with prerequisite programmes. Hazard analysis is the key to an effective food safety management system, since conducting a hazard analysis assists in organizing the knowledge required to establish an effective combination of control measures, (Surak, 2007). Complementarity with HACCP is one out of ten reasons for implementation of ISO 22000, while the other reasons are the following (Escanciano, Santos-Vijande, 2014): improve product quality and safety, improve the firm's image in the market and consumers' confidence, strengthen the firm's future competitive advantage, and improve internal processes and procedures and their monitoring. ISO 22000 is an industrial-specific risk management system for any type of food processing and marketing, which can be closely incorporated with the quality management system of ISO 9001. Combined with ISO 14001, this standard represents an equal partner in creation of integrated management system based on a risk. Although the "youngest" among a series of private standards related to food chain there is the biggest rate of growth in implementation of ISO 22000 - according to the data from 2013, this standard is implemented in 142 countries worldwide, with totally 26,847 certificate.

Positioning of GLOBAL G.A.P. in relation to some quality assurance systems is illustrated in the Table 1. 3rd party certifcation (TPC) has emerged as a signifcant regulatory mechanism in the global agro-food system - TPC reflects the growing power of supermarkets to regulate the global agro-food system (Hatanaka et al., 2005).

GLOBAL G.A.P. nowadays represents one of the most common certified schemes worldwide in the field of food industry. Initially started as EUREPG.A.P. it was turned into GLOBAL G.A.P. in 2007 as more and more producers and retailers around the globe got connected over time. Primarily a pre-farm-gate process standard, for worldwide food safety affairs GLOBAL G.A.P. has increasingly been considered as a main reference for Good Agricultural Practice (G.A.P.). In countries including Austria, Chile, Denmark, France, Germany, Japan, Kenya, Mexico, New Zealand, Spain, and the UK, the GLOBAL G.A.P. has been incorporated into their domestic G.A.P. standards, usually in the form of public-private joint ventures (Mitchell, 2008).

In a wider context Good Agricultural Practices (G.A.P.) "applies available knowledge

to addressing environmental, economic and social sustainability for on-farm production and post-production processes resulting in safe and healthy food and non-food agricultural products" (FAO, 2003). Good agricultural practice assumes implementation of knowledge in using natural resources on sustainable principles, in a human way and along with securing economic efficiency and social stability in order to produce safe, healthy food and other agricultural products. Generic indicators and practices of G.A.P. include aspects related to (FAO, 2003): "soil and water management, crop and fodder production, crop protection, animal production and health, harvesting and on-farm processing and storage, on-farm energy and waste management, human welfare, health and safety, and wildlife and landscape". One of the greatest benefits which G.A.P. brings is that at practical level it helps in standardization of agricultural production and improvement of agricultural products' competitiveness on the global market.

**Table 1.** Comparison of quality assurance systems

| Quality Assurance System | Attribute managed | Implementation | Advantages | Disadvantages |
|---|---|---|---|---|
| ISO 9001 | Quality | Non-mandatory | Good fondation for a quality management system | Guarantee system quality only (not output quality). Experiance to implement. To generic. |
| ISO 14001 | Environment | Non-mandatory | Good fondation for a environment management system | Does not guarantee a certain level of benefits. Does not specify particular production practices. |
| ISO 22000 | Food safety | Mandatory minimum for all suppliers | Good foundation for food safety management system. Based on HACCP | Dificult to implement. Comprehension of the system. Experiance to implement. |
| GLOBAL G.A.P. | Environment Food safety Social | Mandatory minimum for all suppliers | Objectivity (3rd party audits). Reduces monitoring and auditing costs. Specifies production practices. | Not flexible. High investment and running costs. |
| BRC | Food safety Value Organoleptic | Mandatory minimum for all suppliers | Reduces auditing costs Objectivity (3rd party audits) Includes food safety component (HACCP) | Not as flexible as form-specific quality assurance system. |

*Source:* Sterns et al., 2001; Bilalis et al., 2009; Cooper, Graffham, 2012.

Thanks to good results in practice in EU, EUREPG.A.P. has spread worldwide so it was named GLOBAL G.A.P. The certificate GLOBAL G.A.P. assumes except HACCP criteria, ecology standards as well for the fields on which food is produced. There is a similarity between HACCP and GLOBAL G.A.P.,which is related to the existance of the so called control points within the production process in which

certain requirements should be satisfied in order to secure a quality production and a product harmonized to standards.

The principles of GLOBAL G.A.P. are (Qualitass Education, 2009):

- − Limited and controlled usage of all types of agro-chemical substances.
- − Hygienic treatment during production and manipulation of agricultural products.
- − Providing instructions and recording all activities along with securing traceability.
- − Original rules that enable objective verification (confirmation of the procedure).
- − Mutual communication and exchange of opinions among producers, sale persons and users.
- − Care for the environment and sustainable development.
- − Responsible conduct towards employees on the farm.
- − Care for farm animal welfare.

The Certificate GLOBAL G.A.P. assumes, except HACCP criteria, ecology standards as well for the fields on which the food is produced. Three market trends have conditioned an initiative for adoption of this standard: increasing complexity of retailer supply chains, increasing the influence of business surroundings and general complexity and enlargement of market requirements, in other words, consumers (Đorđević et al., 2011).

Consciousness related to safety and quality of food is significantly increasing on consumer goods markets. In order to satisfy their requirements, consumers are demanding from retailers, especially in developed countries, implementation and respect of strict rules, standardized procedures and activities as well as certain characteristics of products. Consumers' pressure and the external image are two of the main driving forces to certification (Darnall, Edwards, 2006).

The main requirements of the final users are (Qualitass Education, 2009):

- − Healthy, quality and biologically valuable food,
- − Producers' responsibility towards environmental protection,
- − Human relations towards employees on the farm and
- − Care for animal welfare.

The result of retailers initiative is that GLOBAL G.A.P. is being spread very fast worldwide. Firms seek certification when their partners lack credible information (Masood, 2013). In this way, through a GLOBAL G.A.P. certification scheme, retailer convey quality signal to consumers. On the other hand sides of supply chain, growers participate in the certification process in order to earn market access to export market.

The magnitude of GLOBAL G.A.P. standard can be expressed by three indicators (Masood, 2013): (a) number of GLOBAL G.A.P. certificates issued; (b) number of

producers accepted under GLOBAL G.A.P. certification process; (c) number of hectares harvested under GLOBAL G.A.P. certification.

GLOBAL G.A.P. was spreading very fast from 2005 when about 35000 firms were included in certification process until 2012 with almost four times more firms, and finally in 2015 when over 140000 firms are being certified (Figure 1). GLOBAL G.A.P. scheme has a network of 1.400 trained inspectors and audits who work for 142 accredited certified bodies whose aim is to certify 409 agricultural products in 112 countries, (GLOBAL G.A.P., 2015a). The countries, such as Chile, Italy, Kenia, Peru, South Africa, are much more covered by this standardization scheme.

Continental share of the certificate is almost unchanged, which can be seen in the Figure 2. However, new markets are more significant for the analysis, for example, Russia with its mushrooms, Greece with sea bass and bream, Netherlands with pork production.

**Figure 1.** Share of certified producers
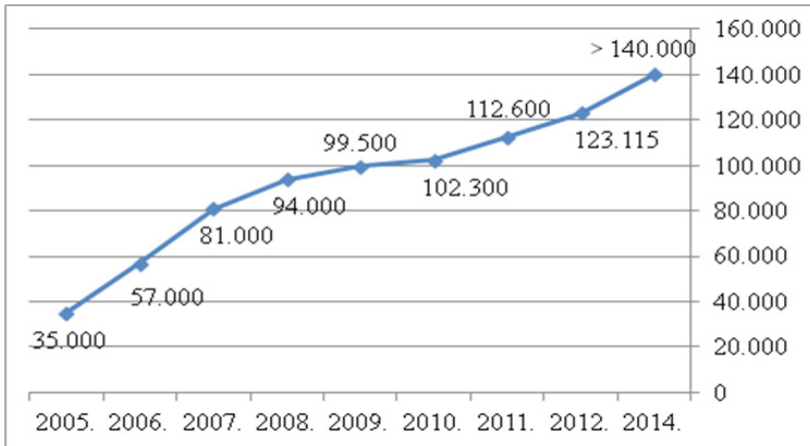


*Source:* GLOBAL G.A.P., 2015a.

**Figure2.** Share of certified producers (in %)
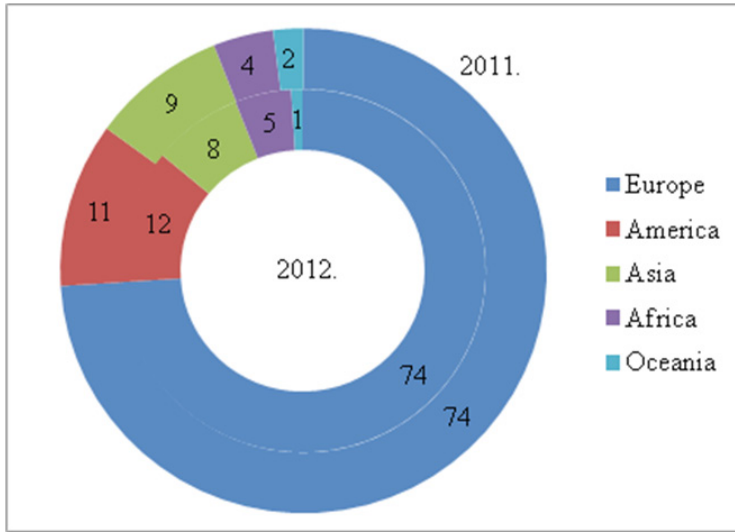


*Source:* GLOBAL G.A.P., 2015a.

If we look at the list of the first five countries according to the number of certified producers we'll see that these countries are, among the others, well-known for food production. It's no surprise that these countries initiated the implementation of GLOBAL G.A.P. in order to improve their competitiveness. An interesting fact is that these five countries have been on the top of the list for several years. Figure 3 shows a comparison of the leading countries related to GLOBAL G.A.P. certificates for two years successively – a significant number of certified companies in Netherlands is obvious.

**Figure 3.** First five countries according to the number of certified producers
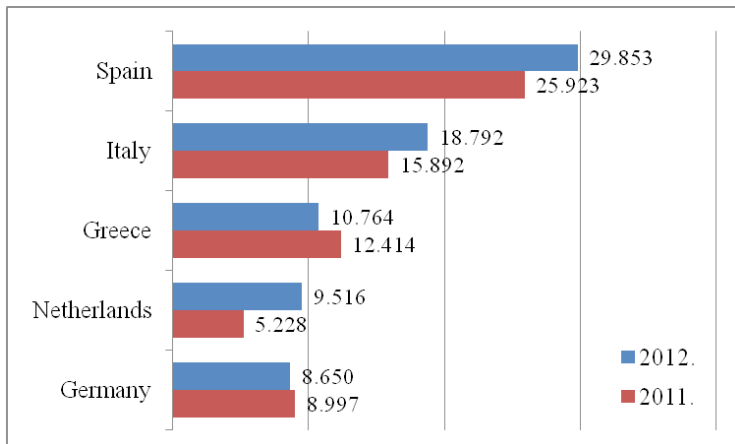


*Source:* GLOBAL G.A.P., 2015a.

The acquisition of GLOBAL G.A.P. certificate assumes an obligation on the side of producers to initiate the process of registration and certification every year. There are the following four, different options of certification (Qualitass Education, 2009; GLOBAL G.A.P., 2015b):

- − option 1, certification of an individual producer or a company,
- − option 2, certification of a group of producers,
- − option 3, parallel certification of individual producers (Benchmarking),
- − option 4, parallel certification of a group of producers (Benchmarking).

Benchmarking certification is performed on an exclusive request of clients who, in that way, want to control their own equivalence via the analysis of contents and parameters in relation to GLOBAL G.A.P.

Before explaining the option 2 related to certification of a group of producers it is necessary to explain the notion of a group of producers. A group of producers represents a registered group whose aim is application for certificate acquisition. (GLOBAL G.A.P., 2015b).

A group of producers is a legally legitimate entity whose final responsibility is a production and a product. It can be registered as an association of producers, cooperations, a trade company, a warehouse and packing company, a cooperation, etc. In order to be certified under the option 2 a group of producers must have implemented QMS. All registered group members are responsible for the production of their products but they are not allowed to sell their products certified as GLOBAL G.A.P. beyond the group (Qualitass Education, 2009; GLOBAL G.A.P., 2015b).

### Implementation of agro-food industry standards in Serbia and neighboring countries

The implementation of agricultural standards in Serbia still isn't adequate to the potentials of this field. Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia by its Regulation on using incestive funds for introduction and certification of safety system in the period from 2005 to 2008 (Serbian Government, 2005-2008) influenced the increase of certified companies. By organizing the promotional action "Think in time" they wanted to raise consciousness on consumers' rights to this kind of protection and the importance of having a documented quality system, for food consumers. In November, 2009 Governments of Switzerland and Serbia signed the agreement on realization of the project "Aid in the field of GLOBAL G.A.P. standard".

According to the data of Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, from 2005 until the end of 2008, there were 781 certified users. In the same time, 112 of them suspended and terminated certification procedure. The greatest number of certifications but suspensions as well was in 2006 – 359 certifications

and 61 suspensions (Infogo.biz, 2013). The number of certified companies is significant considering the fact that in 2004, 85% of the companies from this industry never heard of HACCP. Connectivity of standards ISO 14001 and HACCP is highly significant for food companies. In other words, a company which implements the standard ISO 14001affects the protection of global environment (water, air, ground, natural resources, flora and fauna, people and their relations) and development of environmental quality. The standard ISO 14001has a significant activity in environmental protection, particularly in risk management. Risk management includes a decision – making in relation to the way of environmental protection activity procedure which relies on the result of risk estimation. The standard HACCP represents a management system in which safety of food products is considered through the analysis and control of biological, chemical and physical risks in complete production chain. That is the reason why HACCP represents a logical continuation of ISO 14001 in companies business.

Table 2 presents a comparative example of standards implementation in agro-food industry and their use in Serbia and neighboring countries. Regarding West Balkan countries (WBC), Serbia is a leader in relation to implementation of all schemes of standards. However, as regards to other neighboring countries Serbia lags behind significantly. Apart from GLOBAL G.A.P. implementation of other standards in Serbia is low. Comparing to Hungary, for example, Serbia lags behind considerably in implementation of GLOBAL G.A.P. scheme. This additionaly contributes to uncompetitiveness of Serbian companies. It is obvious from the Table 4 that some neighborin countries, such as Romania and Bulgaria, are more oriented towards ISO certification schemes (generally) than towards GLOBAL G.A.P. scheme, while for Serbia (strictly for food safety) the opposite is true.

There are several reasons for insufficient use of the standards in Serbian agro-food industry and they can be found in the following fact – a company which implements GLOBAL G.A.P. standard has an obligation to perform re-certification every year, which represents a significant financial effort for the company. Moreover, Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia terminated co-financing during implementation process of international standards.

**Table 2.** Implementation of standards in Serbia and neighboring countries

| | ISO 9001 | ISO 14001 | ISO 22000 | GLOBAL G.A.P. | BRC | PDO/ PGI/TSG | Demeter |
|---|---|---|---|---|---|---|---|
| Albania | 167 | 34 | 7 | 0 | 1 | 0 | 0 |
| Bosnia and Hercegovina | 794 | 141 | 17 | 269 | 2 | 0 | 0 |
| Croatia | 2,636 | 828 | 97 | 141 | 14 | 13 | 1 |
| Macedonia | 399 | 131 | 25 | 14 | 1 | 0 | 0 |
| Montenegro | 118 | 24 | 7 | 0 | 0 | 0 | 0 |
| *Serbia* | *2,366* | *762* | *193* | *281* | *37* | *0* | *0* |
| Slovenia | 1,993 | 468 | 19 | 22 | 9 | 25 | 27 |
| **WBC Total** | **8,473** | **2,388** | **365** | **727** | **64** | **38** | **28** |

|  | ISO 9001 | ISO 14001 | ISO 22000 | GLOBAL G.A.P. | BRC | PDO/ PGI/TSG | Demeter |
|---|---|---|---|---|---|---|---|
| Bulgaria | 5,378 | 1,373 | 244 | 17 | 29 | 7 | 2 |
| Hungary | 7,186 | 1,955 | 137 | 957 | 121 | 15 | 19 |
| Romania | 18,450 | 8,744 | 1,014 | 46 | 51 | 4 | 1 |

*Source:* ISO, 2014; BRC, 2015; EU, 2015; DI, 2015, GLOBAL G.A.P., 2012.

According to Đekić et al., (2011) and Smigić et al., (2015) in some Western Balkans countries (Serbia, Bosnia and Herzegovina and Macedonia) implementation of different quality and food safety assurance schemes is either required by law or large multinationals (both producers and retailers) which establish their own schemes and requirements (such as HACCP). However, other private and food quality standards are applied periodically although their implementation and certification is promoted by the governments of these countries. Except HACCP, food safety standard ISO 22000 and ISO 9001 are most commonly implemented in West Balkan countries. It should be mentioned that food producers in these countries received financial support from different governmental and nongovernmental organizations (USAid, SIEPA and EU funds). Besides HACCP, the most common certifications in the Western Balkan food industry cover food safety (ISO 22000) and quality management systems (ISO 9001).

Implementation of GLOBAL G.A.P. and other standards which are used by Serbian agro-food producers implies a support of the Government which has to create a stimulative ambience for procuders. The Government has already stimulated and supported the implementation of HACCP which is nowadays compulsory but it is also necessary to do the same with other standards in this field. At this pont it should be emphasized that food safety system in Serbia needs certain improvements related to food safety control, inspection, knowledge and expertize. In other words, there is room for improving professionals, such as inspectors, governmental officials, consultants and auditors. In addition, a lot of work and efforts should be invested in improving transparency and communication between legal authorities, consumers and food business operators, (Smigić et al., 2015). Moreover, it is necessary to re-establish supporting mechanisms to Serbian agro-food producers through the support in the following fields: finances, education, applying practical experiences, information on other standards close to this field, information on new trends in agricultural industry, taking part in competitions such as G.A.P. Awards.

## Conclusion

The implementation of GLOBAL G.A.P in agro-food industry is of great importance both for the company which has implemented it and for other factors on the market, for example, consumers of its products, the environment in which it operates, business partners who must have the same standards as a precondition for cooperation. This is how a chain of good practice is made which motivates other companies to start the implementation of GLOBAL G.A.P. in order to assure consumers in safety of agricultural products which they buy in retail shops.

The role of retail shops is crucial in encouraging the implementation of GLOBAL G.A.P and other standards familiar with this field. The reason lies in the fact that retailers are the first who can notice consumers' attitudes towards food. Today, consumers are well-informed about healthy food as well as about new trends in this field (e.g. less fats, sugar, etc.), along with the support of international organizations (FAO) which additionally influences flexibility of producers and retailer chains.

Unfortunately, food companies in Serbia are not sufficiently supported by the state to implement GLOBAL G.A.P. We have noticed only the examples of individual support by international organizations (USAid, SIEPA, EU funds, SECO) and NGO sector so far, which is not enough if we want to make a step forward in this field.

Very implementation of GLOBAL G.A.P. has considerable advantages of which the following are identified: easier access to consumers on international markets, higher market price of products (perhaps, not in the beginning but in the future it is expected), etc. However, whether GLOBAL G.A.P. will be implemented depends only on agro-food producers and manufacturers, on their estimation and plans in relation to their company in the future. In what extent and in what way will the pressure imposed by markets, the leading commercial chains and the necessity of Serbia to turn towards competitive export of agro-food products influence Serbian agro-food industry? This question will be answered by some future researches and analysis.

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# ULOGA GLOBAL G.A.P.-A U UNAPREĐENJU KONKURENTNOSTI POLJOPRIVREDNO-PREHRAMBENE INDUSTRIJE

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## Apstrakt

*Pitanja bezbednosti hrane, standardizacije i kvaliteta hrane, predstavljaju izazove za svako preduzeće u ovoj oblasti, na koje ono mora da odgovori ukoliko želi da opstane na tržištu. Na promenu stavova potrošača, značajno su uticali određeni incidenti sa bezbednošću hrane, koji su pokazali da se pitanju bezbednosti hrane mora posvetiti posebna pažnja. U ovom lancu moraju zajedno biti uključeni različiti akteri, od proizvođača hrane (primarni i finalni), udruženja potrošača, međunarodnih organizacija, velikih maloprodajnih lanaca do države. Cilj ovog rada je da se analizira trenutna situacija u primeni sertifikacionih šema u poljoprivredno-prehrambenoj industriji, gde je GLOBAL G.A.P. prepoznat kao perspektivan. Posebna pažnja je upućena u dva pravca: (1) Komparacija primene GLOBAL G.A.P. standarda u odnosu na druge sertifikacione šeme i (2) Pregled i mogućnosti za Srbiju i susedne zemlje, u odnosu napore koji se ulažu u harmonizaciju zakona i šema sertifikacije sa onima koji su zastupljeni u EU.*

***Ključne reči:*** *poljoprivredno-prehrambena industrija, sertifikacione šeme, GLOBAL G.A.P., konkurentnost, Srbija.*

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# PRODUCTION AND ECONOMIC PERFORMANCES OF THE RAINBOW TROUT BREEDING ON SERBIAN FISH FARMS WITH WATER OXYGENATION

*Stevan Čanak[1], Zorica Vasiljević[2], Ibrahim Totić[3]*

## Summary

*An interest for the rainbow trout production is in expansion in Serbia in recent years. When they make plans for investments, the potential investors into the trout production are usually faced with decision what is optimal size of production they are going to establish. In order to make proper decision, they have to know data on the production and economic performances that could be realized with different production volumes. Unfortunately, the literature on economic parameters dealing with the rainbow trout production is not very rich. This paper is dealing with economic aspects of the rainbow trout production in the conditions of the modern technology utilization that assumes use of water oxygenation.*

*The research subject of the paper is comparison between economic results of the various size trout farms dealing with production of market size trout. For the purposes of this analysis it was used the method of analytical calculation. In the analysis there were defined two production models, M1 model with annual production of 50 tons and M2 model with annual production of 150 tons of table rainbow trout.*

*The results of analysis showed that the M2 model has better economic parameters. In the structure of total production costs, the dominant share has feed (50%), while the labor costs of the full-time employees are in second place (20%). If the Serbian producers want to improve the economic performances of trout production, it is primarily necessary to be reduced the costs of these two items (feed and labor costs).*

***Key words:*** *rainbow trout, production conditions, economic effects, water oxygenation*

**JEL:** *L23, Q19*

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## Introduction

On the cold-water fish farms in Serbia it has been produced the rainbow trout (*Oncorhynchus mykiss*) as the table fish, while the brown trout (*Salmo trutta*) and Danube salmon (*Hucho hucho*) have been produced for restocking of open waters – natural watercourses.

The typical size of rainbow trout in Serbia is between 250g and 400g, whereas they are sold fresh on ice. Contrary to developed countries of Europe (Disegna et al., 2009) in Serbia there have not been still produced the organic trouts.

The trout is breeding in Serbia in two ways: with the spring water and with the river/stream water. The breeding based on spring water is characterized by lower variations in temperature, as well as less variation of available water quantity during the year. On the other hand, the use of river water for trout breeding is associated with very large changes in temperature (0°C-20°C) and drastic changes in flow rates during the year. Particularly sensitive period in the trout production represents the summer (June-September) when at the same time the water flow rates are the lowest and the temperatures are the highest. This phenomenon represents the greatest problem in successful trout breeding with the river water. In addition to low water levels in the summer, there is often present flooding in the spring and autumn period as well, which more often causes the considerable economic damages in the trout fisheries like in the year 2014.

The fish farms for trout breeding in Serbia according to the type are mostly the flow-through systems, and according to the way of construction they are the concrete ones (so-called the *raceway* basins or raceways). There are also several cage systems fish farms (Zaovine Lake, Lisinsko Lake), but production on them is proportionally small.

The size of trout farms in Serbia can be expressed on the basis of the volume and number of basins, as well as on the basis of production volume. According to the production, there are fish farms which produce less than 100 kg of trout, as well as those whose annual production amounts to 150-200 t. According to the completeness of the production process, there are the full-systemic farms that begin production with spawning of broodstock as well as the semi-systemic ones that begin production with purchasing of some fry or fingerlings.

In general, the trout farming in Serbia is characterized by very large fluctuations in production conditions, then in the size of the ponds and in the quantity of produced fish. Compared to the neighboring countries, the conditions for the trout production in Serbia can be assessed as the acceptable ones. As a major disadvantage it can be stressed the absence of sufficient quantities of quality water, stable flow rate and the temperature during the year.

The research subject of this paper is comparison between the economic results of the various size trout ponds in Serbia dealing with production of market size trout. For the purposes of this analysis it was used the method of analytical calculation, wherein the essential factors are the production circumstances (primarily the water quality and type of the fish breeding).

## Material and Methods

The main goal of this paper is to analyze the production and economic results on the rainbow trout farms in Serbia in the case of two production models, on the basis of average production conditions and applied technology for rainbow trout breeding with water oxygenation.

The analysis given in the paper has been primarily based on the data collected by the interview carried out on three rainbow trout fish farms in Serbia. There were used average values for the several years' period. Three analyzed farms annually produce over 250 tons of rainbow trout, which represents over 25% of the Serbian production recorded in the past 5 years. On the basis of the average values referring to the rainbow trout production in different farms, there were made the analytical calculations with the basic absolute and relative economic parameters (value of production, operating costs, financial result, the production efficiency and profitability). Comparison of achieved economic results between the farms was done at the level of realized financial results, production efficiency and profitability.

In analysis there were defined two production models: the first model with 50 tons of the market size rainbow trout annual production (M1 model) and the second one with 150 tons (M2 model).

In this paper it was also used the domestic and foreign relevant literature, the secondary results of case studies and resources available on the Internet (RZS, 2015; FAO Fisheries and Aquaculture Department, 2015). The available data were analyzed using the "desk research" method, analysis and synthesis and method of analytical calculation.

## Production Results

According to available data, the production of the trout farms in Serbia is carried out on the exploitation surfaces between 33,255m$^2$ and 42,639m$^2$. Volume of the basins in which the production is performed is nearly as much as the volume because the biggest part of the area (>85%) is occupied by the basins for fattening with the average depth between 1 i 1.1m, while the basins for fry are mainly of a depth between 0.6m and 0.8m.

**Table 1:** Production on trout farms in Serbia in the period 2009-2013

| Indicator/Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2009-2013 |
|---|---|---|---|---|---|---|
| Total production (kg) | 1,067,832 | 1,065,966 | 970,960 | 983,139 | 1,003,991 | 1,018,378 |
| Production for consumption- sold (kg) | 880,051 | 873,047 | 795,925 | 807,849 | 854,916 | 842,358 |
| Total area* (m$^2$) | 35,792 | 36,791 | 33,255 | 36,302 | 42,639 | 36,956 |

| Indicator/Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2009-2013 |
|---|---|---|---|---|---|---|
| Area of fattening basins* (m²) | 30,610 | 31,844 | 28,489 | 31,113 | 37,173 | 31,846 |
| Production of table trout per m² of fattening basins | 28.8 | 27.4 | 27.9 | 26.0 | 23.0 | 26.6 |
| Production of table trout per m² Total | 24.6 | 23.7 | 23.9 | 22.3 | 20.1 | 22.9 |

*Area in exploitation

Source: Calculated on the basis of RZS, 2015 & FAO Fisheries and Aquaculture Department, 2015.

The production of table trout in Serbia in the last five years amounted between 795,925kg (2012) and 880,051kg (2009) according to the sold fish quantities (RZS, 2015 & FAO Fisheries and Aquaculture Department, 2015).

In the calculations and presentation of achieved production per area unit, there can be used different data concerning the production indicator, such as the quantity of produced young fish of different age groups, then the quantity of totally produced fish for consumption, as well as the quantity of produced and sold market size fish in a calendar year. Similarly, for the area of the trout fish basins there can be used data for the total area of the basins, then the basin area for the production of different trout age categories, as well as the exploitation areas by particular years.

The quantity of table rainbow trout that is produced and sold annually in Serbia amounted to 796t-880t in the analyzed five-year period, with an annual average of 842t. This production was realized on the fattening basins area between 28,489m² and 37,173m². Although the increase of areas under the trout farms is very limited in industrial countries for a long time due to the use of water and environmental issues (Lukowics, 1994; Wedekind et al., 2001; Fornshel, 2002), the areas under the trout farms could be increased in Serbia by 3-5 times (Markovic et al., 2011).

Production of table fish per area unit of the basin for fattening was between 23.0kg/m² and 28.8kg/m², with an average of 26.6kg/m². The indicator of production per production capacity unit area provides information on the intensity degree of the trout breeding in the phase of fattening. On the other hand, the production of table fish per total area unit indicates the total engaged production capacities for the production of market size fish and in analyzed period it amounted to 23kg/m² in an average. There are also cases where trout farms achieved production higher than 50 kg/m3 (Markovic et al., 2009).

The shown production refers to Serbia as a whole and it is conditioned by a series of problems the trout farming is facing with (insufficient quantity of water in the summer time, poor financial position of producers, difficulties in selling of fish and payments).

In addition to the results presented, there are fish farms that achieve significantly better production results. These are the fish farms that have much better natural

conditions for fish breeding (quantity and quality of water) or they have modern systems for water oxygenation.

According to the amount of fish produced, the tree analyzed fishponds - "DB FOOD" – R1 (44° 2'12.76"N, 19°38'20.44"E), "Mri-Tech" – R2 (43°53'47.30"N, 21°47'12.19"E) and "Dini-trade" – R3 (43° 6'38.56"N, 22°40'41.80"E) belong to the group of significant trout producers in Serbia, while according to the way of production they belong to the group of very modern and intensive trout fish farms in domestic circumstances (DB FOOD, 2015; Dini-trade, 2015; Mri-Tech, 2015).

Average production conditions in the analyzed fish farms are given in Table 2.

The data presented in Table 2 are much better than the average ones for Serbia as a whole. The basic condition for the achievement of similar results is the use of modern breeding technology with the support of the water oxygenation system.

**Table 2:** Indicators of production conditions and the results achieved in the R1, R2 and R3 fishponds

| Indicator/Fishpond | DB-Food (R1) | Mri-tech (R2) | Dini-trade (R3) |
|---|---|---|---|
| Production capacity ($m^2$, $m^3$) in exploitation | 1,080 | 1,700 | 2,700 |
| Quantity of water available during the year (l/s) | 220-600 | 80-500 | 110-700 |
| Variations in temperature during the year (°C) | 1-18 | 8-13.5 | 6-14 (2-20)* |
| The system for oxygenation | Active oxygenators, perforated hoses | Perforated hoses | Active oxygenators, perforated hoses, partial recirculation of water |
| Annual oxygen consumption (t) | 30 | 100 | 140 |
| Coefficient of conversion per annum for the entire fish farm - FCR ** | 1.1 | 1.08 | 1.13 |
| Losses in the course of fish breeding from the category of 1g up to table fish (%) | 20-30 | 25 | 25 |
| Length of breeding (number of months) | 12-14 | 10-12 | 10-12 |
| Production of table fish per area unit ($kg/m^2$) | 45-60 | 40-60 | 44-60 |

* Before the construction of new penstock. **It was used the medium energy feed.
Source: DB FOOD, 2015; Dini-trade, 2015; Mri-Tech, 2015

## Economic Results and Structure of Costs

Based on the data presented in Table 2 as well as other normative data, it can be made an analytical calculation for the production of trout for defined production conditions. For the calculation of economic results there were selected two fish farms with annual production of 50t (M1) and 150t (M2).

Natural conditions for production and applied technology of production are the key factors that have a crucial impact on the realized production and economic results. Defined conditions and technology of production for which the calculation was made are the following:

- water temperature varies during the year (2°C-18°C),

- quantity of water varies considerably during the year and there is a lack of water during the summer,

- during the summer (June, July, August, September) there are used devices for the water oxygenation,

- the fish breeding begins by provision of fry of average mass amounts to 1g and ends with selling of consuming fish of average mass amounts to 300g,

- the average length of breeding lasts for 12 months.

**Table 3:** Analytical calculation of rainbow trout production

| Model | | M1 | | | M2 | | |
|---|---|---|---|---|---|---|---|
| **Value of production - VP** | **Price (RSD/ kg)** | **Quantity** | **Value (000 RSD)** | **Share (%)** | **Quantity** | **Value (000 RSD)** | **Share (%)** |
| 1. Consumer trout (300g), (kg) | 360 | 50,000 | 18,000.0 | - | 150,000 | 54,000.0 | - |
| Variable costs - VC | - | - | - | - | - | - | - |
| 1. Fry - 1g, (losses 25%), (kg) | 3,600 | 223 | 802.8 | 4.4 | 669 | 2,408.4 | 4.7 |
| 2. Feed (FCR = 1,1) | 160 | 56,911 | 9,105.7 | 49.6 | 170,732 | 26,770.8 | 52.4 |
| 3. Medicines (lump sum) | - | - | 418.4 | 2.3 | - | 1,255.2 | 2.5 |
| 4. Chemicals (lump sum) | - | - | 176.4 | 1.0 | - | 529.2 | 1.0 |
| 5. Oxygen (0.8kgO$_2$/kg fish), (kg) | 18,000 | 40 | 720.0 | 3.9 | 120 | 2,160.0 | 4.2 |
| 6. Seasonal labor | - | - | 244.5 | 1.3 | - | 469.4 | 0.9 |
| 7. Transport of fish | 20 | 50,000 | 1,000.0 | 5.4 | 150,000 | 3,000.0 | 5.9 |
| 8. Services | - | - | 576.0 | 3.1 | - | 1,080.0 | 2.1 |
| 8. Risk reserves | - | - | - | - | - | - | - |
| Variable costs - Total | - | - | 13,043.8 | 71.0 | - | 37,673.0 | 73.8 |
| Fixed costs - FC | - | - | - | - | - | - | - |
| 1. Permanent labor | - | - | 4,107.6 | 22.4 | - | 9,858.2 | 19.3 |
| 2. Water fee (RSD/m³) | 0.0223 | 9,460,800 | 211.0 | 1.1 | 28,382,400 | 632.9 | 1.2 |
| 3. Depreciation of buildings | - | - | 620.0 | 3.4 | - | 1,860.0 | 3.6 |
| 4. Depreciation of equipment | - | - | 321.8 | 1.8 | - | 902.2 | 1.8 |
| 5. Property tax | - | - | 54.7 | 0.3 | | 141.6 | 0.3 |
| Fixed costs – Total | | | 5,315.1 | 29.0 | | 13,395.0 | 26.2 |
| Total costs – TC (VC+FC) | | | 18,358.9 | 100.0 | | 51,068.0 | 100.0 |

| Model | M1 | | | M2 | | |
|---|---|---|---|---|---|---|
| Gross financial result - GFR | - | -358.9 | - | - | 2,932.0 | - |
| Tax on GFR | | 0 | | | 293.2 | |
| Net financial result - NFR | - | -358.9 | - | - | 2,638.8 | - |

Source: Authors' calculation done on the basis of DB FOOD, 2015; Dini-trade, 2015; Mri-Tech, 2015. Remark: All prices without VAT, 120 RSD = 1€

Defined natural production conditions are predominantly present conditions in Serbia, while the use of devices for water oxygenation could be considered as the modern technology for Serbia.

Value of production represents the value of table fish being sold. The quantity of table rainbow trout in the model M1 amounts to 50t, while in the model M2 it amounts to 150t. The price of table rainbow trout in Serbia varies during the year, while the wholesale price mostly depends on current supply and price of imported rainbow trout (Turkey and BiH). In the past 2 years the wholesale price fco buyer ranged from 340 RSD/kg and 380 RSD/kg.

Providing of fry may be carried out only by fish farms that are registered as the breeding organizations with special powers (The Law on livestock, 2009), whereby the price of 1g trout fry, including transportation costs, amount to 3,000-4,000 RSD/kg (without VAT). According to the data obtained from the practice, the losses in number of fishes during the breeding period up to the table size amount to 25%. The highest mortality is occurring in the early stages of breeding (up to 10g), which primarily depends on the age at which the young fishes have been transferred from hatcheries in the outdoor pools and the river water for further breeding. The average mass of dead fish is almost always below 50g, and usually between 30g and 40g.

The gross conversion represents feed conversion ratio (FCR) calculated on the basis of mass of the total produced fish (died and survived ones), while the net conversion represents the same indicator calculated on the basis of survived (sold) consuming trout. The price of feed for trout breeding varies considerably depending on the age fish category and way of purchase. In the trout fishery in Serbia it is predominantly used the high quality feed produced by the famous European producers (Aller Aqua, Coppens, Skretting), where the price depends on the quantity of the food and conditions of payment. In the calculation shown in Table 3 it was taken in account the average price for the medium energy feed (18-20 MJ/kg; digestible energy/kg feed) including the transportation costs.

During the breeding of rainbow trout, in the average case each generation of fish has been treated several times because of the bacterial infections (yersinia, furunculosis, flavobacteriosis) (Jeremić, Radosavljević, 2011; Radosavljević et al., 2013). Selected data on the costs of treatment represent average values obtained from observed fish farms.

In the trout farming there are used different chemical agents for the purpose of disinfection of tools and accessories, vehicles, pools, as well as antibacterial,

antiparasitic and fungicidal baths. Chemical agents that are usually used are benzalkoniumchloride, formaline, hydrogen-peroxide, peracetic acid (Burka et al., 1997), as well as the chlorine lime (Biočanin et al., 2015) or quicklime for sanitation – microbiological decontamination.

In the period since 2005 to the present days, utilization of oxygen on the trout farms in Serbia is gaining in importance. The use of oxygen in the trout farms is a way for increase of production (Clark, 2003). Although the utilization of oxygen and technical systems has long been in use in the trout fisheries of Europe, Serbia is still ahead of their massive use. Concerning the technical solutions, in Serbia there are most commonly used Turboxygene and Oxy-trans devices for oxygenation of the water, as well as the perforated hoses, and there are also the domestic devices for passive oxygenation of water – Oxy-box (Čanak, 2008). The oxygen consumption depends primarily on the quantity and temperature of water during the period June-October and in the previous ten-year period it has ranged between 0.5 kg and 1.5 kg per kilogram of produced table fish.

In order to organize continuous control and the possibility of intervention on the fish farm, it is necessary to have permanently employed at least five fishery workers. With this number of employees it is possible to have two employees per shift three days a week at a time when none of them has used vacation leave. For more demanding operations such as the fish grading, fish bath treatment, stocking, catching of fish, packaging and transport of fish, it is necessary to hire additional labor force, i.e. the seasonal workers.

The consumer rainbow trouts are predominantly supplied freshly caught and chilled at 0-4°C in the appropriate packaging. The transportation costs consist of the following cost items: packing, ice, driver per diem costs and costs of transportation vehicle. Depending on the length and distance of transportation, as well as the quantity of fish being transported, in domestic practice these costs generally range between 15-25 RSD/kg of market size fish.

Costs of services include the fees for externally engaged technologist, veterinarian and accountant. In the M2 model it is anticipated that the fishpond has the full-time employed accountant.

The cost item marked as "Risk" represents the costs of probability that for some unforeseen reason production experience the total or partial collapse. Practice has shown that events such as flooding, power outages due to storms and fish poisoning due to unscrupulous polluters cannot be predicted in advance. The risk in this case is calculated as an item of variable costs, and essentially represents reduction in production value for the estimated amount of risk (Bohl et al., 1999; Schaeperclaus, Lukovics, 1998). The risk is directly dependent on the degree of production intensity as well as the skill of employees. In the calculation given here the "Risk" item has been listed, but there was not included any amount of this type of variable cost, i.e. the risk costs amount to 0 RSD.

The costs of water treatement could be significant item depending on the treatement system (Engle et al., 2005). This paper has been charged this item as the labor costs of employees working on the cleaning of basins and removing of the excrements.

The fee for water is the cost which is determined annually and for 2015 it is determined at the level of 0.0223 RSD/m³ of projected or utilized capacity (Regulation on the fees for water in 2015, 2015**).**

Depreciation of facilities represents depreciation of both production facilities and ancillary ones, such as water-catchment, supply channel, precipitator, basins for breeding, administrative building with warehouse, but also fences, roads, power cable with transformer. Depreciation of equipment includes the annual costs for replacing part of the grader, pools for transport, elevators for fish, devices for killing of fish and other equipment.

Property tax is calculated at the level of 0.4% of the fishpond real estate value (The Law on Property Taxes, 2001, 2002, 2004, 2007, 2009, 2010). Tax on transportation vehicles is a part of the costs for annual vehicle registration and it is included in the consuming fish transportation costs.

Tax on the gross financial result (GFR) is calculated at the rate of 10% on the gross financial result if the GFR is the positive value (The Law on Gross Financial Result, 2001, 2002, 2003, 2004, 2010, 2011, 2012, 2013, 2014).

## Results and Discussion

On the basis of the calculated operating costs for consumer trout on two fishpond models (M1 - 50t) and (M2 - 150t), it can be seen that financial result for the M1 model is negative (-358,908 RSD) and for the M2 model is positive (2,638,799 RSD).

In the structure of total costs the variable costs account for over 70%, i.e. in the M1 model they amount to 71%, and in the models M2 they amount to 73.8%. A similar percentage share of variable costs in both analyzed models lies in the fact that in both analyzed cases it is present the same technology that causes similar variable costs. For M2 model fixed costs are lower than in the M1 model primarily due to lower labor costs of the full time employees.

The dominant costs in both models are the feed costs, which participate by 50% in total costs in both models. The second important cost item is the labor costs of the full-time employees which participate by approximately 20% in total costs. Those two items are followed by the following cost items: transportation, procurement of young fishes, oxygen and depreciation of facilities with a share in total costs between 3-5% for each mentioned item in both analyzed models.

The cost structure could vary greatly in relation to the natural and economic conditions for performing of the rainbow trout breeding. Thus, Hassan et al., (2007) gives an example that the labor costs account for 29% and the feed costs account for 28% in the production of trouts at the analyzed farms in Pakistan.

In addition to the absolute production and economic performance indicators in the rainbow trout breeding, there can be calculated even the relative performance indicators, e.g. the economic efficiency and profitability of production, capital profitability and labor productivity (Gogić, 2009). In Table 4 there are shown the relative performance indicators calculated for both analyzed models of rainbow trout production.

**Table 4:** The relative performance indicators of economic efficiency for model M1 and M2

| Indicator/Model | M1 | M2 |
|---|---|---|
| Coefficient of economic efficiency – Ce (VP/TC) | 0.98 | 1.057 |
| The rate of production profitability - Pp (%) | -1.99 | 4.89 |
| The rate of capital profitability - Cp (%) | -1.95 | 5.17 |
| Labor productivity (RSD/employee) | 8,333 | 15,000 |

Source: Authors' calculation based on data from Table 3.

In the case of M1 model (annual production of 50t of trout), the coefficient of economic efficiency is less than 1 (Ce<1), i.e. this production is economically inefficient. In the case of M2 model (annual production of 150t of trout), the calculated coefficient of economic efficiency is positive (Ce>1), i.e. on each 1 RSD of costs is achieved 1.057 RSD of production value.

The rate of production profitability in the case of M1 model is negative (Pp = -1.99%), since this production has realized the losses. The rate of production profitability in the second case (M2) is positive, i.e. profit participates in the production value by 4.89%. The rates of capital profitability in the case of both models (M1 and M2) behave similarly as the rates of production profitability. Namely, in the M1 model Cp is negative, while in the M2 model Cp is positive and it amounts to 5.17%.

The labor productivity can be expressed both as natural an economic indicator. In this analysis, the labor productivity is calculated as the natural indicator, i.e. as a ratio of the amount of fish produced per full time employee. At the analyzed trout ponds in Serbia this indicator drastically differs in the case of 50t trout production and 150t trout production per year. The main reason for the difference is in the number of full-time employees. Assuming the presence of at least one full-time employee (because of the sensitivity of this production), the production and economic results are significantly burdened due to the high share of labor costs in total costs.

## Conclusion

The production of rainbow trout in Serbia has dated since the first half of the 20th century, but the production in the way it works today (in concrete basins) has been significantly developed after the Second World War. In the recent decade it was slowly adopted in Serbia the modern technologies for trout breeding introduced from developed European countries, and those technologies have enabled achievement of much better production and economic results.

The aim of this work is to analyze the production and economic results in the rainbow trout farms in Serbia in the case of two production models with an annual production of 50t (M1) and 150t (M2) of trout, on the basis of assumed average production conditions and applied technology for rainbow trout breeding, which involves the use of water oxygenation.

The analysis showed that with the annual production of 50 tons of table trout (M1 model) there were achieved the negative economic results (loss of -358,908 RSD, a negative rate of production profitability of -1.99% and negative rate of capital profitability of -1.95%). The labor productivity in this model (M1) is 8,333 kg/employee, calculated on the basis of the full-time employees. The main cause of negative economic indicators for M1 models lies in the full-time employees' labor costs, as it is necessary to provide the 24-four-hours monitoring on the pond which influences the number of the full-time employees.

Production of table rainbow trout in the M2 model (150t annual production) shows positive economic results (net profit of 2,638,799 RSD, the rate of production profitability of 4.89% and the rate of capital profitability of 5.17%).

In the structure of total costs, the dominant share has the feed (about 50%), while the labor costs of the full-time employees are in second place (about 20%). This points to the conclusion that if the Serbian producers want to improve the economic performances of trout production, primarily it is necessary to be reduced the costs of these two items (feed and labor costs).

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# PROIZVODNI I EKONOMSKI REZULTATI UZGOJA KALIFORNIJSKE PASTRMKE NA RIBNJACIMA SA OKSIGENACIJOM VODE U SRBIJI

*Stevan Čanak[4], Zorica Vasiljević[5], Ibrahim Totić[6]*

## Rezime

*Interesovanje za proizvodnju kalifornijske pastrmke je poslednjih godina u ekspanziji. Jedno od uobičajenih nedoumica investitora je za koju veličinu ribnjaka da se odluče. Da bi mogli da pravilno odluče, potrebno je da investitori raspolažu proizvodno i ekonomskim podacima/pokazateljima koji mogu biti ostvareni sa različitim količinama proizvedene ribe. Ovih podataka nažalost nema dovoljno u literaturi. Ovaj rad se bavi ekonomskim aspektima proizvodnje kalifornijske pastrmke korišćenjem moderne tehnologije sa oksigenacijom vode.*

*Tema istraživanja ovog rada je poređenje ekonomskih rezultata ribnjaka različitih veličina na kojima se proizvodi konzumna kalifornijska pastrmka. U svrhu ove analize korićen je metod analitičke kalkulacije. Prilikom analize su definisana dva proizvodna modela, M1 sa godišnjom proizvodnjom 50t i model M2 sa godišnjom proizvodnjom od 150t konzumne kalifornijske pastrmke.*

*Rezultati analize su pokazali da model M2 ima bolje ekonomske pokazatelje. U strukturi ukupnih troškova, dominantno mesto zauzima trošak hrane (50%), dok su troškovi stalno zaposlenih na drugom mestu (20%). Ukoliko proizvođači u Srbiji žele da poboljšaju ekonomske rezultate proizvodnje pastrmke, na prvom mestu je poželjno da smanje troškove hrane i stalno zaposlenih radnika.*

***Ključne reči:*** *rainbow trout, production conditions, economic effects, water oxygenation.*

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# IMPACT OF DEMOGRAPHIC CHANGES ON AGRICULTURAL DEVELOPMENT IN MONTENEGRO

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## Abstract

*Number of citizens in a country represents its primary production potential. Montenegro has significant natural resources for rural development. However, many problems follow rural development, and one of those problems is the demographic problem.*

*The paper analyzes demographic changes in Montenegro by its regions, as well as gender and age structure of the population in the period 1948-2011. Statistical methods (tabular views, percentage accounts, base and chain indexes and graphs) are used in the preparation of the paper. They are used as "desk research" method and method of comparison. The aim of the paper is to highlight the trend of demographic changes and their impact on the development of agriculture in Montenegro, in the period 1948-2011. The obtained results indicate negative consequences of demographic changes (population and deagrarisation), as well as the reduction of the agricultural population. They have also influenced the decrease of agricultural production and the formation of unfavourable environment for its improvement. One of the greatest consequences of deagrarisation is the lack of man-power. Montenegrin agriculture is characterized by the aging of the rural population and significantly lower average level of education.*

***Key words****: demographic changes, rural development, structure, agriculture.*

**JEL:** *Q10, Q16*

## Introduction

Montenegro is located in South-Eastern Europe on the Balkan Peninsula, covering an area

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of 13,812 km$^2$ and having 620,029 inhabitants. Population density of 46 inhabitants per km$^2$ puts Montenegro among the countries with the lowest population density. Compared with countries in the region, density is lower than in Bosnia and Herzegovina (75), Croatia (56.56), Serbia (88.4), Slovenia (102), Macedonia (83) (World Bank, 2014). Urban population accounts to 63% of the total population in Montenegro. According to the census from 2011 - 620,029 people live in Montenegro out of which 1.3% is more than in 2003 - year in which the previous census was carried out. In regard to 2011, the highest number of inhabitants is in the central region 293,509 (47.3%), then in the northern region -177,837 (28.7%), while the coastal region is the region with the lowest population density – 148,683 (24.0%). In the inter-census period, it was evident that there was a reduction in the population in the northern region, while the central and coastal recorded an increase. Above mentioned changes are caused by the natural migration of population, as distinct migratory flows go from north to central and coastal parts of the country. In addition to the aforementioned changes, changes in structure of the population were also recorded - primarily due to age, which may be an important factor of influence on the further development of the region. These changes and trends have had a negative impact on the development of agricultural production, which is almost entirely based on family house holdings. Lack of labour force as the main key driver of development represents a significant drawback for further development. According to one of the principles of traditional peasant economy, impact on agricultural production in the house holds depends on the available number of hands, i.e. the number of household members who are able to work and engage in the field of agriculture (Mendras, 1986). The youth in rural areas have not asked for its economic emancipation due to improving of economic situation of agriculture but instead they went away from it (Bandin, 2011). Turbulent structural changes have occurred in the villages of Montenegro after the end of the World War II. The population is a significant factor in rural development, because the existing population recruits a new workforce, and also because the population is a carrier of needs, as a factor of consumption, i.e. production (Pejanović, 2010). Main reasons for depopulation were: industrialization, urbanization, expropriation and agrarian reform. Unfavourable position of agriculture and private households, as well as more favourable conditions of life in the city caused population escaping from villages and agriculture (Čikić, 2012). In this respect, an example of Montenegro was not isolated. Processes of leaving the rural areas also occured in some other countries of former Yugoslavia, as well as in some countries of the world. Thus, e.g. in Croatia between 1961 and 1971, more than half a million of people have left rural areas. Almost, all rural settlements have been affected by demographic discharge, and a great part of them lost over half of the population in a few decades. Permanent erosion of generation, long-term reduction in fertility and aging raise a number of difficult solvable existential and other problems (Nejašmić, 2012).

Today, some countries in the world have extremely aggravated physical and demographic imbalances, such as the Southeast of Canada, Northeast US, Chinese Plain etc. (MASA, 2010).

## Material and method of work

The paper analyzes demographic changes in Montenegro by its regions, as well as gender and age structure of the population in the period 1948-2011. The focus is on the causes of the "rural exodus" and its implications on the development of agriculture. The official data of the Statistical Office of Montenegro (MONSTAT) were used in the preparation of the paper. Also, in order to present the current situation on the field as well as its comparison with the official statistics, data used was obtained from survey carried out on 60 households in the municipality of Podgorica, Bijelo Polje and Kolašin. The data in this paper is gathered by years and displayed by each year in which censuses in Montenegro were conducted (1948-2011). In displaying the data, the statistical tables, line and area chart were used. With regard to relative numbers of the structure, the participation of population of some regions in the total population was shown, as well as the participation of male and female population in the total population. Dynamic statistical analysis is applied, namely, the method of calculation of basic and chain indices. A "desk research" method is used, as well as the comparison method. The survey was carried out on the 60 households in the municipalities of Pljevlja, Bijelo Polje and Kolašin. The paper aims to highlight demographic discharge of rural areas, which depending on the political-geographic, traffic and other position is expressed in distinctive intensity at different places.

## Research results

In the 20th century, population of Montenegro was under the influence of wars, which resulted in the decrease of the population. The total population in 1921 was 311,341. In period 1921-1931 there was an intense demographic growth, thus in 1931 the population increased by 15.6% (projection of the population of Montenegro to 2060 with the structural analysis of the population of Montenegro). The period after 1945 represents a milestone in the development of socio-economic relations in Montenegro. Participation of Montenegrin population on the total population of the former Yugoslavia ranged from 2.4% according to the Census from 1948 to 2.6% according to the Census from 1991. The largest increase in population of Montenegro was in the period between 1948 and 1953, and it was the highest growing rate in the former Yugoslavia. The increase, among other things, was due to the relatively high birth rate and permanent reduction in mortality (Vujošević, 1990). (*Graph 1*.) shows the change of total population of Montenegro in the period 1921-2001.

**Graph 1.** Change of total population of Montenegro in the period 1921-2011
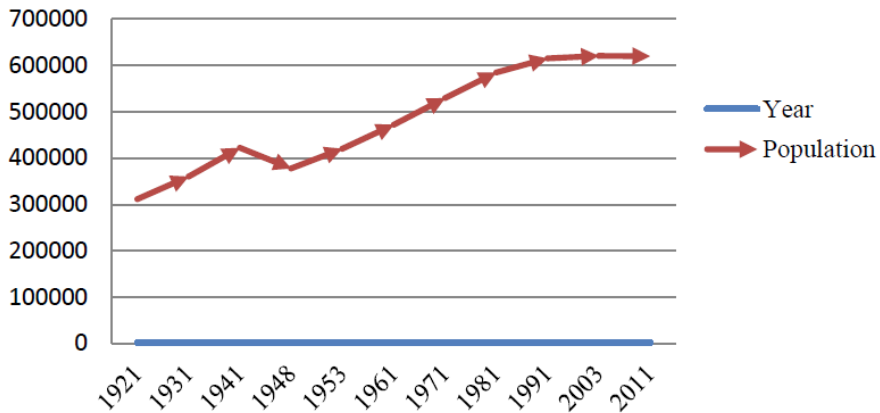


*Source: MONSTAT, 2008*

*Table 1* shows the changes in population according to the base and chain indexes. Calculation of the authors was made on the basis of available statistical data in the publication "Demographic changes in Montenegro since the mid-20th century and perspective to 2050 ", (MONSTAT, 2011).

**Table 1.** Change of total number of citizens of Montenegro according to the base and chain indexes, 1921-2011.

| Year | Base index 1921=100 | Chain index |
|------|---------------------|-------------|
| 1921 | 100 | - |
| 1931 | 115.64 | 115.64 |
| 1941 | 135.54 | 117.21 |
| 1948 | 121.19 | 89.41 |
| 1953 | 134.87 | 111.29 |
| 1961 | 151.60 | 112.40 |
| 1971 | 170.10 | 112.21 |
| 1981 | 187.68 | 110.33 |
| 1991 | 197.54 | 105.26 |
| 2003 | 199.19 | 100.83 |
| 2011 | 199.15 | 99.98 |

*Source: Calculation of the corresponding author according to the data from MONSTAT, 2011b*

According to the conducted census, total population of Montenegro recorded a change in growth. On the basis of the calculated base index which took the year 1921 as the base year, the highest growth was in 2003 (99.19 %) in comparison to 1921. Chain indexes show that in the post-war period, the highest growth was in 1953 compared to the previous census from 1948, as well as in 1961 in the comparison to the census from 1953. In the subsequent period, it began to stagnate, i.e. it began to decline. These changes are immanent in societies that are rapidly industrialized and urbanized

(Vujošević, 1990). In the reporting period regional differences could be recognized. (*Graph 2.*) shows the movement of the population by region.

**Graph 2.** Change of total population on Montenegro by regions, 1948-2011
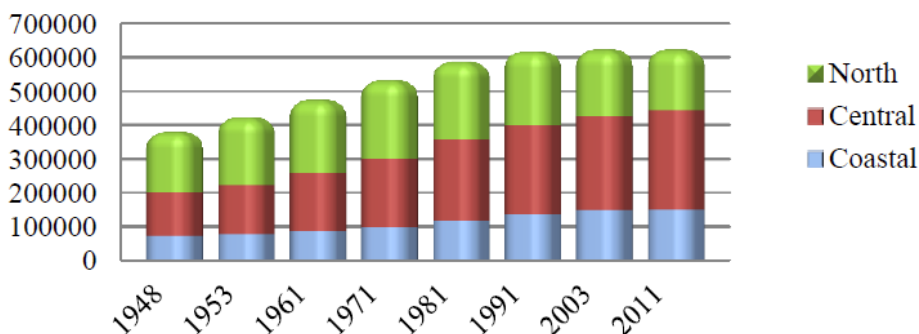


*Source: MONSTAT, 2012*

*Table 2.* shows the total population changes by regions according to the base and chain indices, as well as the percentage participation of the population of some regions in the total population of Montenegro. During the calculation of the base indexes, 1948 was determinate as the base year.

**Table 2.** Changes of total population changes by regions, percentage participation (%), base and chain indices

| Year | REGIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | COASTAL | | | CENTRAL | | | NORTH | | |
| | Participation in total population (%) | Base index | Chain index | Participation in total population (%) | Base index | Chain index | Participation in total population (%) | Base index | Chain index |
| 1948 | 18.5 | 100 | - | 34.2 | 100 | - | 47.3 | 100 | - |
| 1953 | 18.1 | 97.84 | 97.84 | 34.6 | 101.17 | 101.17 | 47.3 | 100 | 100 |
| 1961 | 17.7 | 95.68 | 97.79 | 36.1 | 105.56 | 104.34 | 46.2 | 97.67 | 97.67 |
| 1971 | 18.3 | 98.92 | 103.39 | 38.3 | 111.99 | 106.09 | 43.4 | 91.75 | 93.94 |
| 1981 | 19.8 | 107.03 | 108.20 | 41.0 | 119.88 | 107.05 | 39.2 | 82.88 | 90.32 |
| 1991 | 21.9 | 118.38 | 110.61 | 42.6 | 124.56 | 103.90 | 35.5 | 75.05 | 90.56 |
| 2003 | 23.5 | 127.03 | 107.31 | 45.1 | 131.87 | 105.87 | 31.4 | 66.38 | 88.45 |
| 2011 | 24.0 | 129.73 | 102.13 | 47.3 | 138.30 | 104.88 | 28.7 | 60.68 | 91.40 |

*Source: Calculation of the corresponding author according to the data, MONSTAT (2008)*

According to the calculate percentage of the participation of population by regions, it could be seen that participation of coastal and central region has been growing since the census from 1981, while the participation of population of north region has been decreasing in the total population of Montenegro. This change resulted in a slower pace of development of agriculture. This is because, in the northern region, there is a significant area of meadows and pastures, which are a prerequisite for the development of livestock production, for which this region has a relative advantage. The structural area of land in Montenegro is covered by perennial meadows accounted for 37.39%, while pastures account for 62.61%. Livestock farming was one of the major occupations in the northern area of Montenegro, which has also influenced on the development of psychological and physical characteristics of people in those areas (Cvijić, 1966). Total number of households by areas of perennial meadows and pastures is 43,142, covering an area of 210,182 ha. The average area per household is 4,87 ha (perennial meadows and pastures) - (Structure of agricultural holdings - Used land, Agricultural Census, 2010). Calculated base indexes indicate that in 2011 in comparison to the based year of 1948, population in the coastal region increased by 29.73%, the central by 38.30%, while in the north it was reduced by 39.92%. Chain indices show the changes from one census to another. In the coastal region in 1991 there was an increase in population by 10.61% compared to 1981, in the central by 3.90%; while in the north it decreased by about 10%. The abovementioned has contributed to uneven regional development. Northern region (mainly rural) represents more than 50% of the country, but it has less than third of the total population. On the other hand, almost one-quarter of the population in Montenegro covers over 10% of the territory of Montenegro. These trends of population changes are not in line with the long term goal of Montenegro to develop as an agricultural country, bearing in mind primarily the development of livestock farming, fruit growing and crop husbandry in the north region.

In the context of demographic changes which appeared after 1945, it is important to point out the changes in the age and gender structure of the population. The gender structure of settlers depended on the type of migration. Women are more numerous among settlers who participate in local, internal migration, while men are more numerous in case of external primarily economically motivated migration. The results of the Census conducted in Montenegro, in the period from 1948-2011, showed that the female population outnumbered the men. *Table 3*. shows the total population by gender, as well as its structure.

**Table 3.** Total population by gender and age structure in Montenegro 1948-2011

| Year of census | Total | Male | Female | Participation in total population (%) | |
|---|---|---|---|---|---|
| | | | | male | female |
| 1948 | 377,305 | 178,078 | 199,111 | 47.2 | 52.8 |
| 1953 | 419,905 | 201,718 | 218,155 | 48.0 | 52.0 |
| 1961 | 471,994 | 229,274 | 242,620 | 48.6 | 51.4 |
| 1971 | 529,604 | 259,209 | 270,395 | 48.9 | 51.1 |
| 1981 | 584,310 | 289,740 | 294,570 | 49.6 | 50.4 |
| 1991 | 615,035 | 305,931 | 309,104 | 49.7 | 50.3 |

| Year of census | Total | Male | Female | Participation in total population (%) | |
|---|---|---|---|---|---|
| | | | | male | female |
| **2003** | 620,145 | 312,068 | 321,917 | 49.2 | 50.8 |
| **2011** | 620,029 | 306,236 | 313,793 | 49.4 | 50.6 |

*Source: MONSTAT, 2008*

In the reporting period, the participation of women in the total population is higher in relation to the participation of men. A phenomenon that manifests through a number of women in relation to the number of men is present as demographic regularity in almost all European countries, regardless of their demographic characteristics and social circumstances (Šobot, 2012). The changes that occurred in the period from 1948 to 1991 led to the balancing of gender structure of the population, which had been disturbed due to the World War II. However, although women have a greater participation in the total population compared to men, if some other indicators are observed, the following can be concluded: employment of women in agriculture in Montenegro takes a small part of their total employment (less than 4%), while women make up to one-third of labour force. Main reasons for low interest of women to stay in rural communities are: women are rarely owners of the property and they are rarely in a position of holder of family households. According to the 2010 Census of Agriculture, women make up only 12.87% of holders of family holdings. Of a total number of 48,824 of holders of family agricultural house holdings - most holders (16,228) are in the age group over 65 and over, with a participation of 33.24% (2010 Census of Agriculture, Structure of agricultural holdings). Surveys data conducted on 60 households in the municipalities of Pljevlja, Bijelo Polje and Kolašin almost entirely correspond to the results of the Census of Agriculture. Nevertheless, 86.67 % of holders of households were men, and 13.33% of holders were women (Joksimović, 2014).

Migration changes have also affected on the changes in the age structure of the population in Montenegro, which took place in the direction of demographic aging. This is primarily reflected in the increased participation of old or reduction or decrease in young people in the total population. *Table 4*. shows the population by age groups. *Table 4*. shows population by age groups.

**Table 4.** Population by big age groups in Montenegro, 1953-2003

| Age group | 1953 | 1961 | 1971 | 1981 | 1991 | 2003 |
|---|---|---|---|---|---|---|
| | Number of citizens | | | | | |
| **Total** | 419,873 | 471,894 | 529,604 | 584,310 | 615,035 | 633,985 |
| **0-14** | 149,144 | 171,658 | 169,139 | 160,546 | 155,458 | 131,883 |
| **15-64** | 239,781 | 266,514 | 317,417 | 373,406 | 402,754 | 421,256 |
| **65+** | 30,930 | 33,440 | 40,417 | 48,020 | 50,603 | 75,156 |
| **80+** | 5,972 | 7,088 | 8,322 | 9,366 | 11,215 | 10,087 |

*Source: MONSTAT, 2008*

**Table 5.** Participation of some age groups in the total population (%) 1953-2003

| Age group | 1953 | 1961 | 1971 | 1981 | 1991 | 2003 |
|---|---|---|---|---|---|---|
| | Number of population | | | | | |
| **Total** | 100 | 100 | 100 | 100 | 100 | 100 |
| **0-14** | 35.5 | 36.4 | 32.1 | 27.6 | 25.5 | 21.0 |
| **15-64** | 57.1 | 56.5 | 60.2 | 64.2 | 66.2 | 67.0 |
| **65+** | 7.4 | 7.1 | 7.7 | 8.3 | 8.3 | 12.0 |
| **80+** | 1.4 | 1.5 | 1.6 | 1.6 | 1.8 | 1.6 |

*Source: Calculation of the corresponding author according to the data from the table 4*

If we observe the results in *Table 5*, in absolute numbers, it can be seen that at the time the census from 1961 was carried out, there were 33,440 people aged of 65 and 171,658 under the age of 15. However, according to the census from 2003 the number of elderly people doubled and accounted to 75,156; while the number of young people reduced to 131,883. The data in *Table 5.* indicate that the Montenegrin population was affected by demographic aging. Namely, the data show that in the period 1961-2003, proportion of population of the age of 65 and over increased from 7.1% to 12%, while the proportion of young people decreased from 36.4% to 21%.

**Table 6.** Average age of the population in Montenegro, 1953-2003

| | 1953 | 1961 | 1971 | 1981 | 1991 | 2003 |
|---|---|---|---|---|---|---|
| **Average age** | Number of population | | | | | |
| | 27.4 | 27.5 | 28.9 | 30.7 | 32.7 | 35.8 |

*Source: MONSTAT, 2008*

In the period from 1961 to 2003, the average age of the population of Montenegro increased by 8.3 years (from 27.5 to 35.8). In the period 1991-2003 intensity of aging increased in 2003. The average age was 35.8. The previous analysis suggests that the aging process in Montenegro was very fast. However, in the early 21st century, the population of Montenegro has still been considered as the group of younger demographic of European populations. In 2003, only five countries had lower average age of the population of Montenegro: Iceland, Ireland, Macedonia, Moldavia and Albania (Demographic changes in Montenegro since the mid-20th century and perspectives to 2050). Problems of age structure are presented in the European Union where there is such a relationship that one farmer younger than 35 "goes" per nine farmers over the age of 55. Some Member States (Portugal, Bulgaria, Italy, Cyprus, and the United Kingdom) have a very low percentage of young farmers, and one young farmer barely goes per 20 elderly farmers. Unfavourable demographic changes are reflected on the development of agriculture in Montenegro. There has been a sharp decline in the participation of the agricultural population in the total population of Montenegro. In period after the World War II, villages in Montenegro had suffered tremendous changes. They were the consequence of industrialization, migration and implemented measures of agrarian reform. A series of measures was adopted, and the most important regulations were regarding the reorganization of

peasant cooperatives (30th March 1953), the regulations of the land fund and allocation of land ownership in agricultural organizations (May 27th 1953) and the regulations on transport of land and facilities (15th June 1954). Among other things, this legislation introduced and maximum of arable land of 10 ha per an individual farmer, and only exceptionally, in terms of the family cooperative, this property could be up to 15 ha. The age structure of a population can significantly affect consumer ethnocentric tendencies. The statistical analysis was made regardless the gender of a consumer who, expressing high ethnocentric tendencies, would be older, less educated, with low income, highly religious and dissatisfied with life in Croatia, (Matić, 2013). *Table 7.* shows the change of the participation of agricultural populations in the total population of Montenegro

**Table 7.** Change of the participation of agricultural populations in the total population of Montenegro, 1948 -2003 (%)

| Year | 1948 | 1961 | 1971 | 1981 | 1991 | 2003 |
|---|---|---|---|---|---|---|
| Participation of agricultural population in total population | 75.40 | 48.0 | 42.60 | 13.00 | 7.10 | 5.30 |

*Source: Andrijašević, Rastoder,2006.*

The data on the change of the participation of the agricultural population in the total population of Montenegro indicate its significant reduction in the reporting period. After 1945, as a result of the overall economic development and industrialization of the country, agricultural and general population in the mountainous area is reduced due to mass migration, so in 1961it accounts to about 60% of the total population (Marković, 1974). The process of increasing of non-agricultural and decreasing of agricultural population was also followed by the process of enlargement of urban and reduction of rural population. In comparison to the other republics of the former Yugoslavia, Montenegro in the period 1953-1971, recorded the highest growth of the urban population in relative terms (Vujošević, 1990).

A sudden decrease in the participation of the agricultural population in the total population of Montenegro, at the same time it did not mean rapid increase in the active population. On the contrary, the percentage was very low throughout the post-war period and in 1953 it was 35.9% compared to the total population, or 65% compared to the population of working age.

Similar changes were present in other areas. Thus, for example participation of the agricultural population in the total population of Serbia was 72.10% according to the census from 1948, while according to the census from 2002; the percentage was only 10.9%. For comparison it should be noted that Sweden needed 70 years in order to decrease participation in the total agricultural population from 71% to 41% (from 1840 to 1910). In the United States of America it took 90 years (1820 were 72% of the farmers, and in 1910 there were 32 %), and Japan only after 73 years reduced participation of the agricultural population from 78% (1887) to 33% (1960). France needed 90 years to reduce the number of farmers, because in 1866 it had a participation of 63% and 23% in 1951 (Pejanović, 2010).

The above described processes can be called deagrarisation of the society in Montenegro. They have contributed to the slowdown in agricultural production and the formation of an unfavourable environment for its improvement. One of the greatest consequences of deagrarisation is lack of labour force. The Montenegrin agriculture is characterized by aging of the rural population and significantly lower average level of education. More than 44% of them are older than 55 years, 65% are older than 45. More than half (55.3%) employed in agriculture had finished high school, and only 9.1% had completed higher school or university (Agricultural Census, 2010, Structure of agricultural holdings, 2011b). (*Graph 3.*) shows labour force on family holdings, according to age.

**Graph 3.** Labour force family agriculture holdings
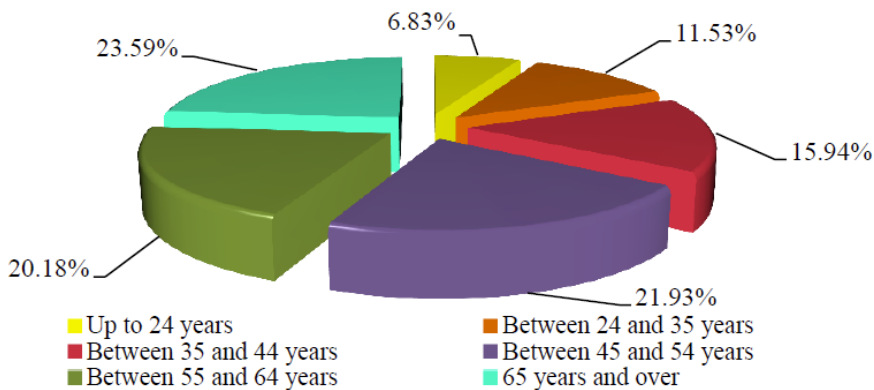


*Source: Agricultural Census 2010, Structure of agricultural holdings by municipalities*

Changes of unfavourable age structure of labour force in agriculture are occured even in the EU. Thus, e.g. 33% of the labour force in agriculture is under the age of 40,57% between 40 and 65, and 10% are 65 or over (EU Agricultural Economics Report, 2013). The unfavourable demographic changes have influenced on the under-use of agricultural land (Nejamšić, 2012). Agricultural land in Montenegro covers the area of 515,740 ha (Statistical Yearbook, 2012), which represents 37.4% of the territory of Montenegro. 189,144 ha or 36.76% of the total area is arable land. However, two-thirds of the agricultural land are currently not being cultivated. Ministry of Agriculture and Rural Development of Montenegro has launched an initiative for the lease of state-owned agricultural land to interested entrepreneurs. It is important to note that Montenegro has enough land resources for competitive production, but they are not properly distributed and used. Specifically, coastal region reports the growth in population structure, i.e. the size of household is the least favourable, while the northern region, which records decrease in the number of population, has the highest percentage of households that use larger areas of agricultural land.

Despite significant land resources, it should be noted that about 31.6% of the total agricultural land is consisted of parcels of 0.50 ha. More than half of the households (54.1%) use 0.10 to 1 ha of agricultural land. Agricultural land is owned by family agricultural holdings and it is almost at the level of 95.2%. The average agricultural holding has 4,6 ha of used

agricultural land (Census of Agriculture, 2010). Great number of uncultivated land is due to a large participation of pasture in the total area of agricultural land in Montenegro. In the upcoming period it is necessary to work on improving living conditions in rural areas and stimulate economic activities, which will have a stimulating effect on the return of young people. It is necessary to work on harmonization of territorial development of rural areas. This can be achieved by measures which will be focused on the development of the rural economy, as well as the opening of new jobs and improving the quality of life in rural areas.

## Conclusion

Decrease in population and depopulation of certain areas were one of the dominant demographic processes in Montenegro in the period from 1948 to 2011. An example of Montenegro, in this respect, was not isolated. Processes of leaving the rural areas also occurred in other countries of the former Yugoslavia. Thus, e.g. in Croatia between 1961 and 1971, more than half a million people left the rural areas. The population of Montenegro is in a phase of demographic aging. Namely, in the period 1961-2003 participation of population age of 65 and over increased from 7.1% to 12%, while the proportion of young people decreased from 36.4% to 21%. The unfavourable demographic changes are reflected on the development of agriculture in Montenegro. There has been a sharp decline in the participation of the agricultural population in the total population of Montenegro, which also did not mean the rapid increase of the active population. On the contrary, the percentage was very low throughout the post-war period and in 1953 it was 35.9% compared to the total population, or 65% compared to the population of working age. It is expressed a participation of population older than 65, which makes 23.58% of the total labour force, while the participation of people under 24 makes 6.83% of the total labour force.

Montenegrin agriculture is characterized by the aging of the rural population and significantly lower average level of education. More than 44% of them are older than 55, 65% are older than 45. More than half (55.3%) employed in agriculture had finished high school, and only 9.1% had completed higher school or faculty. Despite significant land resources, it should be noted that about 31.6% of the total agricultural land is consisted of parcels area of 0.50 ha. More than half of the households (54.1%) used 0.10 to 1 ha of agricultural land. Agricultural land is owned family agricultural holdings and it is almost at the level of 95.2%. The average agricultural household has 4,6 ha of used agricultural land (Census of Agriculture, 2010). Great number of uncultivated land is due to a large participation of pasture in the total area of agricultural land in Montenegro.

In the upcoming period it is necessary to work on the improvement of living conditions in rural areas and to stimulate economic activities, which will have an incentive effect on the return of young people. It is necessary to work on harmonization of territorial development of rural areas. This can be achieved by measures which will be focused on the development of the rural economy, as well as the creation of new jobs and improving the quality of life in rural areas.

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# RESEARCH OF HONEY CONSUMERS' BEHAVIOR IN PROVINCE OF VOJVODINA[1] [2]

*Maja Ćirić[3], Svetlana Ignjatijević[4], Drago Cvijanović[5]*

## Summary

*The region of Vojvodina is considered to be very favorable for honey production, whereby the area of Fruska Gora is primarily considered as the most bountiful. However, one of the key problems that honey producers encounter is the lack of understanding of consumer behavior and therefore inability to create appropriate marketing strategies and programs. Therefore, the aim of this paper is to provide assistance to honey producers in Vojvodina, to lime honey producers from Fruska Gora with protected geographical origin in particular, to identify the motives, attitudes and buying habits of consumers of honey in Vojvodina. The conclusion is carried to summarize the obtained results about what type of honey consumers in Vojvodina buy, why, where, when, how often and what are their attitudes toward the introduction of a new brand of honey. Moreover, it presents the basic guidelines to honey producers for the improvement of marketing strategies and marketing programs.*

***Key words:*** *consumer behavior, motives, purchasing habits, attitudes, Fruska Gora's lime honey*

**JEL:** Q13, M21, M31.

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## Introduction

Honey represents the most famous primary product of beekeeping practices, which is most commonly consumed by consumers in its, so-called, primary condition, ie. as it is taken from bees. Additionally,  honey can be used as an additive in the fructification of another product, or can be processed by creating so-called secondary product, that due to the quality and extraordinary characteristics of honey on human health has a high nutritional value (Bekić et al., 2013). Honey is a unique food that contains all the necessary elements for the growth and development of organisms (amino acids, carbohydrates, vitamins, organic acids, minerals, pollen, essential oils, proteins, enzymes, etc.). The quality of honey depends on the geographical origin and presence of plant species on the site (Dugalić-Vrndić et al., 2011). It is due to the fact that the quality and properties of honey depend on the geographical origin, a study on the protection of geographical origin of Fruska Gora's lime honey is made and through the Lime Trees & Honey Bees for Sustainable Development of the Danube Microregionproject, users of protected geographical origin label are identified. In relation to lime honey produced in other geographical areas, Fruska Gora's lime honey is characterized as highly monofloral, i.e. it contains a very high proportion of lime nectar which is caused by the characteristics of the geographical area and production process. Allotment of lime nectar in Fruska Gora's lime honey is located above the upper limit of the share of lime nectar in honey produced in other geographic areas. High monofloral characteristics of Fruska Gora's lime honey result in its specific sensory, melissopalynological and physical-chemical properties. (Elaborat o zaštiti oznake geografskog porekla za proizvod Fruškogorski lipov med, 2011).

The most suitable areas for the production of honey in Serbia are Sumadija and Zlatibor, while in Vojvodina it is the area of Fruska Gora. Between 2001 and 2013, according to the results obtained within the project Lime Trees & Honey Bees for Sustainable Development of the Danube Microregion, the average production of honey in Serbia amounted to 4173 tons of which 11.24% was produced in Vojvodina. The average number of beehives in the analyzed period is 305.46, of which approximately 16.43% are in Vojvodina. The yield of honey amounted to averaged 12.67 kg per hive, while in Vojvodina that amount was 11.45 kg.

(Ignjatijević et al., 2014a) investigated the comparative advantage of Serbian exports and concluded that, in the past, Serbia had achieved a positive comparative advantage in exports of processed food sector and they rightly believe that technological and organizational modernization of Serbia can improve the current level of cooperation.(Ignjatijević et al., 2015) suggest that "companies must continually work on the sustainable development of trade by applying new technologies in management". In the period from 2004 to 2013 the average value of exported honey from Serbia amounted to 4.79 millions of dollars $, and imports 62.4 thousands of dollars. The analysis of exported quantities of honey indicates a significant increase at the rate of 61.74% per annum. Exports' price has increased significantly and in the last year of export it amounted to 4.42$, which is higher than the average for the ten-year period ($ 3.56). The conducted analysis of the value of exports and imports of honey in Serbia indicates the negligible value of imports of honey. The demand

for honey in the domestic market is met by domestic production, in so that the demand for imports of honey is not significant. On the other hand an expansion in exports indicates the existence of an increase in demand on the international market. This fact precisely points out the need to invest in increasing production and competitiveness of honey on both domestic and international market, in order to utilize the comparative advantage of Serbia for the export of honey and to increase the participation of Serbia in the placement of honey in the international market. But before entering the international food market it is of ultimate importance to research the consumers' requirements and desires both in quality and quantity (Ćirić, Prodanović, 2013). Besides, there is a clear need to continue with structural reforms, in order to promote export structure (Ignjatijević et al., 2014b).

The problems that producers of honey in Serbia and Vojvodina encounter in an effort to increase the production and placement of their products, both domestically and, especially, on foreign market, are numerous. One of the key problems is certainly the nonpossession of adequate knowledge of marketing, lack of understanding of the needs, desires, motives and habits of consumers and therefore the inability to create a proper marketing strategy and marketing program, which would enable them to increase market share both in domestic and international markets.

Considering the above, this paper tries to present guidelines to honey producers in Vojvodina, with special reference to the manufacturers of Fruska Gora's lime honey, which segment of the target market to focus on, what are the characteristics of consumers in this segment, which marketing strategy and marketing program to apply in order to achieve a greater market share and higher profits from the sale of their products.

## The importance of consumer behavior research

Consumer behavior is a dynamic interaction of affect and thinking, behavior and the environment by means of which human beings manage the aspects of exchange in their life (Peter, Olson, 2005).The essence of successful marketing is precisely the knowledge of consumer behavior in order to create an appropriate marketing strategy and marketing mix, and to adequately meet the needs and desires of consumers. Consumer behavior is manifested in selecting, purchasing, consumption and use of products and services on the market, as well as their availability, including the final decision on the retention or rejection of a product or service. Consumers display different behavior regarding the purchase of goods and services, which is correlated with the personality characteristics, product characteristics and particularity of a specific situation. Consumer behavior in the market is influenced by many different factors that can be divided into external (outside) and internal (psychological).The external factors include demographic, economic, geographic and sociological factors, while internal factors consist of personality characteristics, its features and mental states. Although manifested individually, they are strongly influenced by external factors and affect the formation of attitudes, opinions, teachings and motives of consumers (Novaković Rajčić, 2005). Cognitive, affective and behavioral component of the attitude are intercorrelated and very important for consumer behavior and its consumption intentions (Ćirić, Ignjatijević, 2014).

The study of consumer behavior takes interest in ways how the consumers actually use the products and services they buy, how many different brands of products they use, how often and where they buy them and above all, why they buy and use them? Contextually, consumer behavior includes what people buy, why they buy, how and where they buy, when and how often they buy products and services (Maričić, 2008).

Without knowledge of consumer behavior it is impossible to successfully plan the marketing activities of the company. Marketing managers are constantly in a position to analyze what motivates potential customers and why they exhibit certain preferences in the process of purchasing products and services on the market (Milisavljević et al., 2005). The theory and results of research of consumer behavior most often represent the basis for the laws that concern the market. The study of consumer behavior has an overriding public interest in terms of society as a whole (Ćirić et al., 2014).

In order to successfully create marketing strategies and programs, it is necessary to carry out consumer research in order to properly perform the profiling of consumers. Profiling of consumers is a type of procedure that describes the specifics of the consumers in the target market segment. It presents a description of the relevant details of the average buyer of a particular product or service. Profile of consumers in a particular market segment has a significant impact on demand for products and services from the company. Although consumers behave differently while purchasing goods and services in a variety of situations in the market, it is possible, using consistency in behavior in the consumption of consumers, to classify them in accordance to some general (common) characteristics (Maričić, 2008).

### Results of researches of honey consumers' behavior that have already been done in different countries

There have been many studies done on honey consumption by American researchers. To get a better understanding of how consumers perceive honey, as well as how they use it, the National Honey Board (2013) conducted a usage and attitude survey. A total of 501 households, which consisted of men and women between the ages of 21 and 74, were interviewed. The key results they came up with were: From 2012 to 2013, there was an increase from 54 percent to 70 percent in consumers reporting that they had purchased honey in the past year. Among moms, honey purchases had increased from 61 percent to 75 percent in the past year. Honey continues to be used predominantly for food-related purposes, including tea (55%), as an ingredient in a recipe (51%), and on toast/biscuits/muffins/cornbread (46%). Over half of consumers are likely to use honey for non-food purposes. Among nonfood purposes, consumers are most likely to use honey as a cough suppressant. One in five moms reported using honey as a cough suppressant/throat soother (19%).

Batt and Liu (2012) analyzed consumer behavior in Western Australia and came to the conclusion that honey is mostly consumed as a spread or as a sweetener on breakfast cereals and porridge. A very important part of their research concerns the comparison between the consumption behavior of Anglo-Saxon and Asian consumers. They have

concluded that Anglo-Saxons attach more importance to the country of origin, while Asian consumers attach more importance to value and brand recognition - reputation, color and health benefits.

In their research, Murphy et al. (2000) came to the conclusion that, to Irish consumers the most important is the price and the texture of honey and then packaging, scale of production (small producers' vs. massively produced honey) and color. Irish consumers of honey were found to be price-conscious, deriving higher utility from lower priced versions of the product, while this sensitivity is also reflected on consumers' preference for larger packaging. Additionally, a thick texture had a higher utility than a runny texture. Small-scale production had a higher utility than mass production; this was also the case with dark golden color in comparison with light golden color.

When it comes to research regarding the consumption of honey and consumer behavior in purchasing and consuming of honey in Eastern Europe, researches done to date are very scarce (Arvanitoyannis, Krystallis, 2006). By exploring the literature, we have found relevant research for comparison with our country, due to similarities in geographic factors and cultures' influences, and those are researches done in Romania and Hungary which have been crucial to us for comparison with the results of the research that we have conducted.

In the eastern part of Hungary, research has been done regarding the buying habits of honey consumers. On a sample of 902 respondents it has been determined that many different types of honey are produced in Hungary, but that people do not know much about them and that they consume only a few of them. The most commonly used types of honey are traditional acacia honey and flower honey. The respondents were classified according to gender, age, qualifications and income. It was found that the most important criteria in all groups of consumers when it comes to buying honey were: quality, price, type of honey and quality of packaging. Also, it was found that older people take into account the following: price, manufacturer's name and size of the package. The highest number of consumers purchases honey just a few times a year, or a month and mostly in hypermarkets or directly from the manufacturer. Taking into account the results of the research, authors have come to the conclusion that more targeted marketing is crucial in emphasizing honey as a healthy product in order to increase consumption per capita in Hungary (Vanyi et al., 2011).

According to research done in Bucharest, Romania in 2003 with a focus on young, educated urban population, the following data regarding the consumption of honey, motives and consumer purchasing habits was discerned. More than 70% of the sample consumers bought at least 500g of honey within a period of three months. The type of honey that was predominantly favored is acacia honey followed by lime honey. Purchasing honey was most often done directly from the manufacturer or at green markets, while purchases from smaller shops and supermarkets were performed only occasionally. The main motives for the purchase of honey are: medical benefits of honey consumption; dietary quality of honey; ethical character of honey; and suitability of honey with food consumption lifestyle. According to the motives for purchasing, consumers of honey in Romania are classified into three clusters: the first, 'common honey consumers', who use honey as a staple product

in their diet; the second, 'younger consumers indifferent towards honey'; and the third segment, 'enthusiastic honey consumers' who value the therapeutic properties of honey and are more willing to pay premium prices for its organic counterpart. For the first segment of consumers the price of honey is most important, while the third segment of the consumer finds the quality of honey as crucial in the decision to purchase it. In addition, research has identified that the main elements upon which consumers evaluate the quality of honey are color, taste, aroma, thickness, while very little attention is given to the label, warranties, brand name and country-of-origin sign. (Arvanitoyannis, Krystallis, 2006). In Romania, quality cues are defined by search attributes of the bulk product, rather than credence attributes. Marketers targeting this market should be aware of this skepticism towards label information, which necessitates more communication effort to built consumer trust in brands (Athanasios et al., 2006).

During recent studies done in North-West Romania, authors Pocol and Bolboacă (2013) came up with the following findings. Although the frequency of consumption was quite high, the quantity consumed per capita was low (3 kg/year on average). The most popular types of honey were acacia honey, polyfloral honey and lime honey. Respondents preferred to buy honey from local producers, and had more confidence in domestic honey than in imported honey. Honey was perceived to be a delicious product, delightful to consume and was considered beneficial for health by most of the respondents. A number of factors (education, occupation and age) significantly influenced the perception that the respondent had of the value of honey.

### Research method

The purpose of this paper is to study the behavior of consumers of honey in Vojvodina, ie. determining their buying habits, motives and attitudes towards the introduction of a new brand of honey; Fruska Gora's lime honey. In addition, the paper establishes the basic demographic, economic, sociological and geographical characteristics of the test sample of consumers in Vojvodina.

The aim is to, with reference to the analysis of buying habits, motives and attitudes of consumers and their connection with the established demographic, economic, sociological and geographical characteristics of the consumers, create consumer profile which honey beekeepers of Fruska Gora's lime honey should focus on. By understanding consumer profile, honey beekeepers can be provided with basic guidance in the creation of appropriate marketing strategies and marketing programs.

Quantitative research has been applied to the research of consumer behavior, in order to carry out statistical analysis and to generalize the obtained results onto broader population. The applied method was surveying, and the instrument through which the survey was conducted was a questionnaire that was not standardized, but it had been purposely created for this survey. The research was conducted on the territory of Vojvodina, in 25 towns and villages (towns: Novi Sad, Kikinda, Vrbas, Apatin, Vrsac, Sombor, Subotica, SremskaMitrovica, Ruma, Zrenjanin, Indjija, Kula; villages: Kisac,

Backi Petrovac, Vrdnik, Idjos, Rumenka Gajdobra, Cerevic, Sivac, Budisava, Krcedin, Backi Jarak, Temerin, Kac). The time interval in which the survey was carried out was the period between July and August 2014.

The research sample represents 500 randomly selected respondents. Random selection method was used to select a representative sample.

The data was analyzed by use of SPSS for Windows 17.0. As the methods the descriptive statistics, frequencies and percentages were used.

## Results and discussion

In the literature review, we mentioned that consumer behavior depends on the demographic, economic, sociological and geographical characteristics, as well as their internal psychological factors. Therefore, we started the research with the analysis of external influences on consumers, i.e. we examined the demographic, economic, sociological and geographical characteristics of consumers, and then we analyzed a part of internal factors, i.e. their motives, attitudes, as well as demonstrated purchasing habits. Based on the obtained information we have created consumer profile on which manufacturers of Fruska Gora's lime honey in Vojvodina should focus on.

**Table 1.** Demographic, economic, sociological and geographical characteristics of the test sample of consumers in Vojvodina

| 1. | Gender | Male | 194 | 39% |
|----|--------|------|-----|-----|
| | | Female | 306 | 61% |
| 2. | Age | Up to age 20 | 9 | 2% |
| | | 20-30 | 175 | 35% |
| | | 30-40 | 166 | 33% |
| | | 40-50 | 84 | 17% |
| | | 50-60 | 39 | 8% |
| | | Over 60 | 27 | 5% |
| 3. | Level of education | Elementary school | 4 | 1% |
| | | High school | 117 | 23% |
| | | Higher education | 43 | 9% |
| | | University degree | 147 | 29% |
| | | Other (Master, PhD) | 189 | 38% |
| 4. | Number of household members | 1 | 38 | 8% |
| | | 2 | 105 | 21% |
| | | 3 | 131 | 26% |
| | | 4 | 162 | 32% |
| | | 5 | 47 | 9% |
| | | More than 5 | 17 | 3% |
| 5. | Do you have children or parents who live together with you in the household? | Have children | 183 | 37% |
| | | Have parents | 160 | 32% |
| | | Have children and parents | 36 | 7% |
| | | No children and no parents | 121 | 24% |

| | | | | |
|---|---|---|---|---|
| 6. | Total average income of your household is: | Up to 20 000 | 10 | 2% |
| | | 20 000 - 40 000 | 50 | 10% |
| | | 40 000 - 60 000 | 100 | 20% |
| | | 60 000 - 80 000 | 97 | 19% |
| | | Over 80 000 | 185 | 37% |
| | | Don't know | 49 | 10% |
| 7. | Do you eat healthy? | Yes | 194 | 39% |
| | | No | 27 | 5% |
| | | Partially | 279 | 56% |
| 8. | Do you exercise or engage in some physical activity? | Yes, regularly | 142 | 28% |
| | | Yes, occasionally | 268 | 54% |
| | | Ne | 90 | 18% |
| 9. | Do you consume honey everyday because you like it or do you use it only when you are sick? | I consume it because I like it | 255 | 51% |
| | | I consume it because it is healthy | 177 | 35% |
| | | I do not like very much, I only consume it when I am sick | 68 | 14% |
| 10. | Do other people's opinions affect your decision to buy honey? | Friends | 91 | 18% |
| | | Family | 169 | 34% |
| | | Doctors | 38 | 8% |
| | | Media | 21 | 4% |
| | | Other | 19 | 4% |
| | | I make my own decision | 300 | 60% |
| 11. | Place where you live | City | 423 | 84,6% |
| | | Village | 77 | 15,4% |

*Source: Created by the authors based on authors'survey within the project „Lime Trees &Honey Bees for Sustainable Development of the Danube Microregion" No: 6526-00/2011/Grant 64, the project is funded by the European Union and the Austrian Development Agency*

In the sample of test population men and women are equally represented, with a slightly larger proportion of women of 61%. The most represented population is 20-40 years of age. Up to 20 years population is the least represented one with only 2%, while the population over 50 years is merely represented by 13%, which we have taken into account when defining the age profile of consumers because, according to the literature review, population of over 50 years of age is a significant consumer of honey, and thus should not be ignored. Population with university education is dominant, but there is a relevant number of respondents with high school education, which is also important for defining consumer profile. Families with two, three and four members of domestic household are equally represented. The majority of the tested population is either those who live with children 37%, or those who live with their parents in the household 32%. Given that the population sample is dominated by those with higher education, it is not surprising that the average household income is higher than the average salary in Serbia. It should therefore be noted that, in defining the product price, this group of consumers has a lower flexibility when it comes to increasing the prices compared to consumers with incomes below the average. Answers to the questions whether the respondents eat healthy food and whether they

exercise or engage in some physical activity, indicate that a higher percentage of respondents leads a healthy lifestyle. The results show that an individual's decision to purchase honey is mostly affected by two reference groups; families 34% and friends 18%. While the majority of respondents make independent decisions, which can be related to the fact that due to the long-term purchasing of products from the same manufacturer there is no need for information in the decision-making process, information gathering phases and assessment of alternatives are altogether skipped and the decision to purchase is made routinely by habit. In the structure of the interviewed population both respondents from cities and from villages are present, with a majority share (84.6%) of respondents that live in cities.

After identifying the main external characteristics of the sample of consumers we investigated their purchasing habits and motives of behavior. In that way, we got the answers to the questions; what people buy, why they buy, where they buy, when and how often they buy honey.

**Table 2.** Purchasing habits and motives of honey consumers in Vojvodina

| 1. | Do you consume honey? | Yes | 472 | 94% |
|----|------------------------|-----|-----|-----|
| | | No | 28 | 6% |
| 2. | How often do you buy honey? | Once a month | 147 | 29% |
| | | Once in 3 months | 209 | 42% |
| | | Once in 6 months | 116 | 23% |
| | | I don't buy honey | 28 | 6% |
| 3. | What package size of honey do you buy? | 250g | 39 | 8% |
| | | 500g | 157 | 31% |
| | | 1kg | 276 | 55% |
| | | I don't buy honey | 28 | 6% |
| 4. | What kind of honey do you buy? | Acacia honey | 116 | 23% |
| | | Polyfloral honey | 95 | 20% |
| | | Lime honey | 24 | 5% |
| | | Forest honey | 17 | 4% |
| | | Acacia, lime and polyfloral honey | 49 | 10% |
| | | Acacia and lime honey | 21 | 4.2% |
| | | Acacia and polyfloral honey | 58 | 12% |
| | | Acacia, lime and forest honey | 11 | 3% |
| | | Don't buy honey, buy other kinds of honey and other imprecise answers | 109 | 18,8% |

| 5. | Do you consume honey everyday because you like it or do you use it only when you are sick? | I consume it because I like it | 255 | 51% |
|---|---|---|---|---|
| | | I consume it because it is healthy | 177 | 35% |
| | | I do not like very much,  I only consume it when I am sick | 40 | 8% |
| | | I do not consume honey | 28 | 6% |
| 6. | Where do you most often buy honey? | Directly from manufacturer (beekeeper) | 203 | 40,6% |
| | | At the green market | 158 | 31,6% |
| | | In grocery shop | 82 | 16,4% |
| | | At the honey festival | 17 | 3,4% |
| | | In monastery | 4 | 0,8% |
| | | I do not buy honey and other imprecise answers | 36 | 7,2% |
| 7. | Do you consume honey throughout the year or do you increase consumption during a specific time of the year (or season) | Throughout the year | 334 | 66,8% |
| | | In winter | 91 | 18,2% |
| | | In spring | 7 | 1,4% |
| | | They do not buy honey and other imprecise answers | 68 | 13,6% |

*Source: Created by the authors based on authors' survey within the project „Lime Trees & Honey Bees for Sustainable Development of the Danube Microregion" No: 6526-00/2011/ Grant 64, the project is funded by the European Union and the Austrian Development Agency*

The first question, from which we started the study, was to measure the percentage of respondents who consume honey in their diet. The obtained results indicated that 472 respondents (94%) use honey in their diet, while 28 of them (6%) do not consume honey. The answer to the above question resulted in a conclusion that honey is a product that falls into the category of consumer goods which is present in the diet of, as much as, 94% of the test population on the territory of Vojvodina. However, this information does not yet give us an accurate picture about to what extent and how often honey is consumed; we will learn that through the answers to second and third question.

The respondents' answers to the second question show us the habits of consumers regarding the frequency of honey purchases. From the above, we observe that, the out of total number of respondents, 29% of them purchase honey once per month and 42% of them do so once in three months. Therefore, 71% of respondents fall in the category of consumers who often buy honey, whereas 23% of respondents buy honey only once in six months, which means that their consumption of honey is pretty meager. This information is important to connect with the amount of honey to be purchased in order to define a segment of consumers who are the biggest consumers of honey, i.e.  those who have a habit of consuming honey to a greater extent.

The answers given to the third question, which refers to the habits of consumers related to the purchase of certain size of packaging, indicate that the largest consumer preference is to buy packs of 1 kg, 55% of respondents, whereas 31% of respondents buy packs of 500g, while only 8% of respondents buy packs of 250 g.

If we connect the frequency of purchases of honey with the amount of honey consumed by respondents, we get the information that 15.8% of respondents buy honey in packs of 1kg once a month, 9.6% of respondents buy honey in packs of 500g once a month, 24.6% of respondents buy honey in 1 kg packs once in 3 months. Thus, 50% of respondents purchase honey in significant quantities from 333g to 1kg on average per month, while the remaining 50% of respondents either do not buy honey (6%) or, if they buy it, quantities are extremely modest; 41,7g to 250g on average per month. The obtained data significantly changes the picture given by the initial research that even 94% of the test population consumes honey.

In relation to the research by Arvanitoyannis and Krystallis (2006), more than 70% of respondents in Bucharest buy at least 500g of honey every three months, which amounts to an average of 166g per month, as well as in relation to the research by Pocol and Bolboacă (2013) according to which the average consumption of honey in Romania is 3kg per capita annually, which amounts to an average of 250g of honey per month, we can conclude that customers in Vojvodina have a much higher propensity to consumption of honey compared to consumers in Romania.

When analyzing which type of honey is purchased by respondents, by summarizing responses to the open question, we see that consumption is dominated by acacia and polyfloral honey. Lime honey is exclusively purchased by only 5% of respondents, acacia, lime and polyfloral honey are purchased by 10% of respondents, while 4.2% of respondents buy acacia and lime honey. Therefore, lime honey does not fall into the category of honey whose consumption has a dominant position in the market. Acacia and polyfloral honey are, compared to lime honey, much more represented in the consumption of the tested population in Vojvodina. If we compare this data with the research performed in Hungary, we can see that consumption of acacia honey also dominates there but, unlike Vojvodina, polyfloral honey holds a second place in Hungary's honey consumption. In Bucharest, Romania, consumption of acacia and lime honey dominates, while Northwest Romania is dominated by consumption of acacia, polyfloral and lime honey. As we can see, acacia honey is the type of honey that is characteristically dominant in consumption in Vojvodina, as well as in Hungary and Romania, while the preferences of other types of honey vary in researched areas.

The motives for the consumption of honey are, on one hand the satisfaction that taste of honey provides to 51% of the test population, but for 35% of the respondents the basic motive is concern for health, which is in accordance with their lifestyle.

The main motives for buying honey in Bucharest, Romania are: medical benefits of honey consumption; dietary quality of honey; ethical character of honey; and suitability of honey with food consumption lifestyle, wherein the dominance of a particular motive depends on the characteristics of consumers. Comparing the data

that we received by way of research and motives which were obtained through research in Romania, we notice that the motives for the consumption of honey are essentially similar, and which one will dominate depends on the internal and external factors that influence consumer behavior.

On the basis of summarizing the responses to the open question, we get a clear picture that the majority of respondents, as many as 40.6%, has a habit of purchasing honey directly from the manufacturer of honey - known beekeepers, which can be linked to the fact that, given their inability to check the quality of honey, trust in such beekeeper and long term relationship of loyalty they build together is a factor that has the greatest influence when deciding to purchase a particular honey. In addition, other factor contributing to their decision is the cost of honey, which is lower when purchased from manufacturers than it is when purchased through intermediaries. We can also deduct that a significant portion of respondents opts to purchase honey at green markets (31.6%) and in stores of various profiles; from health food stores to large supermarkets (16.4%). Comparing our results with the results obtained in Hungary, consumer research shows us that consumers in Vojvodina as well as consumers in Hungary are in the habit of buying honey primarily from the manufacturer directly. However, while consumers in Hungary have a more pronounced habit to buy honey in stores, in Vojvodina, as we can see, the percentage of consumers who buy honey in stores is rather small (16.4%). Comparison with consumers in Romania displays a greater similarity, because among consumers in Romania there is also a predominance to buy honey directly from the manufacturer and then at green markets, as shown in the research conducted in 2003, as well as in 2013. With regard to the time of year when consumers buy honey, we can see that 66.8% of respondents purchase honey throughout the year. However, 18.2% of them show a greater inclination and habit to buy honey during the winter, which can be associated with more frequent colds in the winter time and the use of honey as a supplemental medicinal resource in this time of year.

**Table 3.** Attitudes of honey consumers in Vojvodina towards the introduction of a new brand of honey

| 1. | Would you be willing to try Fruska Gora's lime honey with above average quality and guaranteed certificate? | Yes | 416 | 83% |
| | | No | 17 | 3% |
| | | Maybe | 54 | 11% |
| | | Do not know | 13 | 3% |
| 2. | What is the maximum price you would be willing to pay for 1 kg of Fruska Gora's lime honey with above average quality and guaranteed certificate? | Up to 500 RSD | 6 | 1,2% |
| | | Between 500-800 RSD | 179 | 35,8% |
| | | Between 800-1000 RSD | 170 | 34% |
| | | 1000 RSD | 111 | 22,2% |
| | | Over 1000 RSD | 34 | 6,8% |

*Source: Created by the authors based on authors' survey within the project „Lime Trees & Honey Bees for Sustainable Development of the Danube Microregion" No: 6526-00/2011/ Grant 64, the project is funded by the European Union and the Austrian Development Agency*

The attitude of even 83% of respondents that they would be willing to try Fruska Gora's lime honey that possesses above average quality and guaranteed certificate, operates as encouragement for producers of Fruska Gora's lime honey and indicates that regardless of the small market share of lime honey consumption, compared to other types of honey, applying appropriate marketing strategy and marketing program the market share of lime honey consumption could be significantly improved.

To obtain guidance on the price which consumers would be willing to pay for a new branded product, Fruska Gora's lime honey of high quality, we asked an open question number 2 (as shown in Table 3) and we summarized and displayed the obtained results. Based on the received results we see that 63% of respondents are willing to pay a price higher than 800 dinars per kilogram of lime honey, which has an above average quality and is certified, while 29% of them would even be willing to part with 1000 dinars or more for such a product. Add to this the information that at the moment the greatest number of respondents (52%) pays between 500 and 700 dinars for 1kg of honey. Even 35% of respondents pay less than 500 dinars per kilo, while only 13% of the population allocates over 700 din.

If we compare the data on the price of 800 dinars and the price of 500-700 dinars, which the largest number of respondents (52%) at the time of interview are ready to part with, we find that respondents are willing to pay a roughly 30% higher price than the average market price per kilogram of lime honey that has an above average quality and is certified. Therefore, appropriate marketing strategy and marketing program that place an emphasis on the above average quality of Fruska Gora's lime honey and guarantee compliance with the standard of quality, create a possibility to achieve a significantly higher price than the one that the majority of respondents is currently paying.

Based on the research of demographic, economic, sociological and geographical characteristics of consumers in the territory of Vojvodina; their buying habits, motives and attitudes that are related to the introduction of the new brand that is Fruska Gora's lime honey, we have created a profile of consumers to which producers of Fruska Gora's lime honey should focus on.

Consumers who purchase and consume the largest amount of honey on average between 333,33g to 1kg on a monthly basis represent the most important market segment which the honey producers should focus on. These are consumers who said they buy 1kg of honey per month, 500g per month and 1kg of honey in three months. This market segment accounts for 50% of the test population. The aim of manufacturers is to create preferences towards the purchase and consumption of Fruska Gora's lime honey with these consumers. These consumers have the following demographic, economic, sociological and geographical characteristics.

According to the gender structure of the consumers, both men and women are equally statistically significant.

According to the age structure of consumers that are dominant in the purchase of honey are persons in ages between 20-30, 30-40 and 40-50 years of age. Taking into account

that the tested sample contained a small percentage of the population over the age of 50, as well as taking into account the experience of honey producers in direct sales of honey, to whom the population over the age of 50 is a very important segment of loyal customers, neither of them should be omitted when defining the profile of the consumer.

According to the level of education, purchasing honey is dominated by those with tertiary education and higher, i.e. Masters Degree and PhD.

According to the number of members in domestic household, three member and four member households dominate in the purchase of honey.

Honey consumers are customers themselves, along with their children and their parents to whom they purchase honey. This means that honey is bought for the whole household. Customers are, according to the above characteristics, an active population with high education, but beside them, consumers of purchased honey are their children and their parents as well.

When it comes to overall average household income, purchasing honey is dominated by households with incomes of minimum 40,000-60,000 dinars, 60,000-80,000 dinars and over 80,000 dinars.

Honey consumers are persons who, completely or partially, eat healthy food. They also exercise or engage in some physical activity regularly or occasionally. Therefore, those are such persons who have a tendency towards a healthy lifestyle.
Motives for the purchase of honey are on one hand the fact that customers prefer the taste of honey, and on the other hand the fact that honey is considered as healthy food. Accordingly, consumers who buy honey throughout the year prevail marginally, but those consumers who buy it during the winter, when the intensity of colds is greater, are also significant statistically.

Family is the only reference group that has a statistically significant effect on the respondents' decision to buy honey, while the majority of respondents make that decision independently.
Both city and rural residents have a propensity to purchase honey.

According to expressed views, such profile of consumers prefers certified, high quality honey and for that product is willing to pay about 30% higher price, which is necessary to bear in mind when defining marketing programs for producers of Fruska Gora's lime honey.

## Conclusion

Through the research of buying habits and motives of consumers, we have reached the conclusion that, although as many as 94% of respondents claim to consume honey, only 50% of them consume substantial amounts of 333 g to 1 kg of honey on average per month. Types of honey that consumers prefer are acacia and polyfloral honey. The motives for the consumption of honey are on one hand the satisfaction that taste of honey provides for 51% of

the test population, whereas for 35% of the respondents, the basic motive is concern for health, which is in accordance with their lifestyle. The largest percentage of respondents (40.6%) purchases honey directly from manufacturers, and then at green markets (31.6), while a fairly small percentage of respondents buys honey in shops of different profile (16.4%) which is, on one hand, related to the confidence that consumers place in the producers and quality of honey and, on the other hand, a lower price that consumers pay in direct purchase than in stores. The highest percentage of consumers purchase honey throughout the year (66.8%), while certain seasonal nature still exists because 18.2% of them declare that they buy honey more frequently in the winter, which is related to the use of honey as a supplemental medicinal remedy during intense colds.

While researching consumer attitudes, we have come to the conclusion that the majority of consumers, as many as 83%, are willing to try Fruska Gora's lime honey that is of above average quality and is certified, regardless of the fact that lime honey does not belong to the type of honey which consumers buy. The reason for this lies in the fact that consumers prefer a high quality of honey because it is linked to better taste and better healing properties of honey, which is in line with the motivations of consumers. For such a quality and certified honey, consumers are willing to pay even a 30% higher price than the average market price of lime honey.

By researching the buying habits, motives and attitudes of consumers, as well as their demographic, economic, sociological and geographic features, we have defined the profile of consumers who represent the largest buyers and consumers of honey which the producers of honey in Vojvodina and especially producers of Fruska Gora's lime honey should focus on. It is about customers, men and women, who are highly educated, active workers with above average income compared to the average salary in Serbia, who purchase honey for their own consumption and the consumption of the entire households that consist of their children and parents. Moreover, it is the consumers who prefer high quality products and foster a healthy lifestyle. The marketing strategy that producers of Fruska Gora's lime honey should implement is the strategy of concentration on one market segment. The producers of Fruska Gora's lime honey need to adjust their complete marketing program to this consumer profile. Based on the characteristics of the consumer profile we have presented the basic guidelines for the marketing program that could be a guiding principle for the manufacturers of Fruska Gora's lime honey as well as for other producers of honey in Vojvodina who have products with similar characteristics.

When it comes to Fruska Gora's lime honey brand, regardless of the high quantity of producers of Fruska Gora's lime honey, the name and complete visual identity of the product should be unique. Only then can we build a uniquely recognizable brand. Moreover, given that it is intended for consumers with above average income, it should be packed in special luxury designed packages in sizes of 500 g and 1 kg, which is consistent with the purchasing habits of consumers. Thanks to the properties and quality of Fruska Gora's lime honey which is, due to the geographical origin, of above average quality in relation to lime honey in other areas, it can be differentiated in the market in comparison to other types of honey and branded as exceptional honey with above average quality which is, according

to the views expressed, very important to the studied consumers. As a basic guideline in creating price, the producers of Fruska Gora's lime honey should take into consideration customer preferences and prices that competitors in the market create for lime honey that is not from Fruska Gora or for lime honey that is not branded. According to our research, consumers are willing to pay a roughly 30% higher price than the average market price per kilogram of Fruska Gora's lime honey, which has an above average quality and is certified. With regard to customers from the territory of Vojvodina, Fruska Gora's lime honey should still be predominantly sold directly from individual producers, given the already built loyal base of customers and their purchasing habits, but it is also necessary to actively take part in selling at green markets, through all honey related events and to take particular focus on health food stores and shops of organic products. By increasing the production of honey and strengthening the potency of offer, the expansion of distribution channels can be considered. When it comes to promotion, it is necessary to make an optimal combination of media in accordance with the defined profile of consumers and available budget, and to work intensively on building a unique brand in order to make Fruska Gora's lime honey an association of above average quality and a healthy lifestyle in the minds of the consumers.

Studies of consumer behavior and creation of marketing strategies and marketing programs, based on the information obtained from research, do not necessarily mean irrevocable success in the market. However, they greatly reduce the risk of error and increase the chance that the product or service would be accepted by consumers and thus provide an adequate market share and profit to producers.

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# ISTRAŽIVANJE PONAŠANJA POTROŠAČA MEDA U VOJVODINI

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## Apstrakt

*Područje Vojvodine se smatra veoma povoljnim za proizvodnju meda, pri* čemu se u prvom *redu ističe područje Fruške gore. Međutim, jedan od veoma važnih problema sa kojim se proizvođači meda susreću jeste u nerazumevanju ponašanja potrošača i samim tim u nemogućnosti kreiranja odgovarajuće marketing strategije i programa. Stoga je cilj ovog rada da se pomogne proizvođačima meda u Vojvodini, a posebno proizvođačima Fruškogorskog lipovog meda sa zaštićenim geografskim poreklom, u identifikaciji motiva, stavova i kupovnih navika potrošač ameda u Vojvodini. U zaključku se vrši sumiranje dobijenih rezultata o tome koju vrstu meda potrošači u Vojvodini kupuju, zašto, gde, kada, koliko* često i kakvi *su im stavovi prema uvođenju novog Brenda meda. Osim toga, iznose se osnovna uputstva proizvođačima meda za unapređenje marketing strategije i marketing programa.*

***Ključne reči****: ponašanje potrošača, motivi, kupovne navike, stavovi, Fruškogorski lipov med.*

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# ECOLOGICAL PROTECTION OF AGRICULTURE THROUGH SERBIA'S LEGAL REGULATIONS AND JUDICIAL PRACTICE

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## Abstract

*Within the codification of Crminal law of Republic of Serbia, which was conducted in 2005, legal protection of agriculture was introduced into ecological delicti which were then emphasised by having them unified in the sole Head of the Criminal code as well as by partially aggravating penal policy. Certain criminal offences, which prior to the codification were a part of a different field of legal protection, are now listed in the ecological delicti catalogue, and that positions them, according to the number of listed deliciti, on a very high place in comparisson to the other groups of criminal offences. Within the ecological delicti, there is a total of 18 (eighteen) offences,which are divided into 4 (four) groups depending on the object of legal protection. In this paper, besides the introductory conceptual defining the object of research, we described the normative arrangement of all the ecological delicti, within the agricultural protection, by researching their essential elements which include the capital and the qualified form of execution, perpetrators features, type of responsability and penalty. Empirical research covers the four year period, more precisely the years 2009 -2012, according to the parameters related to the number of adult persons accused for criminal offenses against the environment which are endangering agriculture, or the number of accused and convicted persons, shown globally and individually according to the structure criminal offenses. Furthermore the research includes the penal policy which reffers to the allready stated penalties, that is- jail sentences and their duration, and that also is depicted individually and globaly according to the criminal offences structure.*

***Key words****: ecological protection, agriculture, criminal code, penal policy.*

**JEL**: *K14, K32, Q15.*

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## Introduction

Let us start from the conceptual identification of offence (delict), that is, its lexical, legal, criminal and sociological meaning. Lexically, the word delict is derived from the Latin word *delinquere,* that is, *delictum*, meaning an act against the law, an offence, crime (Vujaklija, 1980). Legally, it means a criminal offense which under the substantive law includes formal and objective-subjective concept, that is, determination of an offence under the law, its illegality and comitance of an offence (Lazarević, 2006). As per criminological aspect, its meaning is based on a multitude of terms used to designate an unlawful conduct that is the subject of criminological research, where the term delict equals with the terms crime and offence, being considered as an individual criminal behaviour (Ignjatović, 2007). Sociological interpretation of delict comprises asocial and anti-social behaviour that manifests as the rejection and opposition to the proclaimed or customary norms of the community, that is, behaviour that is deemed contrary to social order. Lexically, ecology entails biology and physiology (Ming, 1995) in the narrow sense; it is a science that studies interactions of animals and plants with their physical and abiotic environment and with one another. This paper focuses on environmental offences that within the criminal and legal framework differ from other offences in the distinctiveness of the object of protection (Lazarus, 2000).

The Substantive Criminal Code of the Republic of Serbia comprises 22 groups of standardized offences, which are classified under different chapters of the law. Environmental offences, that is, criminal offences against the environment are the sixth most numerous offences in the codified Criminal Code that has been in effect since 2006 (Criminal Code "Official Gazette of the Republic of Serbia", No. 85/2005 and 111/2009).

Their distinctiveness, multidisciplinary approach and complexity is determined by the object of legal protection, which encompasses important ecological values such as: 1) right to live in healthy environment; 2) rational use of natural resources; 3) preservation of the integrity of biosphere; 4) protection from all forms of environmental pollution, 5) right of access to information on the environment and participation in decision making on important environmental issues; 6) protection of air, water and soil; 8) fauna and flora protection. Protection of the environment through criminal law is based on the concept of biocentric views of the environment, that assign essential importance for life to the environment, and therefore environment is considered as the protected asset *per se,* as opposed to the anthropocentric views that treat the environment as a resource that is subordinate to human needs (Lilić, Drenovak, 2010).

Environmental offences are characterized by their multiplicity, mutual diversity and distinctiveness of the modern crime (Bošković, 1996), and therefore they are classified into four categories: 1) general environmental offences 2) criminal offences pertaining to dangerous substances; 3) criminal offences against the wildlife and plants; 4) criminal offences pertaining to poaching game and poaching fish.

## Methodology and Data Sources

The data on juvenile and adult perpetrators of criminal offences, responsible persons and legal entities - perpetrators of economic violations were obtained from the regular statistical surveys. The data on courts and judges, public prosecutors' offices and public prosecutors were obtained from the Ministry of Justice and Public prosecutors' Council. *Criminal offences* are presented by criminal offences' groups according to the Classification of Criminal Offences determined by the Statistical Office of the Republic of Serbia.

The coverage of criminal offences, as socially negative phenomena, is complete since the statistical surveys comprise a) all adult perpetrators of criminal offences (including criminal offences made by unknowns as well),  b) legal entities and persons in charge – perpetrators of economic violations, against whom a report was submitted to public prosecutor's office and against whom proceedings were conducted and legally closed (absolute decree rendered) with authorized public prosecutor offices and courts.

Adult perpetrators of criminal offences are persons who, at the time when criminal offence committed, were 18 and against whom the proceedings pursuant to crime report and preliminary proceedings were closed,  accused  persons  against  whom criminal  proceedings  were closed and decree irrevocably rendered, as well as persons sentenced. *Reported person - known perpetrator* is an adult perpetrator of criminal offence against whom proceedings by crime report and preliminary proceeding were closed by a decision: charges rejected, investigation suspended; investigation terminated; or charge sheet submitted.

Reported person - unknown perpetrator is an unknown person against whom crime report was submitted to public prosecutor's office, and who was not identified within one year following the crime report was submitted.Accused person is an adult against whom indictment, charge sheet, summary charge or private suit were instituted at court, and against whom criminal proceedings were closed by court decision rejecting private charge; proceedings were suspended or charge dismissed; perpetrator acquitted of charges; charges rejected, security measure passed without stating sentence or perpetrator pronounced guilty. Sentenced   person is a convicted adult person who was pronounced guilty and sentenced to penalties: punishment, conditional sentence, judicial-admonition, security measure, corrective measure, as well as a person pronounced guilty but discharged, is considered to be a sentenced person.

The sources of data titled "Criminal charges" on the crimes against farming by the adult persons in the Republic of Serbia, were obtained on the basis of the research which was conducted using the Questionnaire CK-1" *The Questionnaire for an adult against whom the legal proceeding was completed*".  The data on the crimes of the accused and convicted adults were obtained on the grounds of the research which was conducted using Questionnaire CK-2 "The Questionnaire for the accused and convicted adult against whom the final criminal proceedings was completed".

The instruments of the research have encompassed all the adult persons in the Republic of Serbia against whom there was a reasonable suspicion of having committed an offence against farming and against whom the criminal charges were filed at the competent public prosecutor's office as well as those against whom statutory proceeding was conducted and completed.

The term adult offender relates to the offender who was 18 years old at the time crime was committed. The term type of decision (Questionnaire CK-1) implies the decision of the public prosecutor with which the legal proceedings were completed. The person reported relates to an adult person against whom criminal proceeding was conducted and lawsuit was filed due to the reasonable doubt that the person committed the offence. "The accused" is an adult person against whom indictment, proposition of the indictment or plaintiff was brought before the court. The convicted person refers to an adult person who was found guilty and against whom criminal sanctions were imposed. "Criminal offence" is the offence which has been prescribed by the law as the criminal act which is contrary to the law or committed against law.

By applying the method of content analysis, comparison, correlation and statistical research for a specified period, the number of submitted admission, indictments and verdicts issued in the Republic of Serbia, which will be observed trends in relation to the decisions of the courts and the capacity of the evidence and show how effectiveness legal protection of agriculture. The research is aimed at identifying the legal aspects of protection of agriculture in the Republic of Serbia, in the existing positive legal regulations, the scientific contributions that would highlight the shortcomings and potential modification de lege in future amendments to the legislation in this area.

## Enviromental offences and their characteristics

As previously said, when the Criminal Code was codified all environmental offences were gathered in its separate chapter, what meant the standardization (Adler, 2005) of the protection of the environment through criminal law. On the other hand, certain regulations that regulate the area of administrative- legal protection, in addition to economic offences and felonies, also include criminal offences as a form of incrimination in the areas that regulate: 1) plant health protection; 2) production, trade and use of products for plant protection; 3) use and release into the environment of genetically modified organisms (Winter, 2008); and 4) water protection. We explore environmental offenses and their distinctiveness by describing and analyzing law provisions and theory of criminal justice, focusing on the definition and interpretation of their object of protection, that is, the particularities of certain qualifying characteristics.

## General environmental offences

General environmental offences include protection of basic natural assets through criminal code, that is, protection of biosphere (Eggersz, Mackenzie, 2001), by standardizing certain anthropogenic activities that pose threat to environment. Theory of criminal law classifies

seven criminal offences into general environmental offenses that according to the object of protection and other characteristics encompass: 1) *Environmental pollution*: A global object of protection is the environment as an imperative providing basic conditions for the survival of humankind, through joint protection of air, water and soil (Kraus, et. al., 1991). The act of committing basic form of criminal offence implies the pollution of air, water and soil to larger extent and over a wider area, by violating the regulations on protection, preservation and improvement of the environment. Pollution caused by man (by burning dangerous substances that pollute air, discharging wastewater into a receiving waterbody or soil, releasing or disposal of dangerous chemicals,...), results in air (Guadalupe,1996), water and soil becoming harmful to people's lives and health and the survival of flora and fauna.

Pollution of air, water and soil to larger extent or over a wider area is a threshold that separates criminal offence from minor offences, that is, from economic offence (Ming, 1995) and misdemeanours. The qualified form of criminal offence entails the pollution of air, water and soil which results in destruction of animal and plant life to large extent or environmental pollution in such extent that the clean-up requires longer period of time or great expense.

The elements of criminal offence that are necessary for determining whether basic or qualified form of the offence is committed, and which are not precisely identified by the law (greater extent, wider territory, longer time, higher expenses), as a rule, are established in every individual case based on the expert's opinion, that the competent judicial authority entrusted experts in their field. The offender who commits basic form of criminal offence with premeditation shall be punished cumulatively by imprisonment of six months to five years and a fine, or alternatively by a fine and imprisonment up to two years in the offence is committed from negligence.

For the qualified form of offence committed with premeditation  the offender shall be cumulatively punished by imprisonment of one to eight years and a fine, or cumulatively by imprisonment of six months to five years and a fine if the offence is committed from negligence. 2) *Failure to undertake environmental protection measures*: Unlike the previous criminal offense that can be committed by any offender, this offence can be committed solely by an official or a responsible officer, by failing to undertake, or carry out the protection measures prescribed by the law or by the decision passed by the competent authority.

The consequence of this criminal offence can be abstract or realistic, meaning that the offence is committed once the offender fails to undertake the protection measures regardless of the fact that the offence hasn't resulted in a consequence, and that is its basic form of incrimination for which the offender shall be punished by a fine or imprisonment up to three years if the offence is committed with premeditation or alternatively by a fine or imprisonment up to one year if the offence is committed from negligence.

In case the offence results in a consequence, the offender may receive a more severe sentence, in line with the provisions regulating the criminal offence pertaining to environmental pollution. 3) *Illegal construction and operation of facilities and installations polluting the environment*: This criminal offence, which can also be committed solely by an official or a responsible officer, entails allowing or issuing an approval for construction, start-up or

operation of facilities and installations or use of technologies, contrary to regulations on environmental protection (Schoenbaum,1992), preservation and improvement, that to larger extent and over a wider area pollute the environment.

The offence is committed by doing, or allowing, approving or accepting, as well as by failing to undertake or carry out legally prescribed obligations that most often refer to inspection and monitoring activities. The basic form of criminal offence, which can be committed only with premeditation, encompasses the environmental pollution to larger extent and over a wider area, and the penalty prescribed for an offence includes imprisonment of six months to five years. The qualified form of the offence, which can also be committed only with premeditation, entails the severity and the extent of pollution which are threshold for criminal offense pertaining to environmental pollution, and the penalty prescribed for an offence includes imprisonment of one to eight years. 4) *Damaging environmental protection facilities and installations*: This criminal offence is specific because it can be committed in ideal concurrence, and as a rule the offender shall be punished for this criminal offence only, given that other concurrent offences usually fall within minor offences (theft, destruction and damage to the property of others).

The criminal offence, which can be committed by any person, includes damage (partial destruction which reduces operability of facilities or installations), destruction (complete destruction which makes inoperable facilities or installations), removal or otherwise making inoperable facilities or installations for environmental protection (Torres, Kan, 1985). If the offender commits basic form of criminal offence with premeditation, he shall be punished by imprisonment up to three years, or alternatively a fine or imprisonment up to one year if the offence is committed from negligence.

The qualified form of the offence entails the severity and the extent of environmental pollution which is threshold for criminal offense pertaining to environmental pollution and the respective penalty prescribed, in case the offence is committed with premeditation or from negligence. 5) *Damaging the environment*: Alternatively, this criminal offence encompasses unlawful exploitation of natural resources (exploitation of forests, water, soil, and minerals), unlawful construction of buildings, executing certain works (installation of dams, ploughing the soil, watercourse diversion) or otherwise causing damage to the environment. Thus, this criminal offence, which can be committed by any person, does not result in the environmental pollution, unlike the previous criminal offences, but in causing damage to the environment, including the natural habitat degradation.

The law stipulates only the basic form of criminal offence, which entails the damage to the environment to large extent and over a wider area, and the penalty prescribed for an offence includes imprisonment up to three years if the offence is committed with premeditation, that is, a fine or imprisonment up to one year if the offense is committed from negligence. 6) *Destruction, damage, transfer into a foreign country or into Serbia of protected natural asset*: The object of legal protection is the protected natural asset that is considered as a preserved part of the nature with special values and qualities (geodiversity, biodiversity, scenery, landscapes etc.), which has a permanent ecological, scientific, cultural, educational,

recreational, tourist and other importance, and therefore is subject to special protection as a natural asset of great importance.

If the offender commits basic form of criminal offence which includes destruction or causing damage to a protected natural asset, he shall be punished by imprisonment of six months to five years, if the offence is committed with premeditation, or alternatively by a fine or imprisonment up to six months if the offence is committed from negligence. Another basic form of criminal offence entails unlawfully taking abroad a rigorously protected or protected plant or animal species, that is, importing or bringing into Serbia a foreign plant or animal species protected under international treaties and documents, regardless of the manner in which taking abroad or bringing in is done, the extent and motives.

The penalty prescribed for this form of criminal offense, for which an attempt is also punishable, includes cumulatively imprisonment of three months to three years and a fine, while a rigorously protected or protected plant and animal species shall be seized ("Official Gazette of the Republic of Serbia", No. 5/2010). 7) *Violation of the right to be informed on the state of the environment*: The object of legal protection is the right to be informed on the state of the environment, as a right guaranteed by the Constitution of the Republic of Serbia.

This criminal offence alternatively entails unlawfully withholding information or giving false information on the state of the environment and events that is required for evaluation of environmental hazard and undertaking of protection measures. The penalty alternatively prescribed for this criminal offence, which can be committed solely by an official or a responsible officer and with premeditation, includes a fine or imprisonment up to one year.

## Environmental offences pertaining to dangerous substances

Two criminal offences fall within environmental offences pertaining to dangerous substances: 1) *Bringing dangerous substances into Serbia and unlawful processing, depositing and stockpiling of dangerous substances*: Basic forms of this criminal offence entail unlawfully bringing into Serbia radioactive or other hazardous materials or hazardous waste, and their transport, processing, disposal, collecting or stockpiling, that is, allowing or facilitating by abuse of position or powers, bringing into Serbia of such materials, their transport, processing, disposal, collecting or stockpiling.

Whoever contrary to regulations brings into or transports, processes, collects or stockpiles such materials shall be punished by imprisonment of six months to five years and a fine, while any official or a responsible officer who by abuse of his position or powers allows or facilitates some of the above mentioned unlawful activities, shall be punished by imprisonment of one to eight years and a fine.

The qualified forms of the offence entail destruction of animal and plant life to high extent as a consequence of bringing into or transporting, processing, collecting or stockpiling of dangerous substances, for which the penalty prescribed includes imprisonment of two to ten years and a fine, that is, if the mentioned offenses are committed by organized group of persons, the offenders

shall be punished by imprisonment of three to ten years and a fine. 2) *Illegal construction of nuclear plants*: The incrimination entails construction or permitting the construction of nuclear power plant or a nuclear fuel production plant, or processing plant for used nuclear fuel, for which the penalty prescribed includes imprisonment of six months to five years.

## Environmental offences against wildlife and plants

Seven criminal offences encompass environmental offences against wildlife and plants: 1) *Killing and wanton harming of animals*: The object of legal protection, as a rule, refers to domestic and wild animals, that is, animals that can feel pain, fear, suffering or stress. The basic form of criminal offence entails killing, injuring, torturing or otherwise harming an animal, for which the penalty prescribed includes a fine or imprisonment up to one year. The qualified forms of offense entail killing, injuring or torturing a number of animals or if the offence is committed against animals belonging to specially protected species, for which the alternative penalty prescribed includes a fine or imprisonment up to three years, or if offender with gain as a motive organises or finances animal fights between animals of the same of different species, he shall be punished cumulatively with imprisonment up to three years and a fine. 2) *Transmitting of contagious plant and animal diseases*: The criminal offence entails failing to observe regulations, decisions or orders issued by an authorized body on undertaking measures during an epidemic of livestock disease that may endanger cattle breeding, or during threat of disease or pests that may endanger plant life. If the offender commits basic forms of this criminal offence, he shall be punished by a fine or imprisonment up to two years as an alternative sanction.

The qualified form of the offence is committed if it results in death of animals, destruction of plants or other considerable damage due to the failure to act, for which the penalty prescribed includes imprisonment up to three years. 3) *Malpractice in veterinary services*: This criminal offence can be committed only by a veterinarian or licensed veterinary technician, and it entails application of an obviously inadequate means or method of treatment of animals, thereby causing death of animals or other considerable damage, for which the penalty prescribed includes a fine or imprisonment up to two years if the offence is committed with premeditation, that is, a fine or imprisonment up to six months if the offence is committed from negligence. 4) *Producing harmful products for treating animals*: Alternatively, the basic form of this criminal offense entails production for sale or putting into circulation products for treatment or prevention of disease of animals that are dangerous to life and health of animals, for which the penalty prescribed includes a fine or imprisonment up to one year. The qualified form of offence is committed if it results in death of animals or other considerable damage due to use of harmful products, for which the penalty prescribed includes a fine or imprisonment up to two years, while the penalty prescribed for basic and qualified form of offence that is committed from negligence includes a fine or imprisonment up to six months. 5) *Pollution of livestock fodder and water*:

The basic forms of incrimination entail contamination of livestock fodder and water, by using a harmful substance, that is, contamination of water in fish-pond (Hedemann, 2000) lake, river or canal thereby causing danger to survival of fish or other aquatic animals, for which

the penalty prescribed includes a fine or imprisonment up to two years. It the contamination results in death of animals, the offence is considered as the qualified form, for which the penalty prescribed includes a fine or imprisonment up to three years.

If the offender commits basic or qualified form of criminal offence from negligence, he shall be punished by a fine or imprisonment up to six months. 6) *Devastation of forests*: The general form of criminal offence entails unlawful cutting and clearing of forests or damaging trunks, or cutting down one or more trees in a park, avenue of trees or elsewhere where cutting down of trees is prohibited, for which the penalty prescribed includes a fine or imprisonment up to one year. The qualified form entails committing of offense in a protected forest, national park or other forest intended for special purpose, for which the penalty prescribed includes imprisonment of three months to three years. 7) *Forest theft*: The basic form of criminal offence entails felling one or more trees in a forest, park or avenue of trees, by reason of theft, and the quantity of timber doesn't exceed one cubic meter, for which the penalty prescribed includes a fine or imprisonment up to one years.

The offender commits the qualified form of the offence if the quantity of felled timber he intends to sell exceeds five cubic meters or if the offence is committed in a protected forest, national park or other forest intended for special purpose, and shall be punished by a fine or imprisonment up to three years.

## Environmental offences pertaining to hunting and fishing

Environmental offences pertaining to hunting and fishing comprise two criminal offences: 1) *Poaching game*: The basic forms of this criminal offence entail hunting game during closed season or in the territory where hunting is prohibited, and the penalty prescribed for an offence includes a fine or imprisonment up to six months, that is, poaching on another's hunting preserve and killing, wounding game or catching it alive, and the penalty prescribed for an offence includes a fine or imprisonment up to one year.

The qualified forms of the offence are committed when the offence is committed against big game, and the penalty prescribed includes a fine or imprisonment up to two years, that is, when the offender hunts game whose hunting is prohibited or hunts particular game without a special permit when such permit is required (Ruhl, 2009) or hunts with means which destroy game in large numbers, for which the penalty prescribed includes imprisonment up to three years.

The measure of seizing the bagged game and hunting implements is applied in case of all forms of this criminal offence.  2) *Poaching fish*: It is the object of protection that makes difference between the basic form (Tribe, 1974) of this criminal offense and the criminal offense pertaining to poaching game, and in the case of this criminal offence the object of protection is fish and other aquatic animals. The qualified forms of the offense entail fishing or catching aquatic animals by explosive, electricity, poison, stunning or in manner otherwise damaging to breeding of such fauna or whereby mass destruction (Royal, 1997 ) of such fauna results, that is, catching fish or other aquatic animals of significant biological value or in larger quantity, for which the penalty prescribed includes imprisonment up to three years.

## Methodos and materials in empirical research

An empirical research covers a four-year period, from 2009 to 2012, in terms of data including: reported adults, dismissed criminal charges, indicted persons, convicted persons, as well as the type and the severity of the pronounced sentence. Based on the figures presented in the ( *Table No.1*), we find that the share of reported persons for criminal offenses against the environment accounts for 2% of the total number of reported persons for all criminal offences.

One of the reasons why the number of reported persons is so low, and the same goes for the number of detected criminal offences in this area, surely lies in the fact that the manner of collecting evidence in this area is pretty specific and is usually based on the experts' opinions. Therefore, according to experts and scholars, it is more than necessary to set up teams of environmental forensics experts (Čavoški, 2011).

**Table 1.** Overall number of persons reported for all offences and number of persons reported persons for criminal offences against the environment.

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Overall number of persons reported for all offences | 100, 026 | 74,279 | 88,207 | 92,879 |
| Persons reported for criminal offences against the environment | 2, 081 | 1, 568 | 1,789 | 1,841 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia.

The research findings displayed in the (*Table No. 2*) suggest that the biggest number of persons is reported for criminal offences pertaining to forest theft, accounting for 70% of the total number of persons reported for criminal offences against the environment.

**Table 2.** Number of persons reported for criminal offences against the environment in terms of the structure of the offense.

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Environmental pollution | 16 | 7 | 12 | 8 |
| Failure to undertake environmental protection measures | 8 | 4 | 8 | 1 |
| Damaging the environment | 16 | 8 | 6 | 16 |
| Destruction, damage, transfer into a foreign country or into Serbia of protected natural asset | 2 | 93 | 8 | 10 |
| Killing and wanton harming of animals | 116 | 123 | 196 | 178 |
| Transmitting of contagious animal and plant diseases | 5 | 4 | 6 | / |
| Malpractice in veterinary services | 2 | 2 | 1 | 2 |
| Pollution of livestock fodder and water | 12 | 5 | 3 | 10 |
| Devastation of forests | 157 | 69 | 89 | 103 |
| Forest theft | 1,462 | 1,090 | 1,262 | 1,276 |
| Poaching game | 172 | 99 | 129 | 173 |
| Poaching fish | 111 | 63 | 60 | 60 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia.

The number of persons reported for criminal offences that fall within the group of general offences against the environment and usually pose the most immediate threat to the environment, account for approximately 3%, and that is surely disturbing given the impact of anthropogenic factors on the overall state of the environment.

The figures displayed in the (*Table No. 3*) indicate that 45% of the total number of persons reported for all criminal offenses against the environment is actually indicted.

**Table 3.** Number of persons indicted for criminal offences against the environment

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Persons indicted for criminal offences against the environment | 1,068 | 917 | 635 | 632 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia.

Based on the analysis of certain elements from the (*Table No. 4*) the research confirms the previous findings pertaining to correlation of the persons reported in terms of structure of criminal offences, that is, the fact that the biggest number of reported persons is indicted for criminal offence pertaining to forest theft (around 74%), and that the number of persons indicted for criminal offenses that fall within the group of general offences against the environment accounts for approximately 2%.

**Table 4.** Number of persons indicted for criminal offences against the environment in terms of the structure of offense.

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Environmental pollution | 5 | / | 2 | 7 |
| Failure to undertake environmental protection measures | 2 | 2 | 6 | 1 |
| Damaging the environment | 2 | 2 | 4 | 7 |
| Destruction, damage, transfer into a foreign country or into Serbia of protected natural asset | 6 | 5 | 2 | 4 |
| Killing and wanton harming of animals | 33 | 28 | 38 | 43 |
| Transmitting of contagious animal and plant diseases | 2 | / | 2 | 3 |
| Malpractice in veterinary services | 4 | / | / | / |
| Producing harmful products for treating animals | / | 1 | 1 | / |
| Pollution of livestock fodder and water | 2 | | 2 | 2 |
| Devastation of forests | 77 | 38 | 36 | 49 |
| Forest theft | 787 | 766 | 417 | 421 |
| Poaching game | 74 | 23 | 46 | 49 |
| Poaching fish | 74 | 51 | 78 | 44 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia.

The figures displayed in the *(Table No. 5)* indicate that 63% out of the total number of persons indicted for criminal offences against the environment are convicted, that is, about 28% out of the total number of persons reported for these criminal offences.

**Table 5.** Number of persons convicted for criminal offenses against the environment.

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Persons convicted for criminal offences against the environment | 835 | 333 | 449 | 430 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia.

Further findings referring to convicted persons in terms of the structure of criminal offences, which are displayed in the (*Table No. 6*) confirm the logical trend that indicates that the biggest number of persons is convicted for criminal offence pertaining to forest theft (around 68%) and that the number of persons who are convicted for general criminal offences against the environment is negligible and amounts to approximately 1.8%.

**Table 6.** Number of persons convicted for criminal offences against the environment in terms of the structure of the criminal offenses.

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Environmental pollution | 1 | / | / | / |
| Failure to undertake environmental protection measures | / | 1 | 4 | 1 |
| Damaging the environment | 2 | 2 | 3 | 6 |
| Destruction, damage, transfer into a foreign country or into Serbia of protected natural asset | 6 | 5 | 2 | 4 |
| Killing and wanton harming of animals | 28 | 22 | 27 | 23 |
| Transmitting of contagious animal and plant diseases | 1 | / | 1 | 1 |
| Pollution of livestock fodder and water | 2 | / | / | / |
| Devastation of forests | 69 | 19 | 30 | 36 |
| Forest theft | 616 | 218 | 287 | 297 |
| Poaching game | 45 | 16 | 25 | 27 |
| Poaching fish | 65 | 48 | 68 | 33 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia.

The figures displayed in the (*Table No. 7*) suggest that only 9.5% of the total number of persons convicted for all criminal offences against the environment in the respective period was sentenced to imprisonment.

**Table 7**. Number of persons sentenced to imprisonment for criminal offences against the environment.

| Year | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| Number of persons sentenced to imprisonment | 66 | 33 | 46 | 52 |

Source: Bulletin No. 578 & 588. ISSN 0354-3641. Republic Statistical Office of the Republic of Serbia,

As for the length of prison sentence and the structure of criminal offences for which it was pronounced, figures displayed in the (*Table No. 8*) indicate that the majority of

convicted persons was sentenced to two to three months imprisonment (about 30%), as opposed to two to three years imprisonment (about 1%).

**Table 8**. Number of persons who received a prison sentence for criminal offences against the environment in terms of the structure of the criminal offenses and the length of prison sentence.

| Length of prison sentence | 2-3 years | 1-2 years | 6-12 months | 3-6 months | 2-3 months | do 2 months |
|---|---|---|---|---|---|---|
| Failure to undertake environmental protection measures | 1 | 1 | / | 1 | / | / |
| Damaging the environment | / | 2 | 1 | 1 | / | / |
| Illegal construction of nuclear plants | / | 1 | / | / | / | / |
| Killing and wanton harming of animals | / | / | / | 2 | 1 | / |
| Pollution of livestock fodder and water | / | / | / | 1 | / | / |
| Devastation of forests | / | / | 3 | 1 | 1 | 3 |
| Forest theft | / | 5 | 11 | 38 | 46 | 43 |
| Poaching game | 1 | 1 | 1 | 3 | 1 | |
| Poaching fish | / | / | 3 | 4 | 9 | 6 |

Source: Bulletin No. 578 & 588. ISSN  0354-3641. Republic Statistical Office of the Republic of Serbia,

## Conclusion

The importance of the overall protection, preservation and improvement of the environment was particularly brought into focus at the turn of the 20th and 21st centuries when some studies pointed at unforeseeable consequences that might occur as a result of the uncontrolled human impact on the environment. Man as a living being on the planet Earth put his right to freedom of behaviour above the laws of nature, thus placing himself above the nature. Man justifies his impact on ecology with his need for economic development that is determined by the exploitation of natural resources; nevertheless, that need is opposed to the concept of sustainable development, which implies a strictly controlled use of natural resources, especially those ones which fall within the category of non-renewable ones. The efforts that the responsible part of humankind invests into putting human impact on ecology under control are reflected in the fact that numerous important, international legal standards in the field of environmental protection were adopted thus creating a prerequisite for a wider introduction of the human impact on the environment in the legal framework. In line with these efforts, the Republic of Serbia gathered all criminal offences against the environment under one chapter of the Criminal Code that was codified in 2005 and partially tightened the penal policy. Formally, it can be concluded that the protection of the environment through Criminal Code is adequate. On the other hand, practically speaking and given the findings of

the above empirical research, one may conclude that there is an obvious discrepancy between the formal legal norms and the implementation of the provisions of the Criminal Code in practice. Namely, the research findings indicate that the percentage of persons convicted for criminal offences against the environment is pretty low, compared to the number of persons reported for those offenses, as well as that there is an insufficient number of detected criminal offences falling within the group of general offences that pose the biggest threat to environment, and a negligible percent of persons who are convicted for such criminal offences. Further on, based on the research findings on the type and the length of the pronounced criminal sanctions, it is evident that mild penal policy doesn't achieve its objective that aims at prevention and repression. Based on the above mentioned, we tend to believe that the responsible part of humankind is to persist in its efforts to persuade or prevent other part of humankind "to saw off the branch they are sitting on".

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# EKOLOŠKA ZAŠTITE POLJOPRIVREDE U PRAVNOJ REGULATIVI I SUDSKOJ PRAKSI REPUBLIKE SRBIJE

*Zdravko Petrović[4], Vojislav Jović[5], Dragan Manojlović[6]*

## Rezime

*U okviru kodifikacije materijalnog krivičnog zakonodavstva Republike Srbije koja je izvršena 2005. godine, pravna zaštita poljoprivrede ušla je u ekološke delikte koji su dobili na svom značaju, pre svega njihovim normiranjem u okviru jedinstvene glave zakona i delimičnim pooštravanjem kaznene politike. Pojedina krivična dela koja su pre kodifikacije pripadala drugoj oblasti pravne zaštite, svrstana su u katalog ekoloških delikata, čime su ovi delikti po broju normiranih, zauzeli visoko mesto u odnosu na ostale grupe krivičnih dela. U okviru ekoloških delikata svrstano je ukupno osamnaest krivičnih dela, podeljenih u četiri grupe u zavisnosti od objekta pravne zaštite. U ovom radu je pored uvodnog pojmovnog određenja predmeta istraživanja, izvršena deskripcija normativnog uređenja svih ekoloških delikata, pri zaštiti poljoprivrede, istraživanjem njihovih osnovnih elemenata koji obuhvataju radnju izvršenja osnovnog i kvalifikovanog oblika, svojstvo učinioca, oblik vinosti i propisanu kaznu. Empirijsko istraživanje obuhvata četvorogodišnji period, odnosno period od 2009. do 2012. godine, po parametrima koji se odnose na broj prijavljenih punoletnih lica za krivična dela protiv kojima se ugrožava poljoprivreda, odnosno broj optuženih i osuđenih lica, prikazanim globalno i pojedinačno po strukturi krivičnih dela. Nadalje istraživanje obuhvata kaznenu politiku koja se odnosi na izrečene krivične sankcije, odnosno izrečene kazne zatvora i njihovu visinu, takođe prikazane globalno i pojedinačno po strukturi krivičnih dela.*

***Ključne reči:*** *ekološka zaštita, poljopriovreda, krivično zakonodavstvo, kaznena politika.*

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# THE IMPORTANCE OF FOREIGN DIRECT INVESTMENT FOR SOUTH EAST EUROPEAN COUNTRIES' AGRICULTURE

*Sandra Stojadinović Jovanović[1], Boban Dašić[2]*

## Summary

*As agriculture is strategically important sector for economic development and growth, it is also important every mode of foreign participation in agriculture, including foreign direct investments (FDI). The aim of the paper is to consider whether there are opportunities and potentials for improvements in SEE countries' agriculture through FDI and in which segments. Therefore, the paper analyses agricultural characteristics within other macroeconomic characteristics of SEE countries' economies and also possible FDI impacts on agriculture aiming to determine if there are opportunities for improvements in SEE agriculture through FDI. Research results, presented in the paper, suggest that FDI has significant potential for support and improvement of SEE countries' agricultural performances. However, there is a need for higher level of FDI in order to use potential positive effect as well as recognition of these potential benefits from FDI inflow in agriculture by the governments and policy makers.*

***Key words****: foreign direct investments, SEE countries, agriculture.*

**JEL**: *F21, Q10*

## Introduction

As agriculture is essentially important for economic development and growth, any form of foreign participation in this sector of the country is very important. The different modes of foreign participation in agriculture may be summarized as the following:

- indirect, non-equity participation through implementation of standards and other information-intensive relationships in which a host country farmer/firm produces to the specifications of a foreign company involved in activities downstream or upstream of production in the host country;

- direct, non-equity participation through contract farming;

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- direct equity participation through foreign direct investment (FDI), whereby coordination and control of transactions are fully internalized within the company (UNCTAD, 2009).

One of the most common forms of foreign participation in agriculture is direct equity participation through wholly-owned affiliates that is foreign direct investment (FDI).

There are different definitions of FDI by IMF (IMF, 1993), OECD (OECD, 1996), World Bank (WB, 2004) or UNCTAD (UNCTAD, 2004) and they are all mutually very consistent (detailed in: Jovović et al., 2014). FDI implies investment in an enterprise that includes ownership control over it. As a relevant criterion for the investor to influence or to participate in the management of the company, it is used the threshold of at least 10% of ownership capital. Investor realizes significant influence on the management of the company, retains full control of the invested capital and makes decision on the use of capital (decides where to invest capital, how to organize production, takes care of the business results etc.) and bears the entire risk of capital using (Stojadinović Jovanović, 2008).

South East European (SEE) countries appear in the prevailing role of host countries of FDI inflows (their FDI inflows significantly exceed FDI outflows), which inevitably raises the question of FDI impacts on these countries' economies, including their agriculture. SEE countries are usually analyzed as a part of a Central and Eastern European (CEE) countries' group. But this group of countries has its own characteristics, which stand out from the CEE countries' group and which have influenced our analysis to focus on five SEE countries: Albania, Bosnia and Herzegovina (B&H), Macedonia, Montenegro and Serbia.

SEE economies are featured by luck of domestic resources and investments and, therefore, by huge need for foreign investments. This fact produces the importance of FDI for SEE economies. Whether FDI are important or might be important for their agriculture and how, the paper will show. The importance of FDI for SEE agriculture will be seen through the identification of areas and aspects of SEE agriculture where FDI might bring improvements.

In order to conduct our research and fulfil the aim of research, the research has been carried out in several parts. First, it explores the ambient in which the agriculture of SEE countries takes place by including indicators of macroeconomic performances of these countries, trying to find out whether there are similarities in their macroeconomic environment. Then, in the second part, the research focuses on the SEE agricultural characteristics revealing whether there are common characteristics of SEE countries' agriculture and any limitations and constrains that should be improved. Third part is devoted to the analyses of the level and volume of FDI in SEE agriculture. Rather it researches the share of agricultural FDI in global FDI, as well as in SEE countries' FDI, finding out the levels and tendencies in movement of their shares. Then, in the fourth part, the paper researches general FDI effects on agriculture, i.e. whether FDI can bring positive impacts and improvements in agriculture generally. Finally, given the state of SEE agriculture and its constrains, on one side, and potential impacts of FDI on agriculture, on the other side, the fifth part concludes the research through the main research result – the identification of those FDI impacts which may bring improvements in agriculture of SEE

countries. The special significance of the paper is reflected precisely in the identification of potential positive impacts which SEE countries might get from FDI inflow, starting from the findings of their main unfavourable country agricultural features and agricultural constrains.

## Aim of the paper, materials and methods

The aim of the paper is that, through synthesis of identified common macroeconomic characteristics of SEE countries' economies and their agriculture (especially it's constrains and unfavorable features), on the one side, and possible impacts of FDI in agriculture, on the other side, to identify potential areas and ways for improvement in SEE agriculture through FDI. Therefore, the paper analyses agricultural characteristics within other macroeconomic characteristics of SEE countries' economies and also the possible impact of FDI on agriculture, suggesting that there is potential for improvement in SEE countries' agriculture through FDI.

The data used in the research were obtained from three main sources. These are the UNCTAD database, EBRD database and World Development Indicators of the World Bank database. Also national and international literature and related theoretical and practical studies were used in order to get and confirm the results.

The paper is based on the hypothesis that while general improvements which FDI inflow may bring to host countries' economies by transfer of capital, technology, knowledge and other missing resources, there are also potentials for improvements in individual sectors of the country, including agriculture, through FDI.

The SEE countries appear in prevailing role of host countries, as their FDI inflows substantially exceeded their FDI outflows (based on data from UNCTAD database). These FDI inflows might bring many improvements and positive effects on their economics, such as effects of transfers of various resources (capital, technology, management), effects on the balance of payments, competition and economic growth, industrial structure and entrepreneurship, employment and trade (Stojadinović Jovanović, 2008).

Broad literature gives different opinions about the FDI impacts on host countries' economies in which significant number of studies underlines the positive effects. Caves (1974 and 1996) observes several positive effects of FDI such as productivity gains, transfer of technology, managerial skills and know-how and access to international production network and market. Rappaport (2000) observes that FDI improves productivity of both the firms that receives FDI and also all other host country firms due to technological spill-overs. Literature review of FDI impacts on host country economies is given by Wan (2010). Also there is broad literature concerning the FDI impacts on transition SEE or CEE economies. For example, Zemplinerová (1998) analyzes and compares the share of both foreign investment enterprises and domestic enterprises in total manufacturing output, allocation pattern, specialization and concentration; Hunya examines FDI impacts on competitiveness (Hunya, 2000) and on growth and restructuring in Central European transition countries (Hunya, 2002); while Kalotay (2010) examined the contribution of FDI to structural changes in different groups of transition countries. The identified positive effects of FDI stimulate countries to try to

attract more FDI inflows, especially SEE economies which suffer from the luck of domestic investments and resources and, therefore, have the huge need for foreign investments.

Further elaboration of the initial hypothesis leads us to the opinion that if FDI might bring improvements in countries' economies, FDI might also bring improvements in agriculture. A number of studies show the importance of FDI for a country's agriculture. Some of them suggests that in order to boost agricultural output and develop the sector as a whole more FDI should be sourced (Izuchukwu et al., 2012), some suggests that FDI inflows improve the international overall competitiveness of agricultural processing (Li, 2012), some shows that there is a positive relationship between agricultural growth and FDI in the short- and long-run (Ahmed et al., 2014), while some shows that there is long-term co-integration relationship between agricultural FDI and trade (Ping et al., 2009).

Furthermore, if SEE countries have common agricultural characteristics, within other macroeconomic characteristics, then FDI inflow might bring some common impacts on their agriculture. Therefore, the paper aims to identify these common features of SEE agricultural performances, including their limitations and constrains, in order to recognize the areas and aspects in which FDI might bring improvements. Also the paper's aim is to identify the types of improvements and in which segments they might be, concerning SEE countries' agricultural characteristics.

For the purposes of research, different methods have been used. For the first and second part of the research the comparative analysis of SEE countries and benchmarking of their macroeconomic and agricultural characteristics have been used. The third part of research applies analysis as a method of research of agricultural FDI volumes and shares in global and national FDI, trying to find out the tendencies in their movements. The fourth part implies deductive method going from general effects and impacts of FDI to their impacts on individual host country's agriculture. The fifth part of research is based on the synthesis method of research observations and induction method, going from individual SEE countries' agricultural constrains and FDI impacts to identification of general areas for SEE agricultural improvements through FDI.

## Research results and discussion

The **first part** of research, regarding **macroeconomic performances of SEE countries**, shows that these countries have many similar macroeconomic performances that can be seen through indicators of macroeconomic environment (Table 1). The observed five SEE countries are similar in the level of GDP per capita and in the level of GDP growth and GDP per capita growth. Except Albania, all have negative rates of the two indicators: GDP growth and GDP per capita growth. Inflation generally is not a problem, while Serbia's rate stands out. The foremost problem for all is unemployment, particularly in Macedonia (31%), but also in B&H (28%), Serbia (24%) and Montenegro (20%). Trade openness of SEE countries measured as total trade to GDP varies around value 1 (from 1.3 in Macedonia and 1.1 in Montenegro to 0.9 in Serbia and about 0.8 in Albania and B&H), while exports to GDP ratio exceeds one-third for all SEE countries. The region countries

are also characterized by higher values of import compared with export and considerable values of merchandise trade deficits (WTO, 2012). One more similarity is that all five observed SEE countries are in the EU accession process.

**Table 1.** Macroeconomic indicators of SEE countries

| Indicator | Albania | B&H | Macedonia | Montenegro | Serbia |
|---|---|---|---|---|---|
| Land area (sq. km) | 27,400 | 51,000 | 25,220 | 13,450 | 87,460 |
| Population (000) | 3,162 | 3,834 | 2,106 | 621 | 7224 |
| GDP (current US$) millions | 12,648 | 17,466 | 9,612 | 4,373 | 37,489 |
| GDP growth (annual %) | 1.6 | -0.70 | -0.27 | -0.54 | -1.7 |
| GDP per capita (current US$) | 3,999.9 | 4,555.6 | 4,565.3 | 7,041.2 | 5,189.6 |
| GDP per capita growth (annual %) | 1.34 | -0.56 | -0.35 | -0.61 | -1.22 |
| Inflation, consumer prices (annual %) | 2.03 | 2.05 | 3.32 | 3.18 | 7.33 |
| Unemployment (% of total labor force) | 14.09 | 28.1 | 31 | 19.6 | 23.9 |
| Trade (% of GDP) | 80.4 | 86.3 | 128.7 | 108.5 | 92.4 |
| Exports of goods and services (% of GDP) | 31.3 | 31.2 | 53.2 | 42.4 | 38.2 |

*Source:* data from WB database.

Regarding the degree of the transition process completion, seen through transition indicators of EBRD[3], SEE countries also show similar results (Table 2). The highest progress all SEE countries have in price liberalization and trade and foreign exchange system, reaching the indicators value of 4.0 or 4.3. The largest drop back for all is within governance and enterprise restructuring and competition policy with the indicators value of 2.0 or 2.3 (except 2.7 for Macedonia). In price liberalization SEE countries have reached the standard of market economies achieving the indicator value of 4.3 (Albania and Macedonia) and 4.0 (B&H, Montenegro and Serbia), while in trade and foreign exchange system the three of them have achieved the standard of market economy (Albania, Macedonia, Montenegro) and the other two (B&H and Serbia) are getting closer. In competition policy all SEE countries are away from the market economy with the smallest value of this indicator (2.3 for Albania, B&H and Serbia, 2.0 for Montenegro and 2.7 for Macedonia).

**Table 2.** Transition indicators of SEE countries

| Indicator | Albania | | B&H | | Macedonia | | Montenegro | | Serbia | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1989 | 2012 | 1989 | 2012 | 1989 | 2012 | 1989 | 2012 | 1989 | 2012 |
| Large scale privatization | 1,0 | 3,7 | 1,0 | 3,0 | 1,0 | 3,3 | 1,0 | 3,3 | 1,0 | 2,7 |
| Small scale privatization | 1,0 | 4,0 | 3,0 | 3,0 | 3,0 | 4,0 | 3,0 | 3,7 | 3,0 | 3,7 |
| Governance and enterprise restructuring | 1,0 | 2,3 | 1,0 | 2,0 | 1,0 | 2,7 | 1,0 | 2,3 | 1,0 | 2,3 |
| Price liberalisation | 1,0 | 4,3 | 2,7 | 4,0 | 2,7 | 4,3 | 2,7 | 4,0 | 2,7 | 4,0 |

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3    European Bank for Reconstruction and Development (EBRD) assesses progress in transition through a set of six transition indicators: large scale privatisation, small scale privatisation, governance and enterprise restructuring, price liberalisation, trade and foreign exchange system and competition policy. EBRD assesses progress in transition through this set of indicators which are used to track reform developments in observed countries since 1989. Progress is measured against the standards of industrialised market economies. The indicator values can range from 1 to 4+, where 1 represents little or no change from a rigid centrally-planed economy and 4+ represents the standards of an industrialised market economy.

| Indicator | Albania | | B&H | | Macedonia | | Montenegro | | Serbia | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1989 | 2012 | 1989 | 2012 | 1989 | 2012 | 1989 | 2012 | 1989 | 2012 |
| Trade & Forex system | 1,0 | 4,3 | 2,0 | 4,0 | 2,0 | 4,3 | 2,0 | 4,3 | 2,0 | 4,0 |
| Competition policy | 1,0 | 2,3 | 1,0 | 2,3 | 1,0 | 2,7 | 1,0 | 2,0 | 1,0 | 2,3 |

Source: data from EBRD database.

The processes that featured SEE economies in the last two decades such as transition, ownership transformation and restructuring have shaped their business environment and macroeconomic milieu and determined their attractiveness for foreign investors. The environment in which the goal was ownership transformation of state enterprises, while their privatization was being carried out under conditions which did not only allow this, but also stimulated the participation of foreign investors through investment incentives, in essence determined investment attractiveness of these countries. These are economies in which ownership transformation and privatization processes were the main channels of FDI inflows (Stojadinović Jovanović, 2013). FDI in SEE countries were featured by the trend of growth during the 2000s. The average level of FDI in these economies during 2000-2012 was from $310 million (Macedonia) to $512 million (Montenegro and B&H), $559 million (Albania) and $1,671 million (Serbia); while the total sum of received FDI, in the same period, was from $4 billion (Macedonia) to $6.6 billion (Montenegro and B&H), $7.3 billion (Albania) and to $21.7 billion (Serbia). The FDI inward stock in this period has also risen in all SEE countries (FDI data from UNCTAD database). The largest increase had Serbia (25 times), then Albania (20 times) and Macedonia (9 times). Serbia and Albania stand out regarding the average and the total sum of FDI inflows, as well as FDI stock increase (although the starting level of FDI stock in 2000 was very low).

In the **second part** of the research regarding **agricultural performances of SEE**, comparative analysis of SEE countries reveals many common agricultural features of these economies (Table 3). These economies are characterized by significant share of agricultural land in total land (38%-58%), similar share of arable land in total land (about 20%, except in Serbia and Montenegro which stand out with the highest and the lowest shares of 37% and 13% respectively), similar value of arable land per person (0.2-0.3 hectares per person, except Serbia where is 0.5), similar share of agriculture in GDP (about 10%, except Albania where is 22%) and similar agricultural employment (about 20%, while Albania and Montenegro stand out with the highest and the lowest share of 41% and 6% respectively). It is also observed that, besides well preserved and rich in biodiversity environment, there are many unfavorable features of SEE countries' agriculture (Table 3) which are:

- prevaling small average farm size;
- low productivity;
- low level of modernization;
- low level of investments caused by limited investment capacity and low interest for investments;
- low level of business activities;

- poorly developed infrastructure;
- low income and lack of alternative income sources.

**Table 3.** Findings for observed agricultural performances of SEE countries

| Agricultural performances | Albania | B&H | Macedonia | Montenegro | Serbia | Findings for SEE agriculture |
|---|---|---|---|---|---|---|
| Agricultural land (% of land area) | 44 | 42 | 50 | 38 | 58 | • significant share of agricultural land in total land |
| Arable land (% of land area) | 23 | 20 | 16 | 13 | 37 | • similar share of arable land in total land (~20%; Serbia and Montenegro stand out) |
| Arable land (hectares per person) | 0.2 | 0.3 | 0.2 | 0.3 | 0.5 | • similar value of arable land per person (Serbia stands out) |
| Agriculture, value added (% of GDP) | 22 | 8 | 10 | 9 | 10 | • similar share of agriculture in GDP (Albania stands out) |
| Employment in agriculture (% of total employment) | 41 | 20 | 17 | 6 | 21 | • similar share of agricultural labour in total labour (~20%; Albania and Montenegro stand out) |
| Average farm size (ha/farm) | 1.2 (over 80% are less than 2 ha) | 3.3 (50% are less than 2 ha) | 1.7 (90% are less than 2 ha) | 3.2 (over 60% are less than 2 ha) | 3.7 (over 40% are less than 2 ha) | • prevaling small average farm size |
| Agriculture value added per worker (constant 2005 USD) | 3,630 | 28,183 | 11,133 | 6,083 | 4,100 | • the productivity indicator shows the worst situation in Albania, then in Serbia; B&H has the most notable growth |
| Productivity | low productivity; underdeveloped irrigation and drainage systems; dominance of crop production; the smallest value of agriculture value added per worker | low productivity; dominance of crop production | low productivity; dominance of crop production; the fairly low level of irrigation (although the highest among SEE) | low productivity; the third smallest value (after Albania and Serbia) of agriculture value added per worker | low productivity; dominance of crop production; low level of irrigation; the second smallest value (after Albania) of agriculture value added per worker | • low productivity strenghtened by the dominance of crops prodution in the majority of the countries and the low share of irrigated land |
| Modernization | low level of modernization of agricultural holdings and processing industry | low level of modernization of agricultural holdings | low level of modernization of agricultural holdings | low level of modernization of agricultural holdings | low level of modernization of agricultural holdings | • low level of modernization |
| Interest for investments and investment capacity | low interest for investments in agriculture | limited investment capacity | limited investment capacity | limited investment capacity | limited investment capacity | • limited investment capacity |
| Business activities | poor marketing of products | low level of business activity in rural areas | low level of business activity in rural areas | low level of business activity in rural areas | low level of business activity in rural areas | • low level of business activities |
| Environment | well preserved and rich in biodiversity | well preserved and rich in biodiversity | well preserved and rich in biodiversity; soil and water sensitivity to erosion in some areas | well preserved and rich in biodiversity; natural spring water | well preserved and rich in biodiversity | • well preserved and rich in biodiversity |
| Rural areas | poorly developed infrastructure | poorly developed infrastructure; rich natural and cultural heritage | poorly developed infrastructure; rich natural and cultural heritage; multifunctional role of rural areas | poorly developed infrastructure; multifunctional role of rural areas | poorly developed infrastructure; rich natural and cultural heritage, multifunctional role of rural areas | • poorly developed infrastructure |
| Income and income sources | low income and lack of alternative income sources | low income and lack of alternative income sources | low income and lack of alternative income sources | low income and lack of alternative income sources | low income and lack of alternative income sources | • low income and lack of alternative income sources |

*Source:* Author's findings based on World Bank data; Mizik, 2012; Vujičić et al., 2012; Volk, 2010.

The **third part** of research reveals the small share of agricultural FDI in global FDI as well as in SEE countries' FDI and the decreasing **trend of** global and SEE countries' **FDI in agriculture**. Over the past decades, the tendency of relative declining investments in agriculture has been observed, although the absolute level of investment has been increasing. The global world economy has been characterized by structural changes, including increased share of manufacturing and services (especially services) in FDI and decreased share of agriculture. The partial explanation of declining agricultural share lies in agricultural neglect and underinvestment in it, in favour of other two sectors. Long-term trend of declining agricultural prices contributed to this, too.

Between 1989 and 1991, world FDI flows in agriculture were below $1 billion per year. In the period 2005-2007 they exceeded the value of $3 billion per year, while in the following periods (2007-2009, 2008-2010 and 2009-2011) their absolute amounts became double exceeding $6 billion (UNCTAD database). However, in spite of this tendency of absolute FDI growth in agriculture, they still make less than 1% of total world FDI inflows. Regarding the stock of FDI in agriculture, it is also observed very small and decreasing share in world inward FDI stock: from 0.4% in 1990 to 0.3% in 2009 and 2010 to 0.28% in 2011 (authors' calculations based on UNCTAD database; also in: Jovović et al., 2014). Therefore, these observations lead to the conclusion of insufficient agricultural attraction for foreign investments at the global level, as well as its declining importance.

At the level of individual countries, it is observed that share of agriculture in total FDI inflows, during the first decade of 21st century, was moving at the level of less than 1% to 15%. Furthermore the share of agriculture in total FDI stock is less than 1% in 21 countries of 40 developing countries observed[4]. Regarding SEE countries, the share of agriculture in total country's FDI inflows is also less than 1%, except in Macedonia where is slightly above 1%. The same situation is with FDI stock, where the share of agriculture in total FDI stock of these countries is also less than 1%, except in Macedonia where is slightly above 1% (data from UNCTAD database). The highest absolute value of FDI inflows in agriculture, among SEE countries, has Serbia (together with the highest total and agricultural area and highest population - Table 1 and Table 3), followed by Macedonia. There is also observed tendency of declining shares of agriculture in FDI inflows and FDI stock of SEE countries. This means that similar to the tendency on the global level, there is insufficient attraction of this sector at the level of individual countries, including SEE countries, and its declining importance.

The **fourth part** of research is devoted to the **general effects that FDI might have on agriculture,** revealing whether FDI can bring positive impacts and improvements in agriculture in general. Foreign direct investors may be directly involved in agricultural

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4    The observed countries are: Cambodia, Lao People's Democratic Republic, Malaysia, Ecuador, United Republic of Tanzania, Mozambique, Peru, Honduras, Indonesia, Ukraine, Ethiopia, Viet Nam, Vanuatu, Fiji, Chile, Costa Rica, Madagascar, Brazil, Islamic Republic of Iran, The FYR of Macedonia, Russian Federation, Jordan, China, Greece, Latvia, Estonia, Nicaragua, Romania, Lithuania, Republic of Moldova, Bulgaria, Poland, Serbia, Tunisia, Albania, Czech Republic, Mauritius, Mongolia, Egypt and Bangladesh.

production, establishing wholly-owned affiliate, but they also may be purchaser of agricultural products or suppliers of inputs to agriculture or distributors of agricultural products, or they may be involved in activities such as processing, merchandising or marketing. FDI participation in agriculture includes also the other related activities and companies such as manufacturers and food processors, retailers, wholesalers and suppliers of different kind of inputs (equipment, fertilizers and seeds). According to the different modes of foreign participation in agriculture, there are different impacts on the country's agriculture. Possible positive impacts of FDI on agriculture can be seen through the whole agribusiness value chains, and they can be summarized as shown in Table 4.

**Table 4 .** Possible positive FDI impacts on host country's agriculture

| Area od impact | Provision of inputs and supplying them to farmers | Agriculture production and operating plantations | Procuring farm produce and processing | Procuring processed products and distributing |
|---|---|---|---|---|
| Channels of impact | • Providing inputs (seeds, agrochemicals, machinery) to farmers • Conducting R&D | • Undertaking investment in agriculture production and operating plantations | • Introducing and implementing standards and coordinating the value chain • Selling in domestic markets and/or exporting in foreign markets | |
| Impacts on agriculture | • Transferring technology through provision of inputs • Influencing the agricultural innovation system | • Increasing investment and providing finance to farmers • Transferring technology by introducing new inputs and methods; and undertaking R&D • Influencing the quantity and quality of rural employment • Linkages within and beyond the agribusiness value chain, and various effects on the economy at large | • Promoting the commercialization and modernization of agriculture • Involving some farmers in the value chain and providing assistance to them • Enhancing access to foreign markets and promoting exports • Competitive effects at various stages in the value chain | |

Source: Authors' development based on UNCTAD, 2009.

Given the state of SEE agriculture and observed unfavourable features (Table 3), the importance of foreign direct investments in agriculture and the possible positive effects that FDI might bring comes to the fore for SEE countries (Table 4).

In the **fifth part** of research, synthesis of findings of the main common agricultural features and constrains of SEE countries, on the one side (Table 3), and possible positive impacts of FDI on country's agriculture, on the other side (Table 4), have resulted in the main research result – in the **identification of** potential **areas and ways for** SEE agricultural **improvements through FDI** (Table 5).

**Table 5.** Identification of potential areas and ways for improvements in SEE agriculture through FDI

| State of SEE agriculture: identified agricultural constraints -segment that needs improvement- (Findings from Table 3) | Potentials for agricultural improvements through FDI |
|---|---|
| prevaling small average farm size | • FDI, by purchasing and merging of small farms, may lead to agglomeration |
| low productivity | • FDI may increase productivity through transfer of technology by introducing new inputs and methods and conducting R&D<br>• FDI may influence the quantity and quality of rural employment<br>• FDI may bring competitive effects at various stages in the value chain |
| low level of modernization | • FDI can intensify the commercialization and modernization of agriculture<br>• FDI may lead to diffusion of international standards respecting quality and safety of agricultural products<br>• FDI may influence and upgrade the agricultural innovation system |
| low level of investment | • FDI can contribute to total capital inflows to agriculture<br>• FDI can increase investment and provide finance to farmers |
| low level of business activities | FDI may increase and upgrade business activities through:<br>• Involving farmers in the value chain and providing assistance to them<br>• Linkages within and beyond the agribusiness value chain: linkages with suppliers (backward linkages), linkages with customers (forward linkages) and with others that are not part of agribusiness value chain, producing various effects on the business activities and economy at large<br>• Enhancing access to foreign markets and promoting exports |
| poorly developed infrastructure | • Investment in infrastructure facilities (transport infrastructure, water supply, electrification etc.) to support FDI agricultural projects can benefit farmers in connected locations and promote rural development in general |
| low income and lack of alternative income sources | • FDI can increase the income of domestic farmers: those who are directly employed by foreign-invested plantations or those who are involved in different business schemes operated by foreign affiliates |

Source: According to authors opinion based on in paper listed references.

The final research result shows that there are potentials for agricultural improvements through FDI (Table 5) and they are following:

- the identified SEE agricultural constrain regarding prevaling small average farm size can be removed or reduced through FDI, as activities of foreign investors, by purchasing and merging of small farms, may lead to agglomeration;

- the identified low productivity in SEE agriculture can be increased by transfer of technology through FDI, research and development (R&D) conduction and introduction of new inputs and production methods, as well as by raising the quantity and quality of rural employment and also by increasing competitiveness at various stages in the value chain;

- the identified low level of modernization can be increased through commercialization and modernization of agriculture by FDI, which may lead to diffusion of international standards respecting quality and safety of agricultural products and an upgrade of the

agricultural innovation system;

- the identified low level of investment can be increased through FDI because FDI presents inflow of capital in the country and contributes to the total capital inflows to agriculture and also FDI can increase investments and provide finance to farmers;

- the identified low level of business activities can be increased and upgraded by FDI by involving farmers in the value chain and providing assistance to them or through backward (linkages with suppliers) and forward linkages (linkages with customers) within and beyond the agribusiness value chain or through enhancing access to foreign markets and promoting exports;

- the identified undeveloped infrastructure can be improved by investments in infrastructure facilities (transport infrastructure, water supply, electrification etc.), which would also bring benefits to farmers in connected locations and promote rural development in general;

- the identified constrain of low income and lack of income sources can be reduced or removed by FDI as FDI can increase the income of domestic farmers: those who are directly employed by foreign-invested plantations or those who are involved in different business schemes operated by foreign affiliates.

## Conclusion

The research, divided into several stages, has resulted in a number of findings. Researching the ambient in which the agriculture of selected five SEE countries takes place, by including indicators of macroeconomic performances of these countries, it has been observed that there are similarities in their macroeconomic environment. These similarities have been found in many macroeconomic indicators: in the level of GDP per capita, rates of GDP growth and GDP per capita growth, level of inflation, unemployment, trade openness and exports to GDP ratio, existence of merchandise trade deficits as well as the EU accession process. Also the similarities among these countries exist in the completion of the transition process, where SEE countries show many similar results. The highest progress all SEE countries have shown in price liberalization and trade and foreign exchange system, while the largest drop back all SEE countries have shown in governance and enterprise restructuring and competition policy. The privatization process was the main channel of FDI inflows into these countries which were featured by the trend of FDI growth during the 2000s'.

Researching the SEE agricultural characteristics, it has been observed that there are common characteristics of SEE countries' agriculture and especially common limitations and constrains that should be improved. The economies of these countries are featured by similar share of agricultural land in total land, share of arable land in total land, value of arable land per person, share of agriculture in GDP and agriculture employment and also by well preserved and rich in biodiversity environment. Further, many unfavourable features of SEE countries' agriculture have been detected, such as: prevaling small average farm size, low productivity, low level of modernization, low level of investments caused by limited

investment capacity and low interest for investments, low level of business activities, poorly developed infrastructure, low income and lack of alternative income sources.

Researching the level and volume of FDI in SEE agriculture, more precisely the share of agricultural FDI in global FDI and in SEE countries' FDI, the small share of agricultural FDI and the decreasing trend of global and SEE countries' FDI in agriculture have been observed. The past decades were featured by the tendency of relative declining investments in agriculture, although the absolute level of investments has been increasing. This reflects the insufficient attraction of agriculture for foreign investments at the global level, as well as its declining importance. The same tendency has been noticed on the level of SEE countries - insufficient attraction of this sector and its declining importance.

Researching the general effects that FDI might have on agriculture, it has been revealed that FDI can bring positive impacts and improvements in agriculture generally. These impacts can be found through all fazes (provision, production and procurement), involving the whole agribusiness value chain, and can be realized through various channels of impact.

Performing synthesis of the conducted research, comprehending the findings of the main common agricultural features and constrains of SEE countries, on one side, and possible positive impacts of FDI on agriculture, on the other, the research has shown that there are potentials for agricultural improvements of SEE countries through FDI. It has identified the areas and segments that need improvements and the potential ways to realize these improvements through FDI.

Therefore, the research conducted in the paper has confirmed the initial hypothesis stating that based on general improvements which FDI may bring in host countries' economies, the improvements which FDI may bring in agriculture can also be found. The paper has identified the specific areas and segments where these improvements may be realized through FDI. Accordingly the importance of FDI for SEE countries' agriculture arises precisely from the identified positive impacts that FDI inflow might bring in agriculture of these countries.

The research has also shown the low level of FDI in SEE agriculture, indicating that potentials which might come from FDI are not being used. Therefore, there is a need for a higher level of FDI in the sector in order to get capacity and possibility to use potential positive effects. The research has also suggested the direction in which FDI inflows in SEE should be directed, aiming to realize some of these positive impacts.

Furthermore the identification of potential areas and ways for significant agricultural improvements through FDI is not enough by itself. It is necessary to recognize these potential benefits from FDI inflow in agriculture by the governments and policy makers. This recognition is very important through national policy of FDI and through giving the impetus for FDI in agriculture and their adequate guidelines.

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# ZNAČAJ STRANIH DIREKTNIH INVESTICIJA ZA POLJOPRIVREDU ZEMALJA JUGOISTOČNE EVROPE

*Sandra Stojadinović Jovanović[5], Boban Dašić[6]*

## Rezime

*Kako je poljoprivreda strateški značajan sektor za privredni razvoj i rast, to je i svaki oblik stranog učešća u poljoprivredi, uključujući strane direktne investicije (SDI), značajan. Cilj rada jeste da razmotri da li postoje mogućnosti i potencijali za poboljšanja u poljoprivredi zemalja JIE putem SDI i u kojim segmentima. Stoga rad analizira poljoprivredne u okviru drugih makroekonomskih karakteristika privreda zemalja JIE kao i moguće uticaje SDI na poljoprivredu težeći da utvrdi da li postoje mogućnosti za poboljšanja u poljoprivredi putem SDI. Rezultati istraživanja, prezentirani u radu, ukazuju da strane direktne investicije imaju značajan potencijal za podršku i unapređenje performansi poljoprivrede zemalja SEE. Međutim, da bi se iskoristili ovi potencijalni pozitivni efekti potrebni su veći obimi SDI kao i prepoznavanje ovih potencijalnih koristi od priliva SDI u poljoprivredu od strane vlada i kreatora politika.*

***Ključne reči****: strane direktne investicije, zemlje JIE, poljoprivreda.*

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# MANAGEMENT OF HEALTH, SAFETY AND WELLBEING OF EMPLOYEES IN THE BUSINESS SYSTEM

*Dragić Živković[1], Saša Todorović[2], Ivana Bućan[3]*

## Summary

*Risk assessment and the implementation of measures for a healthy and safe work before the employee starts working, is the basic principle of the prevention of occupational injuries, occupational diseases and diseases related to work.*

*Bearing that in mind, the goal of this paper is to describe the activities of employers and employees in the field of health, safety and wellbeing of employees in a particular business system as well as to measure progress in safety management by analysing data on occupational injuries, occupational diseases and diseases related to work.*

*The research conducted in this paper is based on information and data collected from the public company "Vojvodinašume" and on the description from literature sources. For the purpose of processing the collected data, we used descriptive statistical methods and the data proper are presented graphically and in tabular form in order to facilitate analysis and comparison.*

*Results of the research showed that the number of occupational injuries in the public company "Vojvodinašume" in the period from 2004 to 2013 reduced, particularly the number of minor injuries. However, the public company "Vojvodinašume", in addition to reducing the number of minor injuries, is obliged to eliminate major and fatal occupational injuries, as well as to enable effective prevention of the occurrence of occupational diseases and diseases related to work.*

***Key words:*** *health, safety, wellbeing, business system, injuries.*

***JEL:*** *Q23, J81, K32, L73, M54*

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## Introduction

Human resources management in today's modern business represents one of the key factors of survival and development of any business system, as well as the most important and valuable resource which is available.

The concepts of health and safety are closely related, but a difference must be made between them. Health is a broader concept than the concept of safety, and it is difficult to give its precise definition. Most commonly, health is defined negatively, as the absence of disease, injury or mental or emotional problems, which can reduce the normal activity of people. A negative definition is not a true definition, but health maintenance refers to the maintenance of the overall wellbeing of the individual. Safety usually refers to physical, not mental or emotional wellbeing of an individual. The wellbeing, on the other hand, includes not only the questions of the physical conditions in which the employees work, but also a way of thinking about dealing with people, which is attributed to the view that a worker who is satisfied with the job is more productive (Živković, 2012).

Workers are fully aware of the importance of health, safety and wellbeing because it refers to their life and future, and therefore they lead a fierce campaign to raise awareness of employers of the importance of these issues.

Within the business system, it is possible to identify four key areas that form the framework for the emergence of difficulties and health problems in the workplace (Orlić, 2005):

- environmental factors (noise, poor lighting, poor ventilation, poor temperature control, unpleasant fumes, smoking, too many people, isolation, vibration, poorly designed furniture or equipment, inadequate nutrition, etc.);

- factors of the work design (poorly designed work, conflicting goals, role conflict, too much or too little work, monotonous and repetitive work, underestimation of skills, too little or too much supervision, lack of involvement in decision-making, permanent seating, inadequate breaks, etc.);

- factors of the employment contract (low salary, shift work, overtime work, job insecurity, unfair procedures related to promotion, lack of recognition, etc.) and

- interpersonal relations (poor relationship with colleagues, national or religious discrimination, poor communication, customer and consumer complaints, etc.).

Occupational injuries and diseases may cause considerable costs to society and companies, and when costs are taken into account, mining, construction, forestry and transportation are on the top of the list (Lebeau et al., 2014). Forestry in general and logging in particular are still among the three most hazardous sectors in European countries (Cabeças, 2007). In addition, a significant correlation between the lack of experience of workers and a higher accident rate was found (Wang et al., 2003; Bentley et al., 2002; Shaffer and Milburn, 1999; Lefort et al., 2003).

Faced with this problem in the business system, many employers today are trying to help employees to overcome difficulties that lead to health deterioration. Although no single method guarantees that the difficulties will be reduced, certain strategies can help in

managing and improving the health of employees.

Help and improving of the health and wellbeing of employees comprise the education of employees on safety at work. Regardless of a technological advancement, forestry work remains the one of the most dangerous activities, particularly when workers do not receive proper training (Klun and Medved, 2007). Training on safety at work aims to communicate the nature of workplace risks to employees so as, to raise their awareness of the rules and procedures of safety and to make them behave in accordance with these rules. This education can be carried out separately, or as a part of a broader programme, including lectures, discussions, films, exercises with role plays, posters and the like. Disciplinary measures can also be imposed in case of violation of safety rules. Occupational health and wellbeing are a broad area, which includes physical and mental wellbeing, and therefore emphasizes the need for constant upgrading and improvement of training on occupational safety.

However, learning depends on previous knowledge available, quality and nature of previous education as well as on how developed the capacity for learning is. There are different types of learning which require different methods and approaches of lecturers. Compared to the previous period, activities related to the treatment of employees may be less relevant today for those who deal with human resources, but they are still important (Torrington et al., 2004).

The main purpose of effective safety programmes in the organization is to prevent injuries and accidents at work (Miletić, 2013). The focus of policies related to the health and safety of personnel is safe interaction between employees and work environment. The system of health and safety at work involves the interaction of several different factors such as: legislation, inspection, insurance, technical knowledge and solutions, occupational health services and health protection, notifying, education, research and other (Martinović and Tanasković, 2014). All the factors that arise in the work process in the workplace and in the work environment, which could cause serious occupational injury or damage to health, that is, illness of an employee, represent dangers and harms in terms of regulations on safety and health at work. Risk assessment and the implementation of measures for a healthy and safe work before the employee starts the working, is the basic principle of prevention of injuries at work, occupational diseases and diseases related to work. The perception of risk is of crucial importance for workers, since it prevents workers from exposing themselves to unnecessary risks, therefore, it is an essential element of training and preventive measures (Albizu-Urionabarrenetxea et al., 2013).

Bearing that in mind, the goal of this paper is to describe the activities of employers and employees in the field of health, safety and wellbeing of employees in a particular business system as well as to measure progress in safety management by analysing data on occupational injuries, occupational diseases and diseases related to work.

## Method of research and sources of data

The research conducted in this paper is based on information and data collected from the public company "Vojvodinašume" (hereafter PC "Vojvodinašume") and on the description from literature sources.

Information was obtained primarily through personal communications, that is, interview. The interview was conducted with the employed persons in the Service for General and Personnel Affairs and the Sector for Development and Informatics, responsible for human resources management. By talking to the respondents, information about their experiences in doing the job as well as about the company policy in terms of human resources management, referring in particular to the development and issues of health, safety and wellbeing of the employees was gathered. Similarly, their assessments of the situation and prospects for the future are presented. In addition to the interview with the employed persons in the company, data from internal company records were also collected. The analysis of literature sources has come to certain conclusions and attitudes related to the observed area of human resources management.

For processing the collected data, we used descriptive statistical methods and the data proper are presented graphically and in tabular form in order to facilitate the analysis and comparison.

### Results of the research and discussion

The PC "Vojvodinašume" based in Petrovaradin was founded in 2002 with the aim to integrally manage forests and manage protected natural areas and hunting grounds in accordance with the principles of sustainable development and profitability by increasing forestation and improvement of the existing forest fund of AP Vojvodina. PC „Vojvodinašume" belongs to huge companies with a complex organisational structure *Scheme 1.*

**Scheme 1.** The organisational structure of PC ''Vojvodinašume"



*Source:* www.vojvodinasume.rs

The number of the employees in 2014 amounted to 1,580, while the plan is to have 1,560 employees in 2015. The largest number (over 50%) are workers with low skills, therefore,

special attention should be paid to their professional training for the tasks they perform, which is one of the most important preconditions for safe work (*Graph 1*).

**Graph 1.** The educational structure of the employees in the PC ''Vojvodinašume''
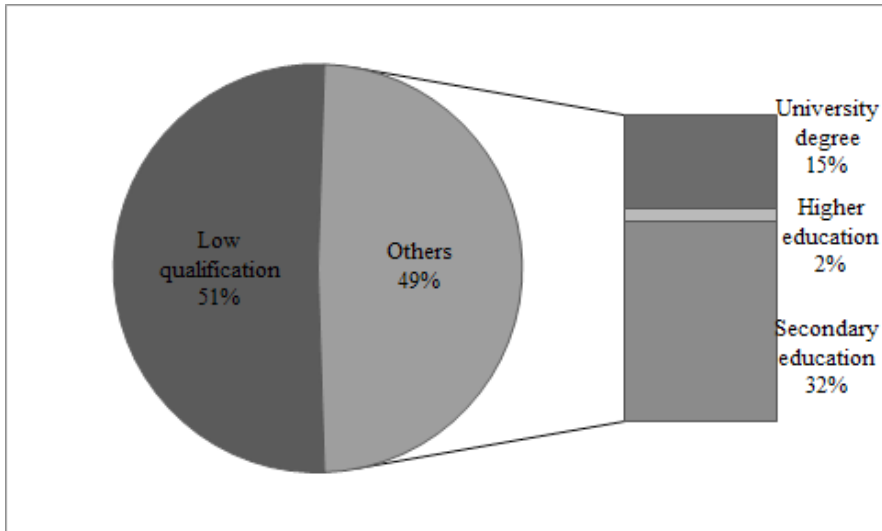


*Source:* The calculation of the authors on the basis of internal documentation of the PC "Vojvodinašume"

The governing bodies of the company are (Nonić, 2010):

- Managing Board, which consists of 11 members (of which 5 are representatives of companies), and it is appointed by the Assembly of AP Vojvodina;
- Supervisory Board, which consists of 5 members (of which 2 are representatives of companies), and it is appointed by the Assembly of AP Vojvodina;
- Company Director appointed by the Assembly of AP Vojvodina and
- Executive Board of Directors, which is an auxiliary executive board of directors and the members of which, as a rule, are assistant directors and heads of departments.

The activity of the PC "Vojvodinašume" is such that it requires an ongoing commitment and support to the creation of safe working conditions by the management. Improving all segments of operations of PC "Vojvodinašume", for the purpose of ecologically sound, socially just and cost-effective management of forest resources, also means an ongoing commitment and support to the creation of safe and healthy working conditions.

Following changes in the legislation, which was introduced the *Act on Safety and Health at Work* in 2005, PC "Vojvodinašume" adopted general and specific acts, that are consistent with new legislation and by-laws. The most important of these is *Regulations concerning Safety and Health at Work*, adopted in 2006, and within it the following programmes and decisions:

- *The programme of training employees for safe and healthy work*;
- *The training programme for employees for first aid*;
- *The decision on the scope, manner and deadlines, inspection and testing of equipment for the work, the process of their maintenance in good condition and keeping records of their maintenance* and
- *The decision on the cases and way of checking employees under the influence of alcohol and other addictions*.

Special emphasis is given to the adoption of *Act of risk assessment for all work places in a working environment*, which was one of the basic requirements of the new law. Risk assessment is the systematic recording and evaluation of all factors in the work process which can cause occupational injuries, diseases or damage to the health of employees and determining possibilities, that is, ways to prevent, eliminate or reduce risks. PC "Vojvodinašume" also operates, controls and monitors health and safety at work on the basis of and in accordance with the following most important laws and regulations of the Republic of Serbia:

- *Law on safety and health at work* ("Off. Gazette of RS", no. 101/05);
- *Law on fire protection* ("Off. Gazette of RS", no. 111/09);
- *Regulations on preventive measures for safe and healthy work at the workplace* ("Off. Gazette of RS", no. 21/09);
- *Regulations on preventive measures for safe and healthy work when using the means and equipment for personal protection at work* ("Off. Gazette of RS", no. 92/08);
- *Regulations on the inspection and testing of work equipment and testing of working environment conditions* ("Off. Gazette of RS", no. 94/2006, 108/2006 - corr. and 114/2014);
- *Regulations on the content and manner of issuing the report form on occupational injury, occupational disease and disease related to work* ("Off. Gazette of RS", no. 72/06, 84/06 - corr.);
- *Regulations on general measures of protection at work from the hazardous effects of electricity in buildings intended for work, and working premises on site* ("Off. Gazette of SRS" no. 21/89);
- *Regulations on special measures for protection at work in forestry* ("Off. Gazette of SRS" no. 33/88);
- *Regulations on equipment and procedures for first aid and organizing rescue service in case of an accident at work* ("Off. Gazette of SFRY", no. 21/71);
- *Regulations on special measures for protection at work in the mechanical processing and processing of wood and similar materials* ("Off. Gazette of SRS" no. 51/88);

- *Regulations on safety and health at work on temporary or mobile construction sites* ("Off. Gazette of RS", no. 14/09 and 95/2010) and
- *Regulations on preventive measures for safe and healthy work in case of manual handling of loads* ("Off. Gazette of RS", no. 106/09).

Health and safety at work of all employees are always a priority, especially of contractors, who are an important segment in business operations of the company. Contractors in forestry, carrying out the following work: in the production of wood assortments (harvest, production and transport), the construction of forest roads, silviculture and forest protection and the like, must meet the requirements in accordance with the *Law on safety and health at work*, *Regulations on special measures for protection at work in forestry* and other laws and by-laws. They must also meet the requirements in terms of technical equipment and personnel for performing work. In order to get acquainted with the dangers and hazards during performing of cutting, making and attraction of wood assortments, PC "Vojvodinašume" delivers, upon signing the contract, to every contractor *Study on planning and performing works on using forests*.

In this way, employers are obliged to provide their workers as much as possible in the practice with health, safety and wellbeing at work. On the other hand, the duty of the employees is to take care of their own safety and the safety of others at work, as well as of health, which appears to be a more difficult form of responsibility for the individual.

Therefore, the mutual work of employers and employees is necessary for the purpose of improving this area by supporting, in full measure, legislation in the field of safety and health at work, raising awareness in this field, improving knowledge and skills, and establishing a culture of work and creation of preconditions for wellbeing.

Recognizing the importance of safety and health at work, PC "Vojvodinašume" obliged the directors of forest holdings to inform all employees and contractors doing the jobs concerning forest use about the importance of safety and protection at work. All the workers while carrying out their works are obliged to comply with certain safety rules, and the most important are:

- to be trained for work and safe work with a tool they handle as well as medically fit to perform tasks with increased risk, as determined by the competent services of occupational medicine;
- to use, during work, means and equipment for personal safety at work (protective helmet, protective clothing, shoes, gloves, etc.);
- to use the means for the work (chainsaws, tractors, transport means, etc.) that comply with the prescribed measures for safe and healthy work, ensuring the control of their use in accordance with the purpose and
- to possess medical supplies for first aid at the site, to be trained for first aid, as well as to provide transportation to the nearest health facility in case of injury or illness of workers.

Within the company, there are Officers for safety and health at work, who perform control and professional supervision over the implementation of measures and safety regulations at work and propose measures for eliminations of observed shortcomings. In exercising control and supervision, the officer in charge of safety and health at work may prohibit the work in the workplace or the use of means for the work in the case when an immediate threat to life or health of the employee is determined.

Every company must follow the efforts aimed at the achievement of safety and health in the workplace, and periodic reports should be written (Terzić, 2012). Statistics on accidents and injuries at work should be compared over time to see the changes that have occurred. Using this analysis, we can measure progress in safety management. Regarding that, contractors in PC "Vojvodinašume" are obliged to report occupational injuries to competent labour inspection and the competent authority for internal affairs in accordance with Article 50 of *Law on Safety and Health at Work* as well as to the manager of worksite of PC "Vojvodinašume" so that records on injuries could be kept. The company has an obligation to comply with certain standards keeping records on occupational injuries of all workers engaged.

Analysis of the total number of occupational injuries in PC "Vojvodinašume" per year in the period from 2004 to 2013 shows that the total number of injuries at the end of the observed period almost halved (*Graph 2*).

**Graph 2.** The trend of the total number of occupational injuries in PC "Vojvodinašume" in the period from 2004 to 2013



$$y = 0.7083x^2 - 15.216x + 155.52$$
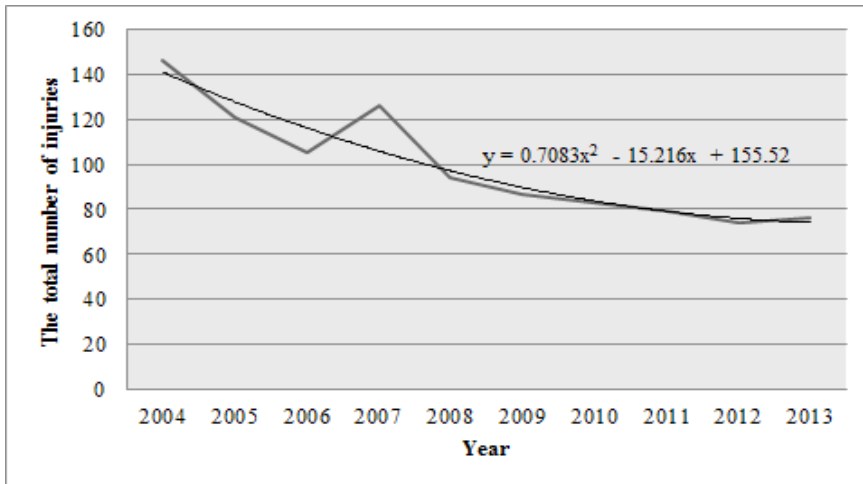
*Source:* The calculation of the authors on the basis of internal documentation of PC "Vojvodinašume"

Based on the statistical analysis of data time series on the total number of occupational injuries in PC "Vojvodinašume" in the reporting period, it can be concluded that the trend of the total number of occupational injuries is decreasing.

Regarding the total number of injuries per each year, minor injuries have the highest percentage of participation (over 85%) (Graph 3).

**Graph 3.** The structure of the occupational injuries in PC "Vojvodinašume" per year in the period from 2004 to 2013
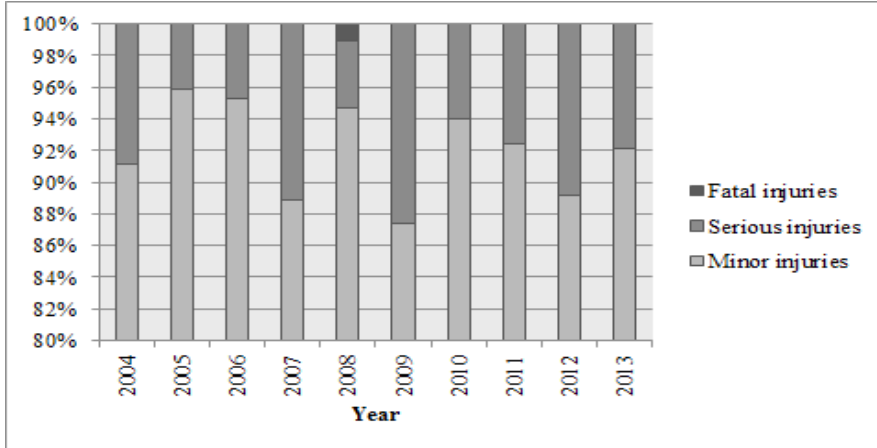


*Source:* The calculation of the authors on the basis of internal documentation PC "Vojvodinašume"

On the basis of the analysis of data time series on the total number of minor occupational injuries in PC "Vojvodinašume" in the reporting period, it can be concluded that the trend of the total number of minor occupational injuries shows the noticeable decline (Graph 4).

**Graph 4.** The trend of the total number of minor occupational injuries in PC "Vojvodinašume" in the period from 2004 to 2013



$$y = 0.678x^2 - 14.531x + 145.12$$
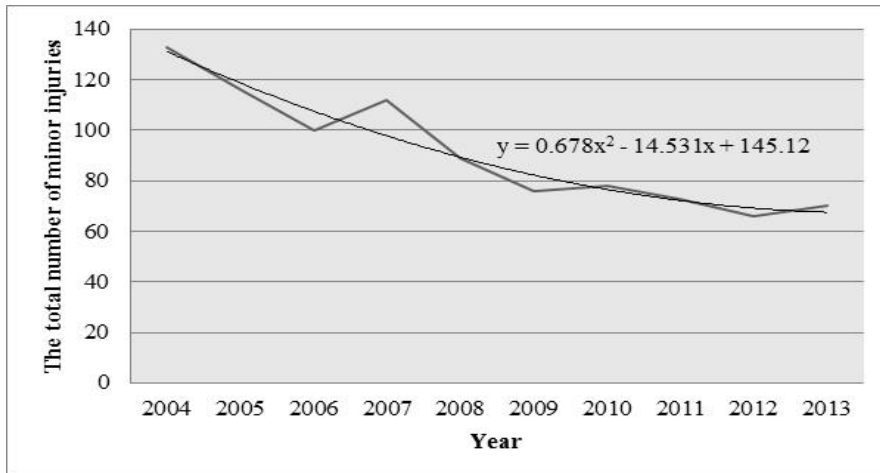
*Source:* The calculation of the authors on the basis of internal documentation of PC "Vojvodinašume"

In contrast to this indicator, the trend of the total number of serious injuries in PC "Vojvodinašume" in the reporting period, does not have a significant tendency to decline, but the injuries are, however, reduced (Graph 5).

**Graph 5.** The trend of the total number of serious occupational injuries in PC "Vojvodinašume" in the period from 2004 to 2013
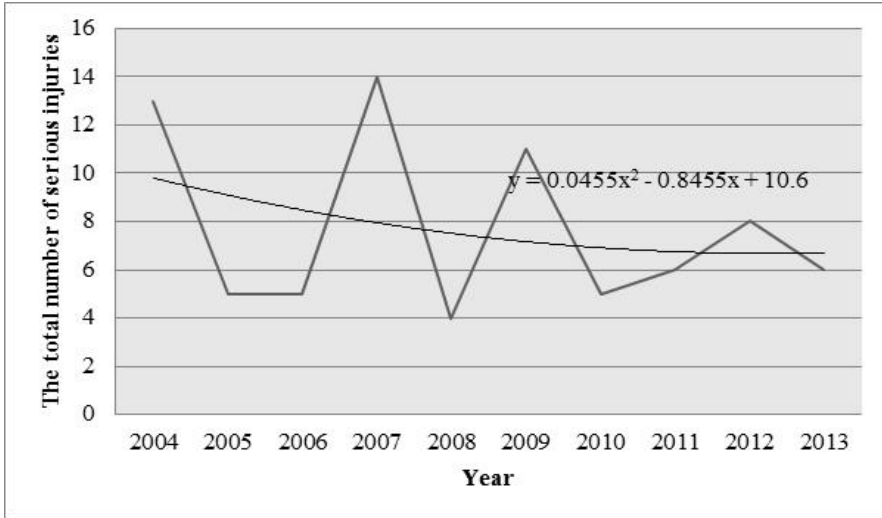


$$y = 0.0455x^2 - 0.8455x + 10.6$$

*Source:* The calculation of the authors on the basis of internal documentation of PC "Vojvodinašume"

**Graph 6.** The structure of the total number of occupational injuries in PC "Vojvodinašume" for the period from 2004 to 2014
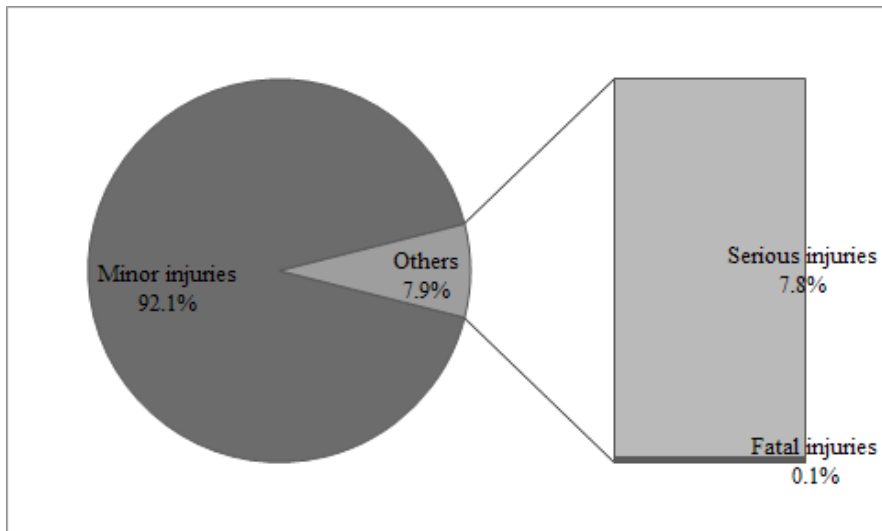


*Source:* The calculation of the authors on the basis of internal documentation of PC "Vojvodinašume"

Observing the entire period of research from 2004 to 2013 in PC "Vojvodinašume", a total of 991 injuries occurred involving lumberjacks, tractor drivers and drivers of a tractor with crane, construction machinery drivers, forestry workers and other workers while in 2008, 1 person was tragically injured (fatal injuries). The largest number of injuries were with minor consequences (92.13% or 913 injuries), while 7.77% or 77 injuries were with severe consequences (*Graph 6*).

Statistical analysis showed that in the period of investigation from 2004 to 2013 in PC "Vojvodinašume", there were averagely of 99.1 occupational injuries per year, of which most were minor injuries of 91.3, while there were averagely 7.7 serious injuries per year. It should be noted that of the total number of injuries 1.21% or 12 injuries were occupational which resulted in occupational diseases which is averagely 1.2 such injuries per year.

**Table 1.** The most common causes of occupational injuries in PC "Vojvodinašume" in the period from 2004 to 2013

| Year | Chainsaw | Inattention of workers | Other means for work | Total number of injuries |
|---|---|---|---|---|
| 2004 | 16 | 97 | 33 | 146 |
| 2005 | 20 | 87 | 14 | 121 |
| 2006 | 11 | 74 | 20 | 105 |
| 2007 | 16 | 64 | 46 | 126 |
| 2008 | 15 | 53 | 26 | 94 |
| 2009 | 4 | 47 | 36 | 87 |
| 2010 | 6 | 49 | 28 | 83 |
| 2011 | 4 | 51 | 24 | 79 |
| 2012 | 7 | 49 | 18 | 74 |
| 2013 | 8 | 53 | 15 | 76 |
| *Min* | *4* | *47* | *14* | *74* |
| *Max* | *20* | *97* | *46* | *146* |
| *Average* | *10.7* | *62.4* | *26* | *99.1* |
| *Total* | *107* | *624* | *260* | *991* |
| *Structure* | *10.8%* | *63.0%* | *26.2%* | *100.0%* |

*Source:* The calculation of the authors on the basis of internal documentation of PC "Vojvodinašume"

Based on these data, it can be concluded that the number of occupational injuries in PC "Vojvodinašume" in the period from 2004 to 2013 decreased. The reason for reducing the number of injuries, is not only the impact of the human factor, but also the impact of factors of improving the technical characteristics of modern machinery and equipment, which are increasingly present in forestry production, as well as the laws and regulations of the Republic of Serbia in accordance with which PC "Vojvodinašume" also operates and

controls and monitors safety and health at work. However, working with forest machines and equipment has severe and tragic consequences, usually because the operators do not operate according to the rules and regulations that exist and that are not sufficiently and consistently respected. This is supported by the fact that, on average, 63% of total occupational injuries in the observed period are caused by inattention of workers (*Table 1*).

The qualification of workers for the work they perform is one of the most important preconditions for safe operation. Therefore, the company must pay even more attention to vocational training and worker training, so that the injuries caused by inattention of workers decrease.

When it comes to workplaces with the highest rate of injuries, according to the records of the company, most of the occupational injuries in the period from 2004 to 2013 were observed in lumberjacks (almost half of all occupational injuries), followed by forestry workers and other workers (*Table 2*).

**Table 2.** The working positions with the most injuries in PC "Vojvodinašume" in the period from 2004 to 2013

| Year | Lumberjack | Tractor driver | Drivers of the tractor with crane | Drivers of construction machinery | Forestry workers | Other workers | Total number of injuries |
|------|-----------|---------------|-----------------------------------|-----------------------------------|------------------|---------------|--------------------------|
| 2004 | 85 | 8 | 10 | 5 | 22 | 16 | 146 |
| 2005 | 65 | 8 | 11 | 0 | 13 | 24 | 121 |
| 2006 | 58 | 9 | 7 | 2 | 18 | 11 | 105 |
| 2007 | 51 | 13 | 3 | 0 | 34 | 25 | 126 |
| 2008 | 54 | 8 | 4 | 0 | 16 | 12 | 94 |
| 2009 | 30 | 12 | 1 | 1 | 22 | 21 | 87 |
| 2010 | 20 | 9 | 1 | 0 | 24 | 29 | 83 |
| 2011 | 18 | 10 | 1 | 0 | 28 | 22 | 79 |
| 2012 | 33 | 5 | 4 | 0 | 11 | 21 | 74 |
| 2013 | 36 | 7 | 0 | 1 | 15 | 17 | 76 |
| *Min* | *18* | *5* | *0* | *0* | *11* | *11* | *74* |
| *Max* | *85* | *13* | *11* | *5* | *34* | *29* | *146* |
| *Average* | *45* | *8.9* | *4.2* | *0.9* | *20.3* | *19.8* | *99.1* |
| *Total* | *450* | *89* | *42* | *9* | *203* | *198* | *991* |
| *Structure* | *45.4%* | *9.0%* | *4.2%* | *0.9%* | *20.5%* | *20.0%* | *100.0%* |

*Source:* The calculation of the authors on the basis of internal documentation of PC "Vojvodinašume"

Taking into account the fact that lumberjacks and forest workers have the largest share in the total number of injuries, i.e., workers in the field (in the woods), performing mostly dangerous and difficult physical labours, parts of the body that are mostly injured are the legs and arms (*Table 3*).

**Table 3.** The parts of the body that are mostly injured in PC "Vojvodinašume" in the period from 2004 to 2013

| Year | Head | Thorax | Arms | Legs | Other parts of the body | Total number of injuries |
|---|---|---|---|---|---|---|
| 2004 | 22 | 33 | 35 | 56 | 0 | 146 |
| 2005 | 23 | 22 | 36 | 40 | 0 | 121 |
| 2006 | 21 | 10 | 14 | 50 | 10 | 105 |
| 2007 | 15 | 7 | 40 | 52 | 12 | 126 |
| 2008 | 17 | 11 | 19 | 43 | 4 | 94 |
| 2009 | 13 | 4 | 25 | 36 | 9 | 87 |
| 2010 | 13 | 5 | 30 | 30 | 5 | 83 |
| 2011 | 13 | 2 | 30 | 27 | 7 | 79 |
| 2012 | 12 | 8 | 17 | 27 | 10 | 74 |
| 2013 | 6 | 16 | 18 | 25 | 11 | 76 |
| *Min* | *6* | *2* | *14* | *25* | *0* | *74* |
| *Max* | *23* | *33* | *40* | *56* | *12* | *146* |
| *Average* | *15.5* | *11.8* | *26.4* | *38.6* | *6.8* | *99.1* |
| *Total* | *155* | *118* | *264* | *386* | *68* | *991* |
| *Structure* | *15.6%* | *11.9%* | *26.6%* | *39.0%* | *6.9%* | *100.0%* |

*Source:* Internal documantation of PC ''Vojvodinašume''

## Conclusion

Results of the research showed that the number of occupational injuries in the PC "Vojvodinašume" in the period from 2004 to 2013 reduced particularly the number of minor injuries. However, the PC "Vojvodinašume", in addition to reducing the number of minor injuries, is obliged to eliminate major and fatal occupational injuries, as well as to enable effective prevention of the occupational diseases and diseases related to work.

Statistics on accidents and injuries at work is useful for determining the need for training in this area, and making sure that security policies are in line with existing and new standards set by the state. As the professional competence of workers for the work they perform is one of the most important preconditions for safe operation, great attention is paid to the professional training of workers - contractors in jobs such as lumberjack, forest tractor operator and operator of crane mounted on a truck. In cooperation with the forestry schools, in 2014, this training was attended by about 800 employees - contractors, who gained *Certificate* that they are qualified to perform these operations. However, taking into account the above information about the most common causes of occupational injuries, and that is inattention of workers, a company must devote greater attention to vocational training and training on occupational safety. This does not only fulfil a legal obligation, but also significantly affects the reduction

of the risk of occupational injuries, because the professional qualification and training on occupational safety is one of the basic requirements for safe operation. Managers and personnel specialists should constantly work on improving and developing a safe and healthy work environment for all employees. This is especially important, given that the activity of PC "Vojvodinašume" is such that it requires an ongoing commitment and support to the creation of safe working conditions by the management. In this regard, the most important document that regulates safety and health system is *Regulations on safety and health at work*, adopted in 2006 and *Risk assessment act for all workplaces in the working environment*. In this matter, the control and professional supervision over the implementation of measures and regulations in occupational safety within the company are performed by the officers for safety and health at work.

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# MENADŽMENT ZDRAVLJA, BEZBEDNOSTI I DOBROBITI ZAPOSLENIH U POSLOVNOM SISTEMU

*Dragić Živković[4], Saša Todorović[5], Ivana Bućan[6]*

### Rezime

*Procena rizika i primena mera za zdrav i bezbedan rad pre početka rada zaposlenog na radnom mestu, jeste osnovni princip prevencije od povreda na radu, profesionalnih oboljenja i oboljenja u vezi sa radom.*

*Imajući to u vidu, cilj ovog rada je da prikaže aktivnosti poslodavca i zaposlenih u oblasti zdravlja, bezbednosti i dobrobiti zaposlenih u konkretnom poslovnom sistemu i da se analizom podataka o povredama na radu, profesionalnim oboljenjima i oboljenjima u vezi sa radom izmeri napredak u upravljanju bezbednošću.*

*Sprovedena istraživanja u ovom radu zasnovana su na informacijama i podacima prikupljenim iz javnog preduzeća „Vojvodinašume" i na opisu iz literaturnih izvora. Za obradu prikupljenih podataka korišćeni su deskriptivni statistički metodi, a sami podaci predstavljeni su grafički i tabelarno u cilju njihove lakše analize i komparacije.*

*Rezultati sprovedenog istraživanja pokazali su da se broj povreda na radu u javnom preduzeću "Vojvodinašume" u periodu od 2004. do 2013. godine smanjio i to naročito lakih povreda. Međutim, javno preduzeće "Vojvodinašume" pored smanjivanja broja lakših povreda, ima posebnu obavezu da eliminiše teže i smrtne povrede na radu, kao i da omogući da efektna preventiva spreči pojavu profesionalnih oboljenja i oboljenja u vezi sa radom.*

***Ključne reči:*** *zdravlje, bezbednost, dobrobit, poslovni sistem, povrede.*

**JEL:** *Q23, J81, K32, L73, M54*

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# ECONOMIC SUBSIDIES IN AGRICULTURE

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## Summary

*The funds allocated to agriculture are a significant part of economic transfers. A large part of the EU budget is directed to agriculture, and the average amount of subsidies in the EU-27 was, in 2013, approximately € 330 per hectare. Agriculture subsidies comprise about 60% of total subsidies in the EU. Situation in Serbia is not as good as in the EU because the subsidies per hectare are three times lower, and a subsidy to agriculture stands slightly above 30% of total subsidies, but with a tendency to increase over the past two years.*

*This paper, through a comparative analysis of public expenditures for agriculture in Serbia and the EU countries (both developed countries and the countries in our immediate surroundings), shows the relevance and importance given to agriculture, due to its development opportunities. Serbian agriculture can be the engine of economic development and this is supported by the fact that the projection of expenditures for agriculture in the medium term has a tendency to rise.*

***Keywords****: agricultural subsidies, budgets, Serbia, EU.*

**JEL**: *Q14.*

## Introduction

Current economic conditions characterized by globalization, scientific and technological development, disturbing ecological situation and unfavourable demographic trends are setting new budgetary challenges that require effective implementation of budgetary policy. This requires maximum budget savings, rationalization of expenditure of funds, maximum budget control and innovation in the design of public needs and budget spending. Public expenditures through which funds are provided for certain categories of the population, but also for social and economic activities of the state, take an extremely important role in budget policy. These are transfer public expenditures that redistribute

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already created social product by transferring funds from one part of a population or economy to another part of the population or economy.

The most important category of transfer spending are transfers with social purposes (social security benefits, disability benefits, unemployment insurance), transfers to economic purposes (corporate subsidies, grants, premiums, compensation, reimbursements), interest on the public debt (repayment of public loans) inter-budget (inter-financial) transfers and transfers abroad.

Transfers to economic purposes are now present in the public finances of many modern states, and are a part of financial policy whose main task is achieving certain objectives of economic policy. Transfers for economic purposes appeared in the financial on policies in the early twentieth century and their increase is particularly manifested during the First World War, during the Great Depression in thirties, during the Second World War, and particularly during the economic recession in the last decades of the twentieth century. The structure of economic transfers and transfer expenditure to economic purposes consists of donations, subsidies, bonuses, reimbursements, compensation, export primes and the like. Subsidizing of prices, agriculture reimbursement, bonus payment export, subsidy of geographical distribution of productive forces, subsidizing transport as well as other industries are all expressions of interventionist economic policies of modern states in the industrialized and developing countries (Đurović Todorović et al., 2006).

In this paper, special emphasis is put on the transfer of economic purposes, especially on the transfers in the field of agriculture.

## Materials and methods

The main goal of this research was to analyse the subsidy scheme for agriculture in Serbia and selected EU countries, and to present and determine its implications and trends for the future.

In order to realize the objective of the research and in order to establish causal relationships of the phenomena investigated, secondary data sources such as data published by national and international institutions (Ministry of Finance and Agriculture and the statistics of the EU), along with the use of published scientific and professional papers, have been used.

Used data include transfers with economic purposes in total and especially transfers for investments and transfers for intervention in the economy in 2013. Data of subsidies relate to total subsidies and especially subsidies for agriculture. Within subsidies in agriculture, subsidies were analysed for direct aid to farmers, rural development and market measures in 2012. In the period from 2003 to 2013. the trends were given for subsidies from the budget of the Republic of Serbia and their structure.

On the basis of collected data, a combination of scientific methods that best fit the defined goal of the research have been applied in this paper: an interdisciplinary approach, the historical method, inductive method, deductive method, the method of analysis and synthesis, as well as the method of description and comparison.

## Results and discussion

*Structure of economic transfer*

Economic transfers are the funds from the budget used for the construction of commercial buildings, for enhancing exports, encouraging production, improvement of living standards, environmental protection etc. They may occur in the form of investment in economy and intervention in economy (various forms of export incentives, compensation, reimbursements, bonuses, subsidies, grants) (Babić, 2013).

Out of total public expenditure in the EU, in 2013, an average of only 1.2% of GDP was invested in the intervention in economy, while the capital investment was 2.2% of GDP. Economies of the EU countries are still having problems that are a consequence of the economic crisis, so that those allocations are at very low levels.

The following table (Table 1) shows that out of the observed EU countries in 2013, more funds for transfers to the economic purposes were allocated to the countries of Central and Eastern Europe than to those of Western Europe, with larger amounts allocated for investments rather than for the intervention in the economy. The largest investments were in Bulgaria, Hungary, Poland and Romania, with the largest resources for intervention in developed EU countries (Belgium, Denmark and Austria).

**Table 1.** Transfers to economic purposes and their structure in selected EU countries and Serbia (in 2013, in % of GDP)

| Country | Transfers to economic purposes | | |
|---|---|---|---|
| | Total transfers | Investment in the economy | Intervention in the economy |
| EU-27 average | 3.4 | 2.2 | 1.2 |
| Belgium | 4.2 | 1.6 | 2.6 |
| Denmark | 4.9 | 2.3 | 2.6 |
| Germany | 2.5 | 1.6 | 0.9 |
| France | 4.7 | 3.2 | 1.5 |
| Austria | 4.4 | 1.0 | 3.4 |
| Sweden | 4.9 | 3.3 | 1.6 |
| Great Britain | 2.6 | 2.0 | 0.6 |
| Czech Republic | 4.8 | 2.8 | 2.0 |
| Bulgaria | 5.3 | 4.1 | 1.2 |
| Hungary | 5.4 | 3.9 | 1.5 |
| Poland | 4.3 | 3.9 | 0.4 |
| Romania | 4.8 | 4.5 | 0.3 |
| Slovenia | 4.7 | 3.7 | 1.0 |
| Slovakia | 3.2 | 2.1 | 1.1 |
| Serbia | 4.8 | 2.3 | 2.5 |

*Source:* Eurostat, 2014.

The highest annual growth rate of GDP in 2013 - 3.5%, was recorded in Romania as the result of expenditures for economic purposes that amounted up to 4.8% of GDP and was higher than in most other countries. The high growth rate of GDP was recorded in Poland and Sweden, and was 1.6%. Regardless of the fact that Bulgaria and Hungary have higher allocations for expenditures with economic purposes (over 5% of GDP) growth rate of GDP in Bulgaria was 0.9% and in Hungary 1.1%, but this is extremely important because in prior years this indicator was declining. In the coming years further growth of GDP is expected, that could be the result of investment activities (Eurostat, 2014).

In Serbia, GDP growth of 2.5% was recorded in 2013, and the budget allocations of the Republic of Serbia for encouraging economic development in 2013 amounted to 4.8% of GDP, or 2.3% of GDP for investment and 2.5% of GDP for intervention in the economy (MFRS, 2014).

*Economic subsidies in agriculture*

A subsidy is defined as a government action that lowers the cost of production, encourages the production of certain products or lowers the price paid by consumers (Mulas-Granados et al., 2008). Agriculture today is the economic area in which a number of countries is implementing agricultural policies using the subsidies provided by the state's budget. Economic subsidies in agriculture are incorporated in the financial policy of a large number of modern states. The reason is that in a number of countries, agriculture and its productivity are lagging behind the development of industry. Another important reason is that the nature of agricultural production is such that it depends on a number of natural conditions. That is why the state needs public finance to subsidize the prices of various agricultural products, to approve reimbursements when purchasing fertilizers, premiums for the production of some cereals, milk, meat, etc. (Jovanović, Đurović Todorović, 2003).

In the European Union the biggest part of budget is spent on agriculture and rural development, but expenditures for agriculture tend to decline. The EU budget for agriculture in the Common Agricultural Policy (CAP - Common Agricultural Policy) in 1984 amounted to about 71% of the total Community budget. In 2005 these costs fell to about 42%, and due to other priorities agricultural community budget declined in 2013 to only 33% of the total EU budget. Out of more than 158 billion EUR of the total budget, slightly over 57 billion EUR was spent on agriculture (Prokopijević, 2009).

The EU budget for agriculture is formed by payments of member-countries for this purpose. The European Community rebalances these payments so that the member-countries get back more or less the amount of the funds invested as a refund from the budget. The most countries receive increased funds from the common EU agricultural budget (compared to the amounts paid into the common agricultural budget), while Germany and the Netherlands, for example, pay a higher amount than the amount they get back from the EU budget for this purpose (Karolić, 2010b). The most of the funds from the EU agricultural budget for individual member-countries are constructed

by their own individual payments to the budget, with a smaller or a larger allowance (European Communities, 2007).

**Table 2.** Subsidies for agriculture from the EU budget (in selected EU countries, 2013)

| Country | The subsidy per hectare (in EUR) | Direct aid to farmers (%) | Rural development (%) | Market measures (%) |
|---|---|---|---|---|
| Greece | 530 | 75.6 | 22.3 | 2.1 |
| Netherlands | 620 | 81.5 | 10.2 | 8.4 |
| Denmark | 360 | 89.3 | 10.1 | 0.6 |
| Germany | 437 | 77.4 | 21.1 | 1.5 |
| Austria | 525 | 55.9 | 42.2 | 1.9 |
| France | 290 | 80.6 | 12.9 | 6.4 |
| Hungary | 335 | 64.8 | 31.5 | 3.7 |
| Bulgaria | 190 | 53.0 | 42.4 | 4.6 |
| Romania | 125 | 42.2 | 52.9 | 4.8 |

*Source:* Eurostat, 2014.

At the EU level, the budget for agriculture is divided into three parts: the direct aid to farmers, which is an average of about 70% of total payments, rural development is on average about 20% and about 10% of the payment goes to market measures. This distribution of funds and the amount of agricultural subsidies is not the same for all EU member states, as shown in the previous table. Netherlands received the highest subsidies per hectare in the form of direct aid to farmers, which is at approximately the same level in Denmark. On the other side, Germany, France, Bulgaria, Austria and Romania get the highest subsidies for rural development.

As the total EU budget for agriculture (for various types of support to agriculture) is divided by the total surface of agricultural land (175 million hectares), so it comes to the average subsidy of approximately 330 EUR per hectare (Eurostat, 2014).

Common European food market (excluding customs duties), with unequal agricultural subsidies, leaves very serious consequences in the countries - members in which farmers have considerably less subsidies (which is generally the case with the former socialist countries). High subsidies in major EU countries lead to low food prices in the market, lower than the actual cost of production - and that is why farmers in countries with low agricultural subsidies, abandon the land and sell it to foreigners and speculators. So, even the countries that have always met their own food needs now become food importing countries. Even in the EU countries that have high subsidies the possibility of increasing the impact of farmers in the total food chain, or a larger ownership share of primary production in the higher stages of processing and distribution of food is being considered increasingly. In some EU countries, direct payments to farmers from the EU budget make up two thirds of farmers' earnings, or about half of their total income – which puts their existence, in terms of reducing the current subsidy, into question (Euractiv, 2013).

High subsidies in developed countries were for many years focused on achieving the highest possible yield, which resulted in depletion of agricultural land and large environmental pollution of water, soil and air, as well as harmful effects on climate change (Karolić, 2010a). Countries in transition face great limitations, because a large share of employment in agriculture, budget restrictions and low credit potential do not allow placing of income transfers to farmers to the forefront (Popović, Katić, 2007).

If we observe the total grants and subsidies in agriculture as % of GDP, as shown in the following chart, we can see that the observed proportion of EU agricultural subsidies in total subsidies is extremely low in Denmark, France, Sweden, and the highest is in Bulgaria. In Serbia, the subsidies in agriculture are at the level of 0.75% of gross domestic product. Having in mind that 2.5% of gross domestic product is dedicated for total subsidies from the budget, it can be concluded that 30% of total subsidies goes to agriculture. (MFRS, 2014)

**Chart 1.** Total grants and subsidies in agriculture in selected EU countries and Serbia (in 2012, in % of GDP)
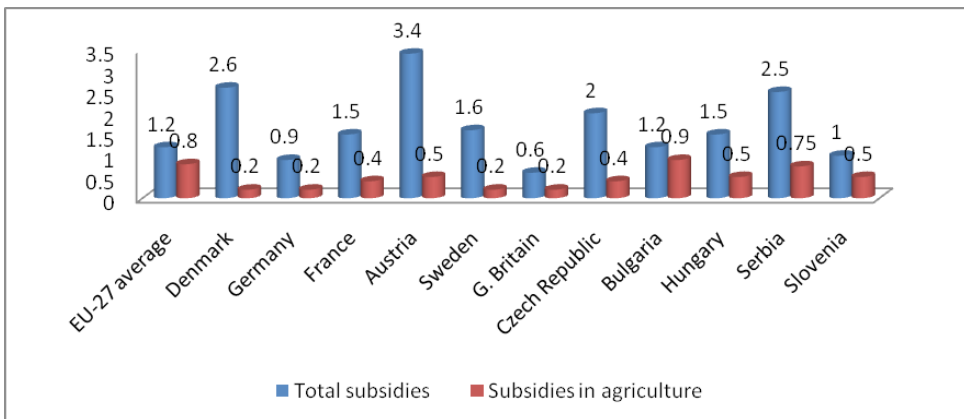


*Source:* Eurostat, 2014.

The basic factor for the development of agriculture in Serbia is the interdependence of agrarian relations and the agrarian structure as well as normative definition of new concepts and innovative agriculture development strategy, based on the acquisition of new knowledge and application of new technologies (Pejanović, 2009). This concept of the agricultural development of Serbia is based on knowledge as a basic premise of building an innovative economy and a society as a whole (Bošnjak, 2005).

Agriculture and village in Serbia have a very important place in the overall economic development of the country, especially in the implementation process of transition reforms. The role of knowledge in rural development is important for agriculture in Serbia since the EU is moving to the knowledge based economy, which is the key to competitive economy (Janković, 2009). In this sense, agriculture is one of the national priorities in science and technology, and includes (MSTDRS, 2010):

- · research and development, application of new enzymes and microbes in bioprocesses, new products, biomass production,
- · evaluation and use of cultivated and wild genetic resources through conventional and molecular breeding methods to obtain productive varieties / hybrids / breeds, which will serve as a base for the production of safe, functional, nutritional and specific foods,
- · advancement of knowledge in the field of sustainable management, production and use of biological resources,
- · development of new technologies and products in the food industry and technologies based on traditional products, and
- · bio-rational utilization, increase of fertility, remediation and soil protection.

**Table 3.** Subsidies from the budget of the Republic of Serbia in the period 2003-2013 (in mill. RSD)

| Year | Subsidies in the economy (Fund for Development) | Subsidies in agriculture | Subsidies for JP "Railways of Serbia" | Subsidies in the field of tourism | Other subsidies | Total |
|------|------|------|------|------|------|------|
| 2003 | 8,308.2 | 7,309.9 | 10,092.7 | 89.5 | 4,923.3 | 30,723.6 |
| 2004 | 6,575.0 | 13,022.0 | 8,948.7 | 152.1 | 6,200.4 | 34,898.2 |
| 2005 | 4,990.0 | 8,961.2 | 8,050.3 | 343.1 | 6,795.5 | 29,140.1 |
| 2006 | 4,106.5 | 11,180.7 | 8,893.5 | 920.9 | 6,650.4 | 31,752.0 |
| 2007 | 3,258.0 | 12,754.3 | 10,600.0 | 1,738.3 | 7,902.0 | 36,252.6 |
| 2008 | 3,931.8 | 25,309.9 | 11,123.0 | 2,581.9 | 6,428.3 | 49,374.9 |
| 2009 | 3,519.8 | 16,694.3 | 12,691.1 | 1,588.2 | 6,381.8 | 40,875.1 |
| 2010 | 4,192.0 | 22,863.9 | 12,400.0 | 2,524.9 | 7,530.6 | 49,511.3 |
| 2011 | 3,730.0 | 18,020.1 | 16,055.3 | 2,872.3 | 15,600.0 | 56,277.7 |
| 2012 | 23,975.8 | 29,547.1 | 13,810.0 | 2,500.9 | 16,764.0 | 86,597,9 |
| 2013 | 14,434.1 | 29,866.0 | 13,065.0 | 1,121.5 | 15,799.0 | 74,258.6 |

*Source:* MFRS, 2014.

The previous table shows the trends of subsidies in the Republic of Serbia in the period 2003 to 2013, as well as their structure. Dominant share in the structure of subsidies are subsidies in agriculture, whose share of the total subsidy exceeds 30%. Regardless of the dominant share in total subsidies, agricultural subsidies, in 2011 were 26.8% lower than in 2010, with a decline recorded in 2009 compared to 2008 as well.

Even though the total subsidies declined in 2013 compared to 2012, one can see the significant increase in subsidies for agriculture. They grow from 30% of total subsidies in 2011 to just over 40% in 2013. If we compare the amount of 330 EUR per hectare-the amount of average subsidies in the EU, with subsidies of 12,000 dinars (6,000 per hectare and an additional 6,000 with receipts displaying) paid in Serbia in 2014, we can see that the allocations for agriculture are reduced, given that subsidies are three times lower (Službeni glasnik no. 8, 2014).

**Chart 2.** Structure of subsidies from the budget of the Republic of Serbia (in 2013, in %)
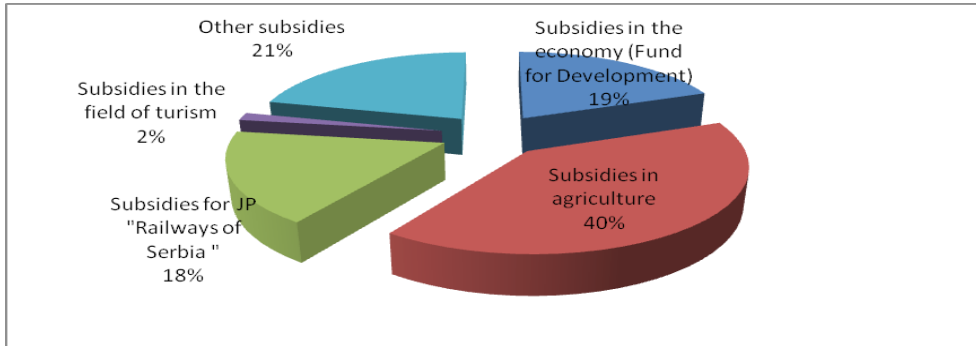


*Source*: MFRS, 2014.

Total subsidies declined in 2013, as well as subsidies in other sectors of economy, while the subsidies for agriculture recorded a slight increase. This significant increase in spending on agriculture was conditioned by the reduction of subsidies for PE "Serbian Railways", which, until two years ago, were slightly lower than those for agriculture. It is important to point out that, comparing to 2012, in 2013 subsidies in the field of tourism were more than halved. This could have negative consequences, considering the development opportunities of tourism in Serbia, especially rural tourism, which in correlation with agriculture, could be an important factor of the development.The Republic of Serbia has rich natural resources that could be valuable for the development of rural tourism. Diverse plant and animal world, many natural rarities, the existence of unpolluted water resources, clean air, good climate, represent a significant potential for the development of rural tourism.(Radović, 2013)

The crisis in Serbian agriculture has been present for a very long time. The development of agriculture is burdened by chronical problems due to the absence of systemic and continuous measures of economic policy. The causes of the crisis are numerous, and the result is permanent unfavorable economic situation in agriculture (Pejanović, Njegovan 2009). In order to promote agriculture and reduce rural poverty, it is necessary to improve the system of subsidizing agriculture. Land area related subsidies should be objictified and fixed subsidies recipients should be checked for their assets (Ristić, 2013). Creation of new commercial farms has to meet the needs of a modern market economy, and the financial support for projects in rural areas should assist the implementation of new technologies, development of export-oriented production program and it should increase competitiveness (Đekić et al., 2011). This would reduce the transfer of agricultural population into non-agricultural activities (Simović et al., 2009).

According to development projections of the Republic of Serbia in the next five years, significant growth in GDP is expected by 2017, which would create space for growth of funds intended to support agriculture. The plan is that support goes in three levels: direct payments and measures of market-price support, support to rural development and support for general services, including veterinary and plant protection (MAFWMRS, 2014).

Subsidizing of inputs is currently the dominant form of support and it has a positive impact on reducing the cost and on the increase of production, but does not comply with WTO rules, because of the direct effect it has on production and consequently on the market (Radović, 2009).

Therefore, the next budget projects a reduction of funds for this purpose, and the funds will be directed to the growth of direct payments per hectare and per animal, with a strong emphasis on the conditioning support by fulfilling cross-compliance rules. Support to subsidize fuel (Blue Diesel), an allowed form of state aid to agriculture in other countries, could be excluded from reduction. (MAFWMRS, 2014)

The vision of agricultural development, as well as development of rural areas in Serbia reflects the projected state of agricultural sector that we want to achieve in the next decade, and as such it predicts (MAFWMRS, 2014):

• that in 2024, Serbian agriculture becomes a sector the development of which is based on knowledge, modern technologies and standards that offer innovative products to both local and demanding foreign markets, and which ensures a sustainable and stable income for the manufacturers
• that, natural resources, environment and cultural heritage of rural areas are managed in accordance with the principles of sustainable development in order for rural areas to become an attractive place for young people, and other rural residents, to live and work.

**Conclusion**

Transfers with economic purposes are the funds in the state budget opt for achieving rapid economic development in general and for the achievement of the objectives of economic policy.

A large amount of the EU budget is directed to agriculture, and when the total EU budget for agriculture (for various types of support to agriculture) is divided by the total area of agricultural land in the EU-27, the result is that the average amount of subsidies is approximately 330 EUR per hectare.

At the EU level, the budget for agriculture is divided into three parts: the direct aid to farmers, which is an average of about 70% of total payments, rural development is on average about 20% and about 10% of the payment goes to the export subsidies to companies that export food. This distribution of funds and the amount of agricultural subsidies is not the same for all EU countries. Greece receives the highest subsidies per hectare, direct aid to farmers is at approximately the same level in the Netherlands, Denmark, Germany, France and Hungary, and Bulgaria and Romania get the most for rural development.

Subsidies for agriculture make up about 60% of total subsidies in the EU, but there are big differences between countries. The share of agricultural subsidies in total subsidies goes from extremely low levels in Denmark (8%) to the highest level in Bulgaria, where agricultural subsidies compose 75% of total subsidies.

Situation in Serbia is not that good because the subsidies per hectare are three times lower than in the EU and the subsidies in agriculture consist about 30% of total subsidies. However, there is an increase tendency in the last two years, so in 2014, this share rises to 40% of total subsidies.

Agriculture and villages in Serbia take a very important place in the overall economic development of the country. The role of knowledge in rural development is important for agriculture in Serbia since the EU is moving to a knowledge -based economy, which is the key to competitive economy. This means that agriculture is one of the national priorities in the fields of science and technology.

In order to improve agriculture and to reduce rural poverty, it is necessary to improve the system of subsidizing agriculture, but also to increase the resources intended for supporting agriculture. Subsidy funds should certainly increase, regardless of the form of support. Their increase is planned in the following medium term for which the GDP growth, which will open the way for greater support for agriculture, is projected.

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# EKONOMSKE SUBVENCIJE U OBLASTI POLJOPRIVREDE

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## Sažetak

*Značajno učešće u ekonomskim transferima čine sredstva koja se usmeravaju u poljoprivredu. Veliki deo budžeta EU se usmerava u agrar, a prosečan iznos subvencija u EU- 27 je 2013. godine iznosio približno 330 eura po hektaru. Od ukupnih subvencija u EU, na subvencije za poljoprivredu odlazi oko 60%. Stanje u Srbiji je znatno lošije jer su subvencije po hektaru tri puta niže nego, a za subvencije u poljoprivredu se izdvaja nešto iznad 30% ukupnih subvencija, ali sa tendencijom porasta u poslednje dve godine.*

*U ovom radu, uporednom analizom ovih izdataka za poljoprivredu, u Srbiji i u zemljama EU (kako razvijenih, tako i zemalja našeg najbližeg okruženja) pokazano je kolika se važnost i značaj pridaje poljoprivredi, s obzirom na njene razvojne mogućnosti. Poljoprivreda Srbije može biti pokretač privrednog razvoja, a u prilog tome ide i činjenica da projekcije izdataka za poljoprivredu u narednom srednjoročnom periodu imaju tendencije porasta.*

***Ključne reči:*** *subvencije za poljoprivredu, budžet, Srbija, EU.*

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# POTENTIAL OF AGRICULTURAL PRODUCTION AND ITS IMPACT ON INSURANCE PREMIUMS

*Jelena Birovljev[1], Željko Vojinović[2], Mladenka Balaban[3]*

## Summary

*Food production is becoming very important and it receives priority in relation to other activities in the world. As the number of inhabitants of the planet grows, food production has greater significance. Its production will certainly be affected by climate changes and the potential of agricultural land, which will be followed by changes in insurance cover of crops.*

*Total area of arable land doesn't have the same quality, but it's especially common for underdeveloped and developing countries is that arable land is not used in the appropriate percent.*

*For Serbia which belongs to that group of countries with low yield on arable land, it can be pointed out that insurance does not cover a sufficient share of that area. The reason for this lies in the lack of trust of potential insured, habits and consciousness of the insured, economic policy pursued by the state in relation to this issue, inadequate training of insurance agents and the lack of proper insurance products.*

***Keywords:*** *agriculture, arable, insurance, premium, damage, growth and development.*

**JEL:** G22, Q14

## Introduction

In Serbia, agriculture is of great importance, from which the importance of insurance of agricultural production stems. Agronomy usually happens on open and unprotected space, which means that it is exposed to various risks. These dangers occur almost every year, with greater or lesser force, causing great damage, and often on catastrophic proportions. Therefore the security of this production, which plays a significant role in the economic protection and promotion of agriculture, is one of the riskiest types of insurances (Swiss Re, 2011a).

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The proportion of the danger is further affected by a proportionally long production cycle, typical for this type of production. When, to numerous natural disasters, to which agricultural production is exposed to, added to other risks to crops and the influence of the state, which is not always go hand to hand to farmers, it is clear that crop production is exposed to a significant extent of financial risk (Carter, Smith, 2007; Morgan et al., 2012).

There are numerous hazards that affect agricultural production. These dangers mostly come from nature and may affect large areas and cause great damage. Man is sometimes the cause of these events (Wright, Hewitt, 1994; Costello, 2012).

Underdevelopment of insurance of agricultural production, thinking of crops, is visible in the data which we represented in the paper. Those are the results of insurance companies which are important for the assessment of situation in that area, and which are derived from small usage of agricultural land and very small number of contracted coverages of crops. These data were compared with data from other countries with adequate parameters.

This paper shows the potential of agricultural land, arable agricultural land, supporting results on insurance through premiums, technical result and damage. The sum of insured which is given in this paper can certainly be much higher with an increase in arable area and higher insured arable land. Hence the result monitored through premiums, technical results and damage will be higher. The mechanism of insurance is based on the atomization of risk, high diversification and statistics of large numbers (Carter, Smith, 2007).

The starting point for preparation of this work was the data on insurance of agricultural production in Serbia. In our Insurance Law, it is classified as other property insurance, along with insurance of machinery breakdown, construction insurance, household insurance, insurance of animals etc. (Brkanić, 1996).

The National Bank of Serbia only provides information on total premiums and claims by types of insurance (National Bank of Serbia, 2014). Source of information on total area of Serbia, total agricultural, used and arable land is the yearly statistical overview for the Republic of Serbia. Data on the total number of households, areal intendedness and concentration of the used and arable land come from the same source. For comparative analysis with other countries, data on average size of lots, average value of crops is given.

The authors have collected data from societies that deal with this type of insurance and which are recorded to provide risk coverage to agricultural production on insured areas, sum of insurance on agricultural productions, damaged insured areas and technical results.

Data on total, agricultural and arable land in Serbia, the number of farmers and basic climate data were taken from the yearly statistical overview for the Republic of Serbia. With the data for Serbia, while doing international comparison, competent data for other countries was used.

All of the data was analyzed in the direction of confirming the theses of this work, with the application of quantitative and qualitative methods. The potential of agricultural production provides the basis for the development of insurance businesses through an increase of the

insured area. The insured area was taken as an independent variable from which, with various analysis methods, which are applied in this paper, can be concluded how much the results of the insurance activity could be higher. Testing the hypothesis we came to a conclusion on the justification for setting the same. With correlation and regression analysis, we came to the conclusions that we present in this paper.

All of the observed data was collected over an eight year period, from 2006 to 2013, so we believe that with the use of different methods of analysis on the observed sample a result was produced which may make the insurance companies, farmers and the state decide on undertaking concrete measures.

### Characteristics of agricultural production in Serbia

The Republic of Serbia covers a total area of 8,840,000 ha. Agricultural land covers 5,346,597 ha, that is, 60%, of which 3,437,423 ha is utilized agricultural area, and 2,513,154 ha arable land. The difference between used and arable land is mainly meadows and pastures. From the standpoint of security, arable land are significant, while meadows and pastures as a rule do not.

For insurance the essential information is the number of farms, i.e. the average size of used land per farm because this can influence the level of costs of underwriting and negotiation of insurance protection (Roberts, 2005). So in Serbia we have surveyed the following number of farms:

- Agricultural holdings (631,622),
- Family farms (628,555),
- Legal entities (2,567).

Seeing as how the insured area is taken as an independent variable in the work, and it occurs as a result of sale of insurance coverage of agricultural production from a number of risks, an important factor of influence on the result is the concentration or dispersion of land which is cultivated. This factor is dominant in Serbia, especially if you take that the majority of arable land, over 55% is in Vojvodina, a total of 1,589,065 ha, out of which 315,247 ha in Južni Banat.

The total result on arable land in the last years of the observed period is at around 3.2 billion euros. The average value as a result of agricultural activities per farm is at about 900 euros. This is certainly the result of the average size of farms in Serbia which is at 5.3 ha, in the Czech Republic 152.4 ha, while Malta it is just about 9 ha. For insurance companies average arable land per capita is essential, which may result in a significant impact on the cost of implementation of insurance protection, which in Serbia is at 0.5 ha, and in Banat even at 1.23 ha per capita.

Results of insurance companies show that the premium collected is at around ten million euros, and in further work data is presented yearly, and if all arable land was insured this premium could amount to 130 million euros. From a total of 28 insurers, the

number working on the territory of Serbia, eleven of them deal exclusively with non-life insurance, while six deal with life and non-life insurance classes. In the collected insurance premium agricultural production, two houses are with by far the largest share, DUNAV and DDOR, while from the other fifteen only a few offer insurance coverage of agricultural production.

The risks that threaten agriculture are divided into basic and additional. Hail, fire and lightning represent basic risks, storms, spring frost, autumn frost and flood fall in additional risks. Under the influence of climate changes, one insurance company as an additional risk recently introduced drought. All risks in one product, i.e. Comprehensive crop insurance (Swiss Re, 2011) does not exist in Serbia, and we estimate that new crop insurance products won't be introduced. The concept of management of agro risks (Chambers, Quiggin, 2004), whose part is insurance, is rarely present in Serbia. Its implementation is gradually influenced by the emergence of big landowners, which occurred after the commencement of the privatization process fifteen years ago.

Insurance of agriculture is voluntary in Serbia. General conditions of crop insurance, except husbandry, predict contracting franchises in the range from 5% to 50%. Farmers pay a lower premium through the introduction of franchisees but when damage occurs they are not satisfied with it, because they expect to be paid the total amount of damage they have suffered. Since the damage to fruit compared to secured areas are by far the largest, insurance companies insist on franchising these crops, usually 10-20%.

It is almost impossible to specify everything that might influence production, but we will still mention some of the important factors: (Brkanić, 1996,) the deficit or surplus of moisture in the soil and in the air (droughts or excessive rain), too high or low temperature of air and soil (frost or heat stroke), lack or excess of plant nutrients, hail, stormy winds, flood, fire, plant diseases (fungi, bacteria, viruses), pests (insects, rodents), weed (Maliva, Missimer, 2012).

In 2007 the state introduced subsidizing insurance premiums, but only for registered farms where agriculture is the only source of income. During the first two years subsidies amounted to 30% of the premium, to be increased to 40% from 2009 onwards. Approximately same volume of subsidies exists in other European countries with which we performed the comparisons with, while this kind of state aid is not introduced in half of them (Tsakiris, Vangelis, 2005).

In order to avoid a big burden on the budget, and in accordance with the Law on local governments, there is a possibility for municipalities to further stimulate farmers to purchase insurance protection. The practice in other countries is that additional subsidies can be approved by municipalities, according to their ability. It is estimated that there are around 450,000 registered farms, but a very small percentage is insured from the risks that endanger agricultural production. Even though the IT-sector in our country is not at a low level there is still no list of insured farms.

### The result of agricultural production in Serbia

In *Table 1* there is the data on insured areas and their share in the total utilized and arable land. From the table we see that the 2008 is the year with the largest insured area, all up to 2013. After a sharp decline in 2009, in the next year there was an improvement, but in the last year analyzed the insured area covered approximately 10% of the total cultivated land.

**Table 1.** The share of total insured area in total used and cultivated in Serbia 2006-2013.

| Year | Area (ha) | Share in total utilized agricultural areas,% | Share in arable land, % |
|---|---|---|---|
| 2006 | 260,828 | 7.58 | 10.38 |
| 2007 | 292,420 | 8.50 | 11.64 |
| 2008 | 302,957 | 8.81 | 12.05 |
| 2009 | 231,482 | 6.73 | 9.21 |
| 2010 | 254,846 | 7.41 | 10.14 |
| 2011 | 252,980 | 7.36 | 10.07 |
| 2012 | 297,948 | 8.67 | 11.86 |
| 2013 | 354,425 | 10.31 | 14.10 |

*Source: authors' own calculation; Statistical Office of the Republic of Serbia (2012): Statistical Yearbook of the Republic of Serbia, Belgrade; Republički geodetski zavod, www.rgz.gov.rs (visited 18.01.2015). Agricultural census, 2012.*

This movement of insured areas is maybe the consequence of world economic crisis which influenced the insurance industry in our country in 2008. From *Table* 1 it can be concluded how small the interest of farmers is for the insurance of their crops. Insurance coverage of 10-15% of the potential shows the weak state, but also the possibility which is at the disposal of insurance companies. On one side we have the insured area which is not getting bigger, the result is that the same number of farmers and on the other is the offer of ever increasing number of insurance companies. Those are the conditions for creation of disloyal competition, discounts which are not in accordance with tariffs, which may cause problems with payment of damages. By achieving better results, gathering greater premiums as a result of increasing insured areas, an atmosphere of trust and security would appear.

**Figure 1.** Trend of insured area
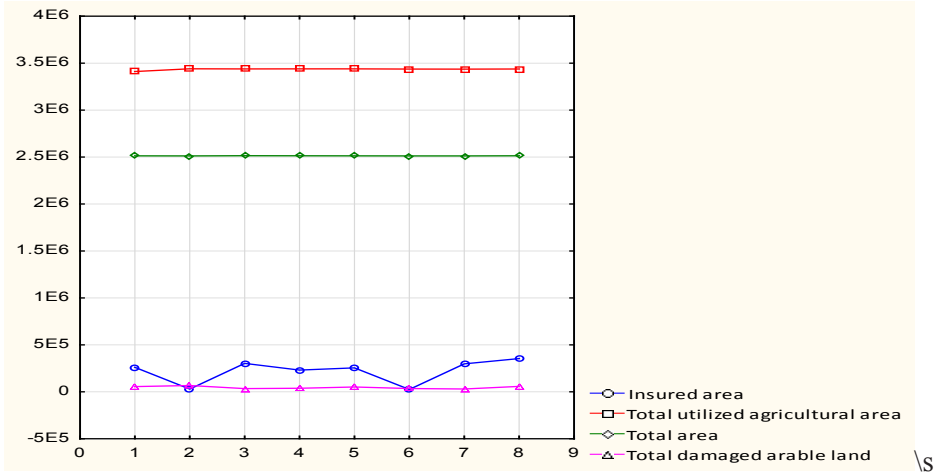


*Source: authors' own calculation*

The offer insurance services, working with clients continuously throughout an entire year, educating farmers, provision of subsidies and other stimulus measures would give results and open up opportunities to make use of the existing potential. A large increase in premiums would occur if there was an increase in the percentage of insurance of arable areas, without initiating an increase in arable land in the total agricultural area. That means the change of soil tillage which is not the subject of work.

## Business results of insurance companies

Height of realized premiums is the first indicator of work success of insurance companies. The premium depends on the amount of insurance, which is usually the real crop value, it is specified by the insured and according to her value premiums are calculated. The sum insurance represents the maximum obligation of the insurer in case of damage and expressed per unit area.

The insurance sum, the name characteristical for this type of insurance depends on: the value of the insured crop,

- the expected yield per crop,
- Prices of crop products,
- structures of insured crops,
- size of the area which is occupied by crops.

Table 2 presents the average values of crops, sums insured and premiums earned during the period. It can be seen that the value of crops had a growth tendency depending on the secured area, which can be seen from the table above, with certain fluctuations. The growth in average value of crops is influenced by the growth of retail prices of agricultural products and other less important factors.

The sum insured and premium growth depending on the average value of crops and fruits for the observed period with the same oscillations. The impact of prices of agricultural products is particularly significant in 2008 and 2011. The insured area was increased in 2008 by 4% compared to 2007, and the sum insured almost 74%. A similar situation occurred in in 2001 when the insured area decreased by 1% and the insurance sum increased by 33%. Such disproportionality in relation to the insured areas and insurance sums is the result of growth of price of agricultural products. In order not to neglect that influence, and to give greater significance to the influence of size of the insured surface this was taken as an independent variable in the data collection.

**Table 2.** Average value of crops and fruits, the total amount of insurance, insurance premiums by years of agricultural production in Serbia 2006-2013 *(€ / ha)*

| Year | Average value of crops and fruits (€ / ha) | Sum | Premium |
|---|---|---|---|
| 2006 | 55,934 | 14,589 | 611 |
| 2007 | 60,624 | 17,728 | 751 |
| 2008 | 104,092 | 31,536 | 1,105 |
| 2009 | 88,937 | 20,587 | 746 |
| 2010 | 92,700 | 23,624 | 794 |
| 2011 | 122,590 | 31,012 | 969 |
| 2012 | 135,800 | 40,461 | 1,126 |
| 2013 | 149,889 | 53,124 | 1,503 |

*Source: National Bank of Serbia, Number of insurances, policyholders and premiums by type of insurance tariff in Serbia*

Starting from data on the total insured areas and insurance sums, i.e. the value of the insured crop production, we have come to value of the insured crop per hectare, which is shown in the table.

Insurance is a mechanism in which the collected and billed premium serves for the payment of damages that the farmer suffered. That is the obligation of the insurer arising in contractual relations with the client. The premium is the price in the direct dependence on the insurance amount that is paid by the insured, and which should be sufficient to cover the risk in a certain period of time and on a large enough number of insured to diversify risk.

Higher premiums as the result of the insurance business in 2008 is a consequence of introducing new tariffs for the insurance of agricultural production and the measures taken by the then government prescribed. In the coming years premiums were stagnating due to the world economic crisis, movement of retail prices for grain and other factors.

After the great fall of 2010, there was a growth tendency of premiums, to be largest be the last year of the period. A better result was driven by slightly higher demand

for insurance protection, greater demand for agricultural products in the domestic market and increased exports to Russia. The rise in prices of agricultural products and fluctuations in the exchange rate of dinar certainly contributed to this result.

If we look at the share of premiums from insurance of agricultural production in total premium of non-life insurance, it does not exceed 2%. Given the importance of agriculture in Serbia, then it is a very small share.

## Damage to crops and fruits

Damage is another indicator of the results of the insurance activity. The damage is a consequence of the events of different risks in agriculture. Even though it's of local character, the risk of hail is the biggest cause of damage. An example of significant damage is a storm, which swept the entire municipality of Arilje in central Serbia in 2011, right before the maturation and harvesting of raspberries crops. The larger part of the total production of raspberries in Serbia is grown in this area. In the following tabular view processed data on the height of damage the damaged surface and the average size of damage per year was given. From the foregoing, it is evident that this indicator has a growth tendency in the eight-year period, with certain oscillations. Minimum damage occurred in 2012, while in 2010 and 2013 with the largest amount of damage.

In the observed period, the damage from 2007 is not negligible, especially if one takes into account that in that year the highest indicator of the damaged area is under crops. In 2013, the amount of the damaged area is also large even slightly higher than the figure for 2006.

Average damage per hectare is the highest in 2013 and 2010, which is appropriate given the extent of damage and its coverage of the protected areas.

**Table 3.** Overview of insurance claim of agricultural production in Serbia 2006-2013.

| Year | Damages million RSD | Surface damage ha | Average damage RSD / ha |
|------|---------------------|-------------------|-------------------------|
| 2006 | 545 | 56,024 | 2,088 |
| 2007 | 710 | 66,968 | 2,428 |
| 2008 | 591 | 34,053 | 1,949 |
| 2009 | 536 | 37,865 | 2,316 |
| 2010 | 918 | 51,764 | 3,601 |
| 2011 | 687 | 35,083 | 2,716 |
| 2012 | 416 | 29,829 | 1,397 |
| 2013 | 1506 | 57,824 | 4,250 |

*Source: National Bank of Serbia, Number and amount of claims by types of insurance and tariff 1) for Serbia;* http://www.nbs.rs/export/sites/default/internet/english/60/60_2/izvestaji/god_T2_2012.pdf.

There was a large discrepancy in the movement of damage amount and the damaged surface, i.e. space of damage. The reason for this, which is especially visible in 2008 and 2012, should be sought in the structure of the damaged areas. The value of husbandries is much lower in relation to fruit crops. When damage occurs to husbandry crops damage amount is less for greater surface area while fruit has a different situation. Damage height to some extent depends on the business policy of the insurer, the choice of the insured if he is selective, choice of the objects of insurance and the application of price of crops, out of which the height of the sum insured depends on.

To what extent will the height of incurred losses, the size of land surface affected by the damage, the amount of the average damage per hectare depend on the coverage of crop insurance that is, on the coverage of different types of insured crops is shown by the correlation analysis.

The following chart illustrates the best for the observed 7 year period, movement of the insured sum, the total premiums and claims per year. We see that in the period 2006-2008, on charts 1 through 3, that the amount of insurance has grown from year to year, accompanied by premiums. During this period, the damage is increased in the first year and 2008 it was at a minimum.

**Figure 2.** Trend of insurance claims in agricultural production
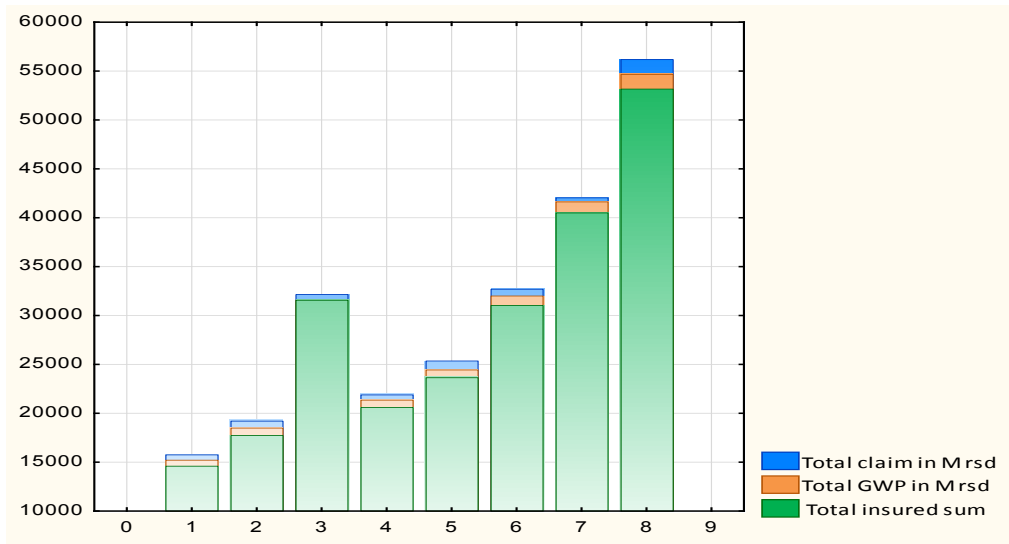


*Source: authors' own calculation*

## The technical result

As the most important indicator of the insurance business with the application of fair presentation of premiums and claims is the technical result. It's common for the insured person not to be familiar with the technical result, which is achieved by implementing insurance protection. Fortified technical result is the quotient of damage and premiums and

it shows the insured and the insurer what interest they could achieve. A positive technical results indicates unfavorable insurance that a client has, and the insurer is not ready to give up a part of the premium in this case. On the other hand, a negative technical result is not good for insurers because it involves him operating with a loss which in turn may have implications for policyholders.

The technical result is monitored in the short and long term, according to individual tasks, clients and by types of insurance. To select the optimal solution for farmers it is important to know what the result will contribute and its different approach to insurance protection.

In the observed period the technical result in the insurance of agriculture ranged from positive to negative to be negative only in two out of the eight year period. Damage indicators suggest that the negative technical result occurred in 2010 and 2013.

**Table 4.** The technical result in the insurance of agricultural production in Serbia 2008-2013

| Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|------|------|------|------|------|------|------|------|------|
| **Claim/ premium**% | 89 | 95 | 53 | 72 | 156 | 71 | 37 | 102 |

*Source: authors' own calculation*

This result reflects the adequacy of premium rates in ensuring agricultural production. To a large extent it depends on the basic variables, insured area of arable land, but also other factors less important and which we mentioned in the framework of processing data on premiums and claims.

## Analysis of insurance results

Terms for insurance of fruits and crops as well as the results of the insurance activity in the area, are similar to the data obtained from other countries: Bulgaria, Czech Republic, Slovakia, Hungary, Romania and Slovenia. Similar products and tariffs are applied and the fact is that in all of those countries there is no comprehensive crop insurance. Basic coverage of risks is against hail, fire and lightning and additional storms, frost and flooding. Recently cover against risk of drought was introduced.

In the structure of insurers in other countries we specified, agricultural insurance is offered by private companies, while in Serbia the leading insurer in this area is owned by the state.

According to the data collected we come to the conclusion that arable land covered by insurance protection in Serbia is far less than in other countries. Hungary and the Czech Republic have much higher share of insured areas in relation to arable, six times higher than the indicator in Serbia, while in Bulgaria it is seven times and in Ukraine ten times higher. This attests to the fact of good choice of independent variables in the work.

From the standpoint of international comparisons in insurance premiums amount of crop production, we emphasize that it is lower only in Bulgaria. In the Czech Republic and Hungary

it is up to four to five times higher than in our country. Likewise, we emphasize that Serbia is the only one among the surveyed countries in which the technical result in crop insurance is averagely unfavorable because in the reported period it amounted to about 85%. To be favourable it should not exceed 80%. This results in that the Serbian insurers must realize gains in other branches of insurance - specifically, from the standpoint of agriculture, the beneficial effect of insurance of motor vehicles, buildings, equipment, and people employed in this industry spill and cover an unfavorable technical result in crop insurance (Marković, Jovanović, 2008).

In order to bring the correct conclusions what is the significance and potential of agricultural production for the insurance business, we will show the correlation relationship of the insured surface with the results of the insurance activities such as: the average sum insured, the total amount of insurance, total premiums, total damage of insured damaged surfaces, the average amount of damage and the technical result.

From the following table of the correlation analysis of the taken parameters, we see that there is a remarkable statistical significance in their correlation. However, in order to realistically show the movement and the impact of the insured surface and thus the total agricultural and farmland to the results in the insurance, we will take the regression analysis of the following variables which will also be dependent on:

• The total amount of insurance,

• Total premiums,

• The total damage,

• The technical result.

What is important to note is that we took a secured area as an independent variable, with the note that its movement certainly depends on the total area and area of arable land. As those two sizes move, so will the insured surface with the influence of other factors, general insurance factors such as acquisitions, products, social standards, state policy, agricultural development and investment in machinery and equipment.

**Table 5.** Paired Samples Test

| Insured area | | Paired Differences | | | | | t test | Degrees of freedom | Stat. relevant |
|---|---|---|---|---|---|---|---|---|---|
| | | Aritmet. mildfield | Standard Deviation | Standar mistake aritm midlfield | 95% confident interval | | | | |
| | | | | | Lower limit | Upper limit | | | |
| Pair 1 | Total insured sum in m rsd | 251.90 | 30.25883 | 10.69811 | 226.60611 | 277.20014 | 23.546 | 7 | .000 |
| Pair 2 | Total insured sum in m rsd | -669.63 | 256.8630 | 90.81480 | -884.38212 | -454.89638 | -7.374 | 7 | .000 |
| Pair 3 | Total claim in m rsd | -457.63 | 321.5065 | 113.66972 | -726.42544 | -188.85306 | -4.026 | 7 | .005 |
| Pair 4 | Technic. result | 196.61 | 55.88985 | 19.76004 | 149.88567 | 243.33583 | 9.950 | 7 | .000 |

*Source:http://www.nbs.rs/export/sites/default/internet/english/60/60_2/izvestaji/god_T1T2_2012.pdf*

The first result we got with regression analysis indicates that the insurance sum grows in-line with the increase in insured agricultural areas.

**Figure 3.** The total amount of insurance depending on arable land
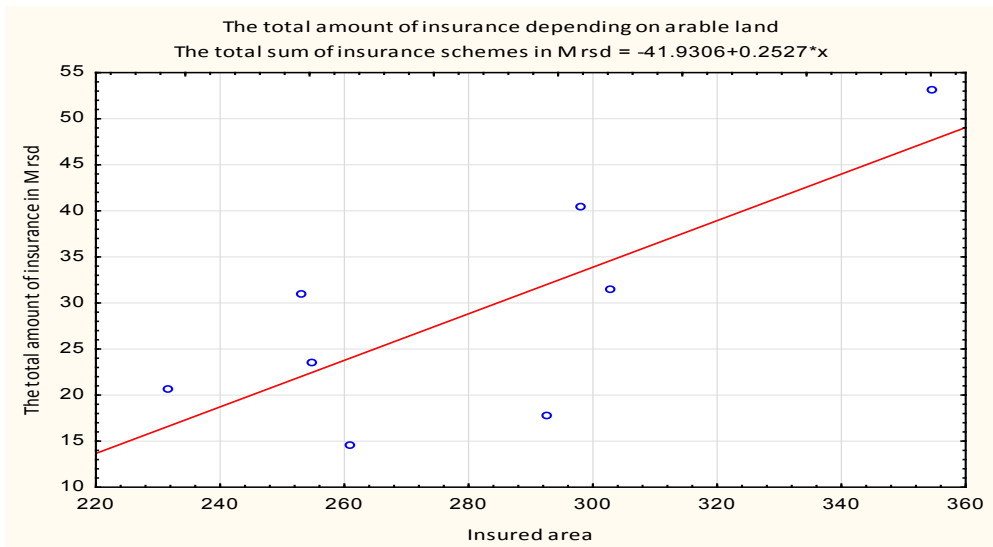


*Source: authors' own calculation*

In addition to the total amount of insurance we took the total insurance premium in the regression analysis as well. Trend of movement of total insurance premium is quite similar to the movement of the sum insured, and they are directly dependent. With the increase of insured surface, so will increase the insurance premium.

**Figure 4.** The total GWP of insurance depending on arable land



The total GWP of insurance depending on arable land
The total GWP of insurance schemes in M rsd = -774.682+6.1402*x
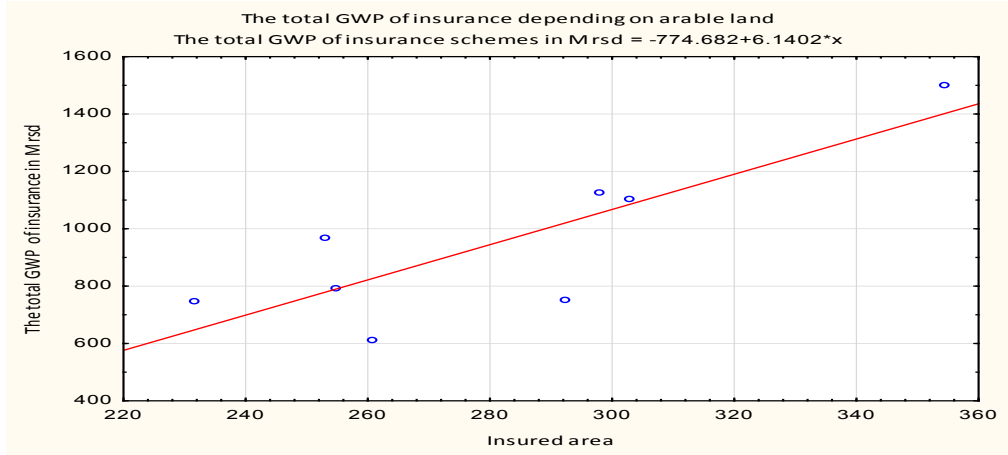
*Source: authors' own calculation*

Unlike the insurance sum on the insured agricultural land and the total insurance premiums in the same area, the movement of damage can be quite different and this is confirmed by the following chart.

**Figure 5.** The total claim of insurance depending on arable land



The total claim of insurance depending on arable land
The total claim in M rsd = 9827.6154-68.4489*x+0.1264*x^2
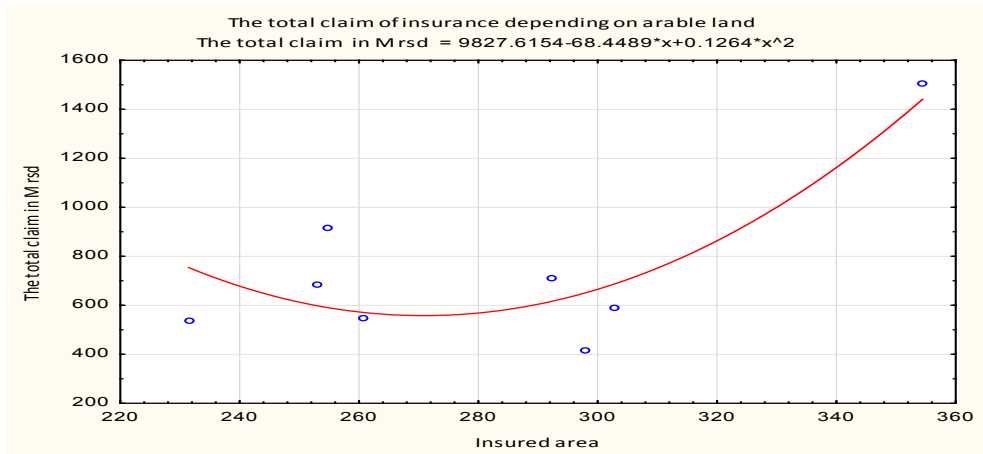
*Source: authors' own calculation*

We see that trend of losses in the reporting period 2006-2013 did not linearly vary with respect to the secured area. Future developments of damage should be planned in this way, especially taking into account the unstable weather conditions and major problems of flood risk and other disasters, which we expect to forecasts.

This does not mean that we should reduce the insurance coverage of agricultural production, from the perspective of risk for the insurers, on the contrary, increase efforts to diversify and atomize risks that threaten the domestic agricultural production.

In this regard, we observe the movement of technical result of insurance companies in the period from 2006 to 2013, on insurance of agricultural production in Serbia. Although this result is variable and even negative in some years, however, still observing the whole period the result is positive. It's encouraging that agriculture has the potential with which this result could be even better, and that insurance companies have room to reduce costs and thus relieve the insured, and provide a realistic income to them.

**Figure 6.** Technical result of insurance depending on arable land
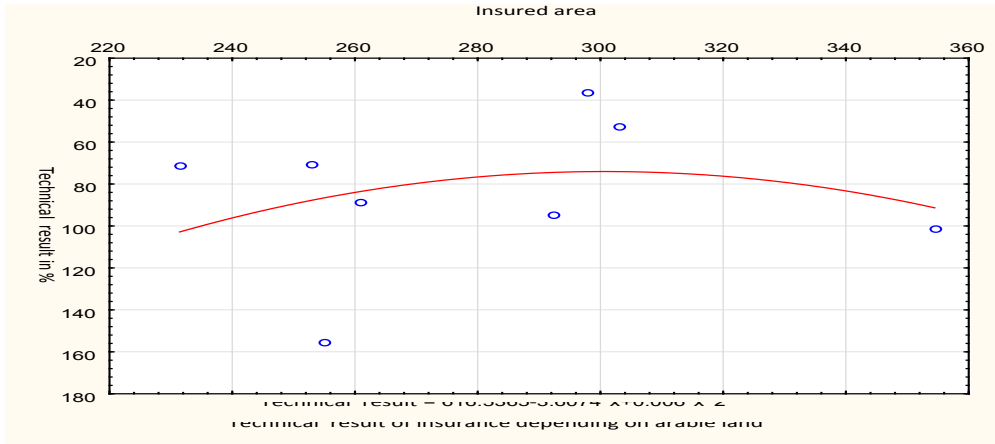


*Source: authors' own calculation*

All of the graphs are given with the formula of interdependence depending on variables with respect to the independent variable. In this work that is the insured area and the dependent are the amount of insurance, insurance premiums, claims and insurance technical result.

## Conclusion

All data presented in this paper points to under-utilization of natural resources of agricultural land. A very small percentage of available land is cultivated. According the weaker results of agricultural activity occur.

Insurance as a supporting activity is at a very low level of development. The premium that is achieved could be increased up to ten times with greater utilization of agricultural land, along with more appropriate forms of insurance protection and greater influence of the state.

Insurance as a risk coverage is only used by big and professional farmers who are not so numerous. Unfortunately, a large percentage of small-scale farmers with small property simply avoids insurance even though their income depends on the whims of nature. It is essential that insurance in Serbia takes place which insurance has in modern, developed economies. This can be encouraged both by state and credit institutions that help the development of agriculture, from insurers, but also by the farmers themselves (Mahul, Stutley, 2010).

Proposals can occasionally be heard in Serbia on the introduction of compulsory insurance of agricultural production by adopting appropriate legislation. One of the alternatives is the issue of voluntary or compulsory insurance of agricultural production. We pointed out that in most countries this insurance voluntarily (Diaz-Caneja et al., 2009).

Given that we are in a country with a large number of taxes, duties and other government levies, we believe that this wouldn't yield results in increasing premiums, because in this type of insurance relations can't be built on force, but on the economic interests of all stakeholders. All farmers would consider obligatory insurance of fruits and crops as additional costs. The economy as a system is under great pressure of securing budget revenues, businessmen in Serbia are constantly stating their displeasure with tax obligations they have and the fact that there are far fewer employees in the economy in relation to the public sector.

Seeing as how the insurance of agricultural production is seasonal work, many producers insure their crops during the spring works. The insurer often concludes a contract with executing an overview of the object of insurance because of the volume of work, with which he is making a big mistake. It's his duty is to determine the condition of crops in the field, in the first place whether the crop are there, and then to assess whether the yield that insured aims to is expected and realistic for the area (Žarković et al., 2014).

The performance of insurance companies that deal with risk coverage of fruits and crops is not of continuous character. They often give deals with huge discounts, with which they are brought into a situation where they can't provide the adequacy of funds to cover the assumed risk. With this they provide market share for themselves but unfairly (Vukoje, 2013).

As we have seen in the analysis of results displayed, damage is not directly commensurate with regard to arable land, and in order for the insurance mechanism to function it is necessary to respect tariffs, objectively show results and the state should divert more attention to control and supervise these insurance companies. Regardless of the poor results, a relatively small premium, it is essential that farmers gain confidence and that is possible only in conditions of fair market, whose guarantor is the state legal system.

Great importance and encouragement to the development of insurance business, to a larger number of contracts and raising awareness of farmers was given by the state by introducing subsidies. Although in 2012 only 14,871 insurance policies were contracted, refund of premiums in a certain percentage as a subsidy provided by the state, gave the results in terms of increasing the number of contracts, secured arable land and insurance premiums.

Due to lack of information, low awareness of the importance of insurance protection and ignorance on the conditions of insurance of fruits and crops, farmers view insurance as a cost they can do without. This is especially noticeable in years in which there was no damage. The concentration of insured areas is for the most part in hail areas. Therefore a continuous access for the insurer to education of farmers is necessary, as well as offering insurance protection not only during the season of agricultural work. Insurers have to work much more on familiarizing farmers with the benefits provided by insurance production.

One of the more specific risks in the insurance of agriculture is drought. In Serbia, only one insurance house covers that risk, along with quite a complex process of claims processing. Assessment of the damage done by an appraiser based on meteorological data but he can take into account the shortcomings of the technological process, with which damage can be greatly decreased or even repelled. Drought is a phenomenon which covers a wide area, typically the entire country and could lead to a significant drop in the yield of agricultural crops, thus significantly affecting the overall food production (Dragović, 2001).

The role of prevention is to reduce the probability of risk or to forestall the occurrence of adverse events on insured crops and fruits. Directions of preventive action depends in the first place from the dangers that threaten crop production. Prevention should focus on the causes of the damage which are dominant. Seeing as how hail brings the most damage, the most effective protection against hail is an anti-hail net which is too expensive for many manufacturers. Antifreeze systems are also beneficial. This provides, next to the protection against frost, harvest of fruit when it rains and crops are protected against hail. Preventive measures should be far more those that are included in agricultural risk management in our country (AXCO, 2014).

By expanding insurance coverage to arable land in less risky areas, greater dispersion of risks and a better technical result would be achieved. From the analysis it can be seen that by the increase in arable land there was higher insured area with previously mentioned increase of comprehensiveness of arable land insurance coverage which would achieve enviable results.

An increase in the total utilized agricultural area would probably in the same percentage increase arable land. If other conditions for better functioning of the insurance business were met such as raising awareness of farmers on such form of protection, by government measures in terms of stimulating agricultural production and relative share in the premium paid by the farmer, raising the level of activity of insurers to offer products and improved accuracy in rehabilitation etc. would probably make the percentage of the insured area grow faster. Estimates of growth in insurance business from the beginning of this century were in hundreds, which also applies to insurance of agriculture. We still have that potential in ensuring agricultural production, but it should be up and coming.

With greater diversification and atomization of risk, with large amounts of insurance premiums would grow faster than the damage. Of course, one should bear in mind the element of surprise but it certainly exists. In the reporting period, the technical result is positive on average. In the last year of the observed period, 2013 even though it had worse outcome it is not authoritative to confirm the thesis because it is normal for such a long period to have years with bad results and years that carry greater risks. However, it is applicable to the insured by increasing the surface area increases with higher premiums and premiums have a better result.

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# MOGUĆNOSTI POLJOPRIVREDNE PROIZVODNJE I NJIHOV UTICAJ NA PREMIJU OSIGURANJA

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### Sažetak

*Proizvodnja hrane u svetu postaje izuzetno važna i zadobija značaj u poređenju s drugim aktivnostima. Kako broj stanovnika na planeti raste, proizvodnja hrane sve* će *više zadobijati na značaju. Na nju* će *u ubudućnosti zacelo uticati klimatske promene, a to* će *biti praćeno i promenama u osiguravajućem pokriću. Za zemlje u razvoju je osobeno* što *se obradivo zemljište ne koristi na pravi način i* što *je osiguravajuća zaštita za useve takođe nerazvijena. Za Srbiju, koja pripada skupini zemalja u kojima se ostvaruju niski prinosi poljoprivrednih useva, možemo istaći da se osiguranjem ne pokriva zadovoljavajući deo obradivih površina. Razlog za to leži u nepoverenju mogućih osiguranika, niskoj svetsti o osiguranju kod stanovnika, privrednoj politici koja se sprovoti po tom pitanju, neodgovarajućoj obuci zastupnika osiguranja i nedostastku primerenih osiguravajućih usluga.*

***Ključne reči:*** *poljoprivredna proizvodnja, siguranje biljne proizvodnje, premija osiguranja, osiguravajuća društva, osiguranje u Srbiji.*

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# COOPERATIVES IN SERBIA - EVOLUTION AND CURRENT ISSUES

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## Abstract

*Cooperatives in Serbia have long history, evolving from big traditional families to the contemporary social networked organizations and even private companies acting like coops. Current legal framework, on one side, enables many possibilities, but on the other side prevents further development of cooperatives. An interview of key players in the coop sector was one of the research methods. Other methods include historical method, comparative analysis method and case study method. In conclusion, the major obstacle for the further coops development in Serbia is legal status of ownership. Other obstacles are: the level of state interference, the loyalty of primary producers and participants, the aver*age land size per households, etc. The paper includes three parts: historical evolution*, successful case study and framework for future development.*

***Keywords:*** *coops, legal framework, ownership, agricultural household, individual producers*

**JEL:** *Q130, O130*

## History of Cooperative Movement in Serbia

The history of cooperative farming and cooperative movement in Serbia has from its inception to date been primarily linked with the history of farmers 'cooperatives because Serbia is a country of rich cooperative history and tradition. That development was not identical in different regions of present-day Serbia.

The first credit-farmers' cooperative in the region of Central Serbia was founded in the village of Vranovo in 1894, in the vicinity of Smederevo, and only one year later was formed the association of farmers 'cooperatives under the name of Chief Union of Serbian Farm Cooperatives. Three years later was passed the first law – the Law on Crafts and Farmers' Cooperatives which governed the entire cooperative area. The number of cooperatives existing in Serbia prior to 1900 was over 650. The number

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was increasing from year to year as the main purpose was to build a wall of protection against the loan sharks and impoverishment of the rural population in late 19th and early 20th century (Cooperative Union of Serbia, 2014).

The tradition of cooperative organization in the territory of present-day Vojvodina is more than 150 years old. The first farmers'-credit cooperative in Vojvodina, established in 1846 in Bački Petrovac, was the third cooperative formed by that time in the world. Becoming aware of the advantages the cooperative movement was providing, forming of new cooperatives in this region started soon thereafter, first in Erdevik (1855), in Titel and Pivnice (1868), in Gložan (1869), Ruma (1883), etc. The cooperative movement in the region of Vojvodina was in the first half of the 20th century developing in parallel with the cooperative movement in the developed countries of Europe.

Abrupt development of the cooperative movement was a consequence of the accelerated development of the commodity-money economy, farmers' orientation towards producing for the market, increase of fiscal obligations to the state, fragmented land holdings, primitive land cultivation, extensive livestock breeding, poor yields, and poor harvest years. All of the listed unfavourable circumstances were a fertile soil for usurious lending provided by country landlords and merchants. Cooperative ideas were recognized under the influence of Serbian scholars of the second half of the 19th century, primarily that of Svetozar Markovic and Mihailo Abramovic (Zakić, Stojanović, 2009). Under their influence, cooperatives were becoming an indispensable prerequisite for existence of the village and peasantry. They were founded on the basis of cooperative principles, topical even today, and were until World War One constantly on the rise both in terms of numbers and performances. During the First Word War, more than 800 cooperatives were operating in Serbia. The war left serious consequences on the cooperative movement in Serbia, and the recovery was long and painstaking. Until 1937, cooperatives in Vojvodina were operating according to the Austro-Hungarian legislation which did not limit the cooperative members in accomplishing their economic interests through cooperative organization. Cooperative movement consolidated during the thirties of the past century both from social and economic point of view, which entailed the passage of the Law on Economic Cooperatives in 1937. In this way, standardization of cooperative legislation was achieved. Taking into account that Serbia was an underdeveloped agrarian country, this law enabled the rural population to improve their material standing.

In the period between the end of World War II and the 90-ties, four models under direct influence of the state were applied in the domain of cooperative movement:

- Purchasing – Sales Cooperative,

- Farm Cooperative,

- General Farm Cooperative, and

- Basic Organization of Cooperative Members.

Basic Law on Farm Cooperatives envisaged two forms of association, general farmers' cooperatives and farmers' cooperatives that mostly looked like Soviet kolkhozes which were formed by simple association of farmers' holdings. Agrarian theory claims that this form of organization had a highly negative impact on the farmers' cooperative movement, which view proved, over time, to be correct in practice (Hofstede, 2001). Obligatory membership in the cooperatives was contrary to the cooperative principles of voluntariness, which resulted in the lack of motivation on the side of members for the work of cooperatives. Soon after, state authorities permitted withdrawal from membership in farmers' cooperatives. Farmers availed of this opportunity to a great extent as they did not see any economic interest in doing business on the basis of this form of cooperation. As a result of farmers' withdrawal from farm cooperatives, they were massively discontinuing their operation.

Law on agrarian reform and colonization was adopted in 1945 (Official Gazette of the Federal Republic of Yugoslavia; No.64/45, 24/46, 105/48). The renewal of the farmers' cooperative movement started in 1953 through the formation of general farmers' cooperatives that significantly contributed to the strengthening of cooperative funds and improvement of the standard of living of the rural population and quality of life in the countryside. Primary objective of these cooperatives was the purchase and sales activity, and improvement of agricultural production

The accelerated progress of farmers' cooperatives and economic consolidation of farmers during the 50s and early 60s entailed creation of a significant cooperative property. For example, the cooperatives increased their holdings from 10,438 ha in 1954 to 202,683 ha in 1966; obsolete equipment was at that time replaced by the new one; livestock breeding was developing on the cooperative holdings, and the like. It is worth mentioning that the 1953 Constitutional Law (Law on Agricultural Land Fund of National Property and Land Allocation to Agricultural Organizations, Official Gazette of the Federal Republic of Yugoslavia; No. 22/53) transformed the cooperative ownership into socially-owned ownership. In this way, entire property that the cooperatives had acquired by private capital investment of cooperative members became part of "nobody's" and "everybody's" socially-owned property.

The 1965 economic reform had a negative bearing on cooperatives because farmers were given a possibility to establish manufacturing-economic relations with other economic operators. Cooperative associations were also suffering sizeable damages in that period. Adoption of the Law on Unique Chambers of Trade and Industry in 1962, cooperative associations lost the status of legal entity, while chambers of trade and industry became legal successors to the overall highly valuable property of cooperative associations. By adoption of the new 1974 Constitution (Official Gazette, year xxx; No. February 9 – 21, 1974) was also adopted the Law on Farmers' Pooling in Association. In this way, cooperative unions regained in 1976 the status of legal entity, but without property.

The period from the end of World War Two until the 90s mainly resulted, unlike the pre-war period, in the devastation of the cooperative movement and in distancing

from the cooperative principles and market-based doing business. By its permanent interventions in the area of cooperative movement (as in other areas of agriculture), the state contributed to the drastic drop in the farmer's trust in the cooperative movement and in other forms of farmers' pooling and association in buying inputs, cultivating land and in selling produce, which is one the reasons for lagging behind in the development of primary agricultural production in relation to market economy countries.

This new Law on Cooperatives enabled setting up of farmers' cooperatives as independent legal entities. The 1990 Law on Cooperatives (Official Gazette of the Federal Republic of Yugoslavia; Nos. 67/93, 46/95 and 101/05) sets forth the obligation of returning the earlier cooperatives' property that had been transferred to agricultural enterprises and agro-industrial complexes to those cooperatives. According to the provisions of the Law, a part of basic organizations of contract farmers had to be separated from enterprises and organized in cooperatives; however, a major portion of their property had to remain in enterprises. As the bulk of cooperatives' property was not returned to the cooperatives in accordance with the provisions of this law, another attempt was made by a new Law on Cooperatives passed in 1996 (Official Gazette of the Federal Republic of Yugoslavia; Nos. 41/96 and 12/98) to enable restitution of this property. Political motives, inefficiency of competent authorities and, generally, careless attitude vis-à-vis the ownership issues was again the reason for inefficient enforcement of the provisions which governed restitution of the cooperative property under the new Law, so that only a small portion of this property was returned to the cooperative sector. In Vojvodina, almost 700 thousand hectares of arable land were taken away by nationalization and the return of that ownership will represent an enormous expenditure for the Serbian state. Estimates indicate that only about 60,000 ha of agricultural land have been returned to cooperatives, while agricultural companies are still holding more than 130,000 ha of agricultural land in cooperative ownership (source: Cooperative Union of Serbia, 2014).

The period of transition and accelerated privatization is opening up a series of new issues for the cooperative property and, accordingly, for the cooperative movement as well. The 1996 Law on Cooperatives imposes that the property of earlier cooperatives, transferred free of charge by organizational and status changes to other users, who are not cooperatives, be returned to the cooperatives it used to belong to. If such a cooperative does not exist any longer, the property shall be returned to the cooperative of the same type that operates in the given region. The courts where these processes are conducted are insisting on establishment of the facts, namely, whether a cooperative was an owner or just a user of the requested property. Such insistence is actually suggesting a negative solution because in the period 1953-1988 all legal entities were treated only as users of social ownership over the means of production.

Therefore, a general conclusion is that cooperatives operate as economically weak entities on the market. Although economic weak, these cooperatives are indispensable for small and medium-sized farmers who, in their absence, would not be able in most cases to set up the production or achieve appropriate conditions for the sale of their commodities and for collecting the proceeds from such sold products. Cooperatives

are also highly significant for the processing industry, intermediaries in trade and end-consumers who purchase in one place, through them, the quantity of goods that they would otherwise have to contract with, or buy from, a large number of farmers if cooperatives did not exist.

Creation of a critical intellectual mass in the village is one of the crucial conditions for employment of experts who need to be a locomotive of a faster transfer of technology and knowledge, more efficient and better marketing of agricultural commodities and successful management of farm cooperatives that need to become a focal point of agricultural development of the country (Zeuli, Cropp 2004). Cooperatives are also the protagonists of rural development as confirmed by the history of the cooperative movement, which is currently one of the leading problems in Serbia (Gulen, 2013). This gives additional value to the cooperatives and points to their great importance and role in the economic development of Serbia. In the following text we are presenting one of the coops successful stories in the area of primary agricultural production with the good prospects for further development.

## Business Case of Farmers' Cooperative (FC) Gospodjinci

The Cooperative was formed on 06 October 1993 as a consequence of the transformation of the old former cooperative into a socially-owned agricultural manufacturing enterprise. Former cooperative members were suddenly deprived of the support they had enjoyed by that time. Twenty-seven (27) of them got associated in a cooperative in order to jointly perform certain activities as cooperative members. In this way, FC Gospodjinci found itself in a group of **new cooperatives** in that conditional division into new and old cooperatives, which is generally adhered to. These new cooperatives can also be conditionally divided into three dub-groups: a) "Private" cooperatives – which sounds paradoxically; however, common sense leads one to make such a conclusion based on the perusal of the entries in the Business Registers Agency where several persons with the same name and surname can be found among the founders; b) "Donation cooperatives" – resulting from the donations from the projects, a large number of which could not survive after the cease of money inflow from donations; and c) Genuine new cooperatives – originating from the need of agricultural producers, such as the cooperative in Gospodjinci.

**FC Gospodjinci engages in organization of primary agricultural production,** in view of the fact that it was formed without fixed assets. FC Gospodjinci has one hundred equal coop members. Besides those members, there are about 70 to 100 non-members which are cooperating on contract bases with the organization. Cooperative members contributed only their original cash capital, but not the land, with an intention to perform through the cooperative certain works jointly at lower costs. **The Cooperative performs the following activities**:

a) **contracting production** – cooperative members and contract farmers voluntarily contract the sales through the cooperative. Sale of 100% of crop farming products

is contracted through the cooperative, as well as a part of vegetable growing production. However, cooperative members and contract farmers are free and frequently contract the sale of vegetables individually. Many of them are highly competitive and produce 70-80 t/ha of various vegetables, which is at European level. As channels for the sale of vegetables are still open for individual producers, particularly for products for which, apart from the domestic there is a marked foreign demand (USAID, 2008, pp.35-37), they often prefer individual sales. However, taking into account the poor financial standing of numerous processing companies (facing bankruptcy) that are no longer reliable buyers (payers), the need for the cooperative's services is increasing here as well

b) **leasing infrastructure** (buying stations, silos, etc.)

c) **advisory services** – since 2006 has also been recruited a plant protection engineer. His role is to provide in the field basic advice and seek answer in other places to more complex questions that he is not able to provide in the field

d) **agricultural pharmacy** – direct payment or even deferred payment after the harvest

e) **supply of intermediates** at more favourable prices and terms of payment. Services are used by the cooperative members and contract farmers, or by about 70% of agricultural community in the village.

**The key factors of success** entailed a successful performance of the listed activities by the cooperative and its further growth. The figure of 27 cooperative members in 1993 rose to 54 in 2003. Cooperative members and contract farmers are now cultivating about 2,500 ha. The basic factor of the cooperative's growth is **confidence**. Director of the cooperative is always one of the cooperative members. Secondly, cooperative members have invested **their personal money contributions** in the cooperative, which happened particularly dramatically during the purchase of business premises. The third factor of success was a fruit of **professionalization of management.** The fourth factor of success is the accession of FC Gospodjinci to **business association** "Vojvodina Agrar", which represents collectively 26 members of the association in negotiations with the buyers (processing companies and exporters) and other business partners. It suffices to say that this association is the largest single supplier of the leading soya processing plant in Serbia, Victoria Group, with a share of about 40%. The fifth factor is the fact that the cooperative has at least partially settled one of the biggest problems faced by the farmers in Serbia, the access to bank loans.

**The turning point of the growth** took place in 2003 within the participation in the international project with the development agency "Jaeren Produktutvikling" of Stavanger, Rogaland District in the south-west Norway. This development agency had already been engaged in development projects in Norway, Croatia and Bosnia and Herzegovina. They started working in Serbia in 2002 with the cooperatives in Bač and in Gornja Jarušnica. In June 2003, FC "Gospodjinci", FC "Srbobran" of Srbobran, FC "Agro-Rača" of Rača, and FC "Resnik" of Resnik joined the project. In 2005, FC "Brazda" in Rusko selo and FC "Sebečevo" near Novi Pazar also joined. It is interesting to note that almost all of these

cooperatives originate in multiethnic regions with an intention, *inter alia*, to improve the economic ambiance in these socially sensitive environments. FC "Gospodjinci" joined as one of the smallest among these cooperatives, but very soon outgrew many of them in terms of turnover. The project brought two donations. The first, standard donation according to the project programme, involved a total sum of EUR 350,000, which was distributed according to the following formula: 70% of the funds to the cooperative members and 30 % to the cooperative. Cooperative members were approved a loan of EUR 5000 on a 5-year term for the purchase of machinery or a foundation stock. The cooperative could use its part for infrastructure. Thus, an extruder for soya bean was purchased, an electronic truck scale of a 50t capacity was built, and the storage space within the cooperative was adapted.

The second donation was a non-standard grant for the purchase of the former plant for filling steel cartridges with $CO_2$ gas of "Karbodioksid" factory of Bečej, which was transformed into the cooperative's head office. This fully arranged and equipped space (electric power, water-supply, access road, buildings) was at sale for DEM 90,000 only. The Norwegian project did not include in its program such a type of support, but the project team rightly assessed that this could be a key step for the cooperative's development. A condition was imposed that the cooperative provide one half of the necessary money. In three days, cooperative members managed to raise about 1 million dinars, and ensured financial assistance from Žabalj Municipality worth 0.4 million dinars. This sum represented more than one-half of the necessary money and was sufficient for the Norwegian project to approve the second half of the necessary funds. The Cooperative got its head-office, storage space, administration building, agricultural pharmacy, etc.

**Professionalization of management gave additional impetus to the development.** The Norwegian project required recruitment of a professional director. By that time, directors worked on a voluntary basis. For this purpose was provided a new grant in the form of one-year salary (in a modest amount of about EUR 300 per month). In such circumstances, one of the cooperative members, a graduate agronomist, became director which function he has been discharging successfully ever since. The cooperative has also been enabled to assist its members in technical terms by developing its third type of activity, advisory services. The grant earmarked for the director's salary was used, instead for the salary, to develop the fourth activity – purchase of the first stocks of commercial goods for the agricultural pharmacy. The pharmacy justified its existence in the first year having realized a turnover of 4 million dinars. Managing director fits perfectly in the process of decision making, proposed by the Law on the Coops. All 100 coop members are participants to the governing body of the coop (Parliament of the Coop). From the ranks of this governing body seven members are chosen for the Executive Board and 3 members for the Supervisory Board. Managing Director is as well elected from the ranks of the governing body. On the temporary basis the coop is engaging consultants for agriculture issues from the private as well as the state sector. The contractually involved cooperants are not allowed to participate in the aforementioned process of governing the coop.

**FC "Gospodjinci" is currently a successful cooperative.** Since 2012, the cooperative has its silo and a buying station, the infrastructure which additionally raises security on the side of cooperative members - producers. Current performance is very good. Today, FC "Gospodjinci" has annual turnover of about EUR 2 million. Out of this figure, the pharmacy's share in the said turnover is about 70-80 million dinars (EUR 600,000-700,000). The cooperative employs 7 persons on a full-time basis: director (1), plant protection engineer (1), bookkeeper (1), unloading station and silo (1), pharmacy (2), supporting worker (1). Cooperative members, contract farmers and employees are economically motivated for cooperation and work.

**One of the essential factors of unity is also the undertaking of some social functions** by the cooperative. The cooperative is the central institution in the village. It is the place where villagers buy intermediates, sell their products, get advice and store their goods. Also, they find in the cooperative a support for their numerous social activities, such as the work of sport clubs, organization of cultural and sports manifestations, etc (Merrett, Walzer, 2012). They see the future in the strengthening of integral production and in further promotion of cooperatives' joining business associations.

In the former SFRY, cooperatives were based upon association of farmers with small holdings. Average size of a holding was about 4ha per household. Such a holding is economically unsustainable. This is why the existing regulations are oriented towards enlargement of the average holding size, which is expected in the period between 2014 and 2020. Private agricultural production in the SFRY was after 1945 brought down to the production on small holdings while large-scale primary agricultural production was shifted to agro-industrial complexes and only partially to cooperatives. In contemporary circumstances, large-scale private agricultural production is renewing, and holdings are getting larger and larger. **Is there a room for cooperatives in this division of labour?**

Cooperatives have numerous defects:

  a) Management system is complicated and sluggish; cooperative members who are decision-makers are sometimes not sufficiently informed or technically competent to assess or forecast  how events will be unfolding;

  b) Equality of cooperative members in the decision-making represents a barrier when a loan needs to be guaranteed or when pooling of assets requires participation because some of the members cannot participate at all or can participate with a smaller share, but always have the same vote in the decision-making. Cooperative members who are able to bear the risk are not motivated due to possible risk/benefit asymmetry;

  c) Cooperatives' management is sometimes insufficiently professional and does not match the needs of modern agricultural production. Also, (in)competence of cooperative members as such limits their abilities to control the management;

  d) Cooperatives either do not have property (new ones) or the property is treated as socially owned and the disposal of which requires consent of the Privatization

Agency through a long and uncertain process;

e) The Law on Cooperative Farming is understated – it is neither possible to buy a cooperative nor otherwise transform it in business terms; there is a large number of actions filed concerning the cooperatives because of the unclear status.

On the other side, cooperatives have a great number of advantages (Zakić, Stojanović, 2009):

a) Trust of cooperative members in collective work, particularly strengthened through the system of collective decision-making and entrusting enforcement of the decisions and reporting on their implementation to one of their members (director);

b) Non-profit nature of the cooperative – which assures the participants in the collective operation that only most necessary costs will be collected;

c) Social functions of the cooperative – for which it is easier to accept than it is for a company, due to its non-profit nature, the financing of social activities in the village.

Cooperatives, in Serbian economy, are moving in the right direction, but slowly and often in back and forth manner.

### Framework for future development

It is evident that the development of the cooperative sector in Serbia came to a halt almost two decades ago and that there is no adequate solution. A question can be raised as to what is it so complicated that causes such a long standstill? Several different legal issues cumulated by the evolution of cooperative farming in Serbia have been simultaneously preventing the development of this concrete segment.

Cooperative farming improvement strategy in Serbia would need to rest on the below listed principles.

**Settlement of property rights relations** – legal status of cooperatives' and/or cooperative unions' property recorded as social or state ownership. Property status determination will, *inter alia*, make it possible for cooperatives to use such property as an instrument securing the repayment of bank loans.

**The legal matter will need to be consolidated** so as to ensure the internal and external harmonization of legal regulations. New regulations will lay down the foundations of modern cooperative policy and a relevant legislative-legal ambiance for implementation of the reform in the cooperative sector. Legal recognition and regulation of a higher degree of autonomy of the cooperative sector within the category of economic entities will create a legal basis for enactment of adequate incentives and facilities in separate laws.

**Reorganization of cooperative unions** needs to be oriented towards placing accent on their business functions. The reorganization will need to reflect primarily in the performance of commercial functions aimed at ensuring better market conditions both on the side of purchase and sale for all cooperatives – members of cooperative unions. Also, it would be necessary for the reorganization to go towards autonomy of the association formed by the

cooperatives on the basis of their free association, and not to be a practically state body vested with public authorizations and powers (Mijatović, Paunović, Kovačević, 2012).

**Establishment of a new legal concept of cooperative audit** will upgrade the work in the area of cooperative audit, in conformity with positive examples from the world practice.

The cooperative sector is not able to settle the above issues without the influence of the state. Independent acting of market mechanisms has already led to a significant decrease in the number of active cooperatives and even to their disappearance in some parts of the country. Absence of active government measures would result in implosion of this segment of business operation in the long run.

**A set of different measures is in place** which can be used by the government to help further development of the cooperative movement in Serbia. **The first set** includes the measures of regulatory nature. Adoption of the new law would help arrange in a much better way the form and organization of cooperatives, their management, funding and property with an accent placed on the return of socially- and state-owned property to cooperate ownership.

**The second set of measures**, non-regulatory and economic in nature, relates to stimulating cooperative development. These measures include subsidies and other types of government assistance (inviting applications for participation in programs and projects). This set also includes the measures of social nature, with a lower level of government intervention, such as various forms of information, educational and media campaigns aimed at raising the level of awareness on the side cooperative members and users of cooperatives' products and services (Šunderić, 2008). Also significant are the measures for raising the level of professionalism of cooperative members, and those relating to the strengthening of social responsibility (Deller, Hoyt, Hueth, 2009). Genuine effects of these measures will be accomplished only if they will follow the application of the law that has settled the essential issues in advance.

The expected improvement of the business environment should stem from the new law on cooperatives, which is to be proposed by the Ministry of Economy. It will be the basis for the simple and clear way to regulate this area and would contribute to increased motivation and interest in the establishment of cooperatives. In addition to the Law on cooperatives, better development of the cooperative sector will be supported by the development of Law on internal organization of the agricultural market, currently under the jurisdiction of the Ministry of Agriculture and Environment. This regulation will define the organization of agricultural producers that would be licensed and controlled by the Directorate for Agrarian Payments. These organizations are, in essence, associations of all producers of one kind of product. They are significant for the state administration because they represent a single point of contact with all producers of that product, which co-operatives are currently not providing. Furthermore, the improvement of the cooperative sector will be achieved through the inclusion of advisers for agricultural associations to assist in the creation, establishment and more efficient functioning of the cooperatives in Serbia.

## Conclusions

Change and creation of a stimulating legal framework and settlement of the property status of old cooperatives is the first and the most important task in the creation of a favourable ambiance for a successful development of cooperatives in Serbia. The issue of cooperative property disposal dates back to 1974, followed by two unsuccessful attempts for its settlement in 1990 and 1996, so that the outcome is a very small number of decided court cases.

Government support is necessary, in reasonable amounts, however, and targeted in a manner to spur the activities that produce specifically defined effects (Iliopoulos, 2013). It is advisable to avoid leasing in the cooperative sector, and also the negative discrimination of the private sector (Mijatović, Paunović, Kovačević, 2012).

Cooperative unions must get reorganized by putting in the focus of their work the interest of the cooperatives instead of the interest of own administration and the state. Cooperative unions which help accomplishment of the market objectives of their members contribute to the settlement of diverse issues of the member cooperatives, enable networking and exchange of experience and knowledge, and also lobby for a better position of the cooperatives, such as the Cooperative Union of Vojvodina, contribute to the recognition of the cooperatives' role in the national economy (Ševarlić, 2012).

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# ZADRUGE U SRBIJI – RAZVOJ I AKTUELNA PITANJA

*Biljana Chroneos Krasavac[3], Goran Petković[4]*

## Rezime

*Zadruge u Srbiji imaju duboko istorijsko nasleđe, razvijajući se od tradicionalnih poljoprivrednih porodica do savremenih socijalno umreženih organizacija, a ponekad i privatnih kompanija koje se ponašaju kao zadruge. Postojeći pravni okvir sa jedne strane, otvara prostor za čitav niz mogućnosti, dok sa druge strane, na određeni način, onemogućava dalji razvoj zadruga u Srbiji. Intervju sa ključnim akterima u sektoru zadrugarstva je istraživački metod koji je korišćen u radu. Ostali istraživački metodi uključuju istorijski metod, metod komparativne analize kao i metod studije slučaja. Radom se zaključuje da je pravni status zadružne svojine glavna prepreka daljem razvoju zadruga u Srbiji. Među ostalim ključnim preprekama navode se: stepen ili nivo državnog mešanja, lojalnost primarnih proizvođača i ostalih učesnika, prosečna veličina poseda po gazdinstvu, itd. Rad se sastoji iz tri dela: istorijat razvoja, studija uspešnog slučaja, okvir i smernice budućeg razvoja.*

***Ključne reči:*** zadruge*, pravni okvir, vlasništvo, poljoprivredno gazdinstvo, individualni proizvođači*

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# TAX TREATEMENT OF FARMERS IN THE REPUBLIC OF SERBIA

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## Summary

*The subject of this paper is the tax treatment of natural persons that perform agricultural activities in the Republic of Serbia. The goal of the paper was to analyse norms related to the most important taxes that burden farmers, to assess their status in the Serbian tax system, as well as to formulate appropriate de lege ferenda propositions. The research showed that in many aspects farmers have privileged tax treatment due to the importance of agriculture in national economy, as well as their number and social-economic profile. Apart from the normative method, which was used predominantly, sociological, axiological and comparative methods were also used.*

***Key words:** farmers, property tax, income tax, VAT.*

**JEL**: *K34, Q19*

## Introducton

Agriculture is an extremely important economic activity and crucial precondition of economic development of any country. Its status is somewhat specific because, apart from the economic, it also has social and ecological importance. However, taxation of agriculture while respecting fairness, efficiency, abundance and simplicity is not an easy task. Moreover, in finance literature there is a standpoint that agriculture is the sector that is very difficult to tax (Rajaraman, 2004).

In order to comprehend the overall support that state provides to natural persons that perform agricultural activities (hereafter referred to as 'farmers'), it is necessary to consider not only subsidies, but also tax expenditures, i.e. 'lost revenues'. Due to the fact that they are less visible than subsidies, without their detailed consideration it

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could be concluded that support to farmers is not enough, i.e. 'ignoring tax concessions leads to an understatement of the real extent of government involvement in agriculture' (OECD, 2006). Despite the fact that 'lost revenues' from agriculture are not too high, because taxes levied on agriculture have small portion in total taxes (Fabris, Pejović, 2012), they must not be ignored.

According to the data collected within the agriculture census in 2012, among enumerated agricultural holdings, 99.5% are owned by natural persons, while the average economic power of family agricultural holding in 2012 was 4.990 € (Cvijanović, Subić, Paraušić, 2014). If, together with the above mentioned, we take into consideration the fact that the number of members and full time employees on agricultural holdings in the Republic of Serbia is 1.44 million, and that 98% of this number are owners and members of agricultural holdings (Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, 2013), what implies that Serbia is 'overwhelmingly agrarian country' (Mihailović, Paraušić, Cvijanović, 2012), the importance of reviewing tax treatment of farmers becomes evident. Taking into consideration that revenues from certain taxes that burden farmers (property tax and tax on revenue from agriculture and forestry, i.e. tax on revenue from self-employment) belong to local budgets, it is important to emphasise that way of their regulation also affects the degree of fiscal autonomy of units of local self-government.

The goal of the paper is to analyse and assess tax treatment of farmers in the Republic of Serbia, to point out advantages and disadvantages of legal solutions, to determine their *ratio legis* and to formulate appropriate *de lege ferenda* propositions. The basic hypothesis from which we started in our research is based on the premise that Serbian legislator, through tax system, provides the privileged treatment of farmers. In order to confirm that hypothesis, the most important taxes (understood in the narrowest sense), to which farmers are subject, are will be analysed. These are property tax, income tax (tax on revenue from agriculture) and value added tax.

## Methods of research

The subject matter of the paper is approached by using classical methods of research of law. In order to reveal logical content of norms dedicated to the tax treatment of farmers in the Republic of Serbia, the initial method, like in any other research of law, was normative method. Sociological method is used in order to explain social causes of norms and axiological method in order to determine their *ratio legis*. The application of comparative method was of crucial importance for consideration of legal solutions that exist in comparative law, in order to find the one that is best suited for implementation in the Republic of Serbia.

## Property tax

Given that the property tax is paid on real estate, when reviewing fiscal treatment of farmers, the issues of tax treatment of agricultural land and objects used for agricultural production deserve special attention.

The property tax is paid on property right on agricultural land, but only for those whose surface is larger than 10 acres (Article 2, paragraph 1, point 1) of the Law on Property Taxes). Amendments of the Law on Property Taxes from 2013 erased the provision that prescribed that the property tax is paid on the difference between the total surface of land and surface of 10 acres, which means that, according to the applicable solution, in case of exceeding the limit of 10 acres, the property tax will be paid on the entire surface of agricultural land, which is not in accordance with on the principle of horizontal equity, and therefore it should be amended. In the context of taxation of agricultural land, a provision of the Law on Property Taxes that prescribes that property tax is paid on possession and use of real estate on which property right holder is not known or is not determined (Article 2, paragraph 1, point 6) of the Law on Property Taxes) is also important. Based on this, taxpayer could be determined, for argument's sake, in case of 'abandoned' agricultural land, which is not registered in the cadastre of real estate or during probate proceedings. Namely, although the tax liability based on the property tax in case of inheritance occurs in the moment of death of a testator, it is possible that up until the determination of an heir, agricultural land is used and in these cases person who uses agricultural land is the payer of property tax.

Personal easement (e.g. usufruct right) and right to lease agricultural land are not subject to property tax. Since large surfaces of agricultural land, especially those publicly owned, are used on the basis of the lease agreement (according to data of the Ministry of Agriculture, Forestry and Water Management from 2012, out of 2,480 million acres of agricultural land enlisted in the Register of Agricultural Holdings, 773,603 acres is leased land, out of which 40% is publicly owned agricultural land), it is clear that in these cases the property right holder, and not the lessee, is in the role of payer of property tax. However, since publicly owned real estate is exempt from property taxation, regardless of whether it is leased with the purpose of making profit (Article 12, paragraph 1, point 1) of the Law on Property Taxes; Article 12, paragraph 3 of the Law of Property Taxes), it is clear that large surfaces of agricultural land will practically remain untaxed.

With amendments of the Law on Property Tax from 2013, Serbian legislator made a radical turnaround, when it comes to laying down tax base for agricultural (and forestry) land. Tax base is no longer completely devalued amount (five times the amount of annual cadastral income from that land), but its value, determined on the basis of usable surface and average price of square metre of agricultural land in the zone in which it is located. Paying property tax on a completely worthless base could be explained only by social-political reasons, because from the fiscal and economic aspects this solution was not justified. Namely, owing to the base of property tax for agricultural land, units of local self-government were deprived of part of their revenues, which in terms of constant budget deficit is not insignificant. In addition, property tax that burdens agricultural land is tax with the least distorting effects due the fact that the offer of the land is completely inelastic. Considering that taxing goods, apart from land, will automatically mean less these goods, tax on land does not create excess of tax burden (Cohen, Caughlin, 2005).

Average price of square metre of agricultural land is calculated based on the data from at least three turnovers of agricultural land in the period from 1 January to 20 September of a year prior to the year for which property tax is assessed and paid – current year (Article 6, paragraph 1, point 5) of the Law on Property Taxes). Intention of Serbian legislator was, therefore, to make the market value of an agricultural land as the base of the property tax. Taking into consideration the circumstance that all units of local self-government will not be in possession of data on turnover of agricultural land in each of the zones on their territories, Serbian legislator prescribed that in that cases the relevant factor will be average price of a square metre of agricultural land in border zones, i.e. zones that border with the zone in which there was no turnover, regardless of the local self-government unit to which they belong. However, if border zones also do not register turnover of agricultural land, tax base will be equal to base in a current year (Article 6, paragraph 5, point 8) of the Law on Property Taxes). For example, if on the territory of a unit of local self-government there is no turnover of agricultural land in any of the prescribed zones, for purposes of assessing property tax for 2014 tax base will be equal to the base of the current year, i.e. 2013. This means that the property tax base for agricultural land will be completely devalued, because in the tax year of 2013 it was determined based on cadastral income. The 'old' tax base will be valid until units of local self-government obtain relevant data on turnover of agricultural land. Having in mind the conditions on real estate market in the Republic of Serbia, it is thought that the great number of units of local self-government will be faced with absence of data on turnover, therefore in them, despite changing the way of valuing the tax base, there will be no increase in revenues from property tax on this base. This especially refers to smaller and undeveloped units of local self-governments.

In contrast to built structures, agricultural land is subject to proportional rate (Article 11, paragraph 2, point 2) of the Law on Property Taxes). In the spirit of the fact that the property tax is a local tax, central authority prescribed only the highest allowed rate (up to 0.3%), and within this limit local self-governments determine its exact height. Prescribing the flat rate for agricultural land is justified. Otherwise, there would be a possibility for tax evasion in order to avoid higher marginal rates – division of land into a number of parcels. Having in mind that certain local self-government units, contrary to the Law, prescribed zero rate for agricultural land (Cvjetković, 2015), prescribing the minimum rate should be considered.

Although the Law on Property Taxes prescribes relatively wide scope of tax reliefs, in the context of taxation of farmers only few of them are relevant. In order to stimulate taxpayers to use agricultural land efficiently, the Law on Property Taxes prescribes tax exemption for agricultural (and forest) land which is being restored, within 5 years since the commencement of restoration (Article 12, paragraph 1, point 6) of the Law on Property Taxes). While the base of property tax was cadastral revenue, the above mentioned provision was not of greater importance. However, commitment to the concept of the taxation of the market value of agricultural land should lead to its use in the accordance with the concept of 'highest and best use' (Paugam, 1999).

The Law on Property Taxes has one other, very important, tax relief for farmers. This is tax exemption for objects that are intended and used only for primary agricultural production (Article 12, paragraph 1, point 11) of the Law of Property Taxes). These are objects for storing mechanisation, stalls for live-stock, objects for growing mushrooms, snails, fish, etc. (Article 26, paragraph 2 of the Law on Agricultural Land). In order to achieve tax exemption on this basis, it is necessary to determine whether these objects are exclusively used for primary agricultural production, i.e. it is necessary to carry out on-site inspection. Although the above mentioned solution primarily favours farmers, it cannot be disregarded that it also favours local tax authorities, which are, in that way, spared from all difficulties related to valuation of objects that are used exclusively for primary agricultural production, because they are rarely singly on the market.

Farmers in the Republic of Serbia have the possibility to exercise tax exemption for agricultural land on one more basis. It is exemption of very low-value property that is motivated by social-political and administrative reasons. Namely, property tax on the territory of one unit of a local self-government is not paid by taxpayer when total base for all his real estate on that territory does not exceed 400,000 RSD (Article 12, paragraph 2 of the Law of Property Taxes). Having in mind the average price of a square metre of agricultural land, the importance of this provision is clear, when it comes to agricultural land of smaller surfaces located in the peripheral zones of the undeveloped units of local self-governments. For example, the average price of a square metre of agricultural land for determining property tax for 2014 on the territory of Crna Trava municipality in the fourth zone is 54.90 RSD, in Kuršumlija municipality in the fifth zone is 16.00 RSD, and in Babušnica municipality in the fifth zone only 14.70 RSD. In cases when base of the property tax for agricultural land in tax year, due to lack of data on turnover, is based on cadastral revenue, it is highly likely that, based on the Article 12, paragraph 2 of the Law on Property Taxes, tax exemption right can be exercised. All above mentioned tax exemptions for agricultural land and objects intended for primary agricultural production will not be applied if they are permanently given to other persons for making profit (Article 12, paragraph 3 of the Law on Property Taxes).

The property tax will also not be paid on agricultural land that a taxpayer lends without compensation to a person who was driven out after 1 August 1995, on condition that driven out person and members of his/her household do not earn revenues on some other grounds (Article 12, paragraph 5 of the Law on Property Taxes). Behind this tax exemption lies, primarily, social-political reasons, although economic reasons cannot be disregarded, in cases when taxpayer lends without compensation uncultivated agricultural land.

Comparative analysis points out that the privileged treatment of agricultural land, from the aspect of property tax, is very common solution. For example, in FYR Macedonia (Article 8 of Law on Property Tax) and Bulgaria (Lozev, 2010) agricultural land is completely exempted from taxation, while in Republic of Srpska tax exemption is prescribed for cultivated agricultural land, which serves only for the own agricultural production (Article 9 of Law on Real Estate Tax). There are also solutions (Latvia,

Armenia) that provide privileged treatment of agricultural land through normative value as the base of property tax, which significantly differs from market value, and which is usually calculated based on presumptive revenue from agricultural land (Ganzenko, 2010; Kronbergs, 2010). In financial literature there are stances that, in the field of property tax, it is necessary to review tax reliefs prescribed for agricultural land, since the agricultural sector in most countries already has privileged treatment in terms of income tax, and since such a treatment necessarily means increased tax burden of other sectors of economy (Bahl, Wallace, 2010), i.e. stances that preferential treatment of agricultural land is 'major factor constraining the process by which farming adjusts changing economic and technical conditions and reform' (OECD, 2006).

## Tax on revenue from agriculture

The choice of the base of tax on revenue from agriculture is, certainly, one of the most prominent dilemmas in this area. Confusion exists whether this tax should be conceived as real (factual) or as a presumptive tax. Its solution depends on what is the priority for the legislator: fairness, on one hand, or administrative-technical reasons and political goals, on the other. Although taxing actual revenue earned by performing agricultural activities is, by far, the fairest solution because it is in accordance with the ability to pay principle, it is, also, linked with serious administrative-technical difficulties. Namely, a part of farmers' revenues remains outside tax authorities' reach. This, primarily, includes the revenues earned by selling agricultural products on green markets, as well as revenues that would be earned if products indented for personal use would be sold on the market.

Since 2013 in Serbian tax law there is no longer tax on revenue from agriculture and forestry. It was a tax which was paid on presumptive revenue from the land, i.e. cadastral revenue, except when taxpayers opt to pay tax based on actual revenue, which happened very rarely in practice. Its repeal did not lead to loss of revenues for units of local self-governments (revenue from this tax was completely given to them), since this tax had not been paid at all for years. Namely, tax obligation was absurdly small because revaluation of cadastral revenue has not been done since the middle of the 1990s, in order not to 'irritate' the significant number of the electoral body – farmers (Popović, 2011). Thus, the Serbian legislator 'gallantly' freed farmers from paying tax on revenue from agriculture and forestry on cadastral revenue, because otherwise administrative costs would be higher than collected revenues.

From 2013 revenue from agriculture and forestry is classified as revenue from self-employment, and therefore in the role of a taxpayer are natural persons – the holders of family agricultural holdings listed in the Register of Agricultural Holdings that keep books (Article 31, paragraph 1; Article 32, paragraph 2 of the Law on Individual Income Tax). The above mentioned provision created confusion in terms of whether all holders of family agricultural holdings become entrepreneurs, i.e. whether all of them have obligation, as entrepreneurs, to keep books. Dilemma was resolved in 2013 prescribing that natural persons who earn revenue from agriculture and forestry achieve

the status of entrepreneur and have an obligation to keep books only under the following conditions: 1. if a holder of the registered agricultural holding chooses to have a status of an entrepreneur by submitting application to the competent tax authority; 2. if the registered agricultural holding is taxpayer of VAT (Ministry of Finance of Republic of Serbia – Tax Adminstration, 2013).

Article 85, paragraph 1, point 16) of the Law on Individual Income Tax prescribes that revenue from selling agricultural products earned by holders of agricultural holdings, users of agricultural pension and persons who pay contributions for mandatory social insurance on the basis of decision of tax authority, are not treated as other revenues, in terms of that law, and will not, therefore, be taxed. Following legal provisions, if revenue from selling agricultural products are earned by other persons (e.g. members of agricultural holding), that revenue will be treated as other revenue and they will be taxed on the rate of 20%, with recognition of standard expenditures of 90%.

Having in mind the above mentioned, it is clear that a large number of farmers in the Republic of Serbia will not be obliged to pay the individual income tax. Therefore, despite law amendments, the situation is more or less the same. Farmers in the field of taxing their revenue still have privileged treatment. It is not rare solution, i.e. privileged treatment of farmers in the field of taxation of income is a common occurrence, especially in developing countries (Rajaraman, 2004). Situation is different in developed countries. Some of them (USA, Canada) tax agricultural activities as other activities, i.e. they successfully overcame difficulties related to taxation of actual revenue (Andersen *et al.*, 2002), while others take into account administrative and social-political constraints related to the taxation of actual revenue. For example, in Germany the size and value of an estate is a key factor that determines whether taxpayer will pay tax on actual revenue determined in books or on presumptive revenue determined based on the value of land (Andersen *et al.*, 2002). In Poland only special type of agricultural holdings which perform certain agricultural activities (production in greenhouses and plastic tunnels, fungi production, etc.) are in the system of personal income tax. They pay tax on estimated annual income (which is determined based on area or the number of animals), or on actual income determined in books (Soliwoda, Pawlowska-Tyszko, 2014). Other farmers, like farmers in Serbia, pay only agricultural tax which is kind of property tax (Parlińska, 2008). Therefore, comparative analysis showed variety of solutions in this area. In essence, farmers' income may be determined on the basis of entries in books, simplified accounting records, the size of estate and other methods of estimation (Soliwoda, Pawlowska-Tyszko, 2014).

Not taxing revenues earned by farmers is pronouncedly unfair from the aspect of taxpayers who earned revenue in same amount on some other basis. Therefore, although their economic power is the same, they are taxed completely differently. Considering that taxation of actual revenue is currently not feasible, the solution for this situation could be implementation of lump sum taxing, i.e. taxation of presumptive revenue that would be determined on the basis 'relatively rigid way to some factor or factors that can be more easily verified than income itself' (Rao, 1989). The easiest solution would

be to revaluate cadastral revenue. At the same time it would be an important step in alleviating the qualitative discrimination of revenues. In financial literature there are viewpoints that the cadastral revenue as the base of tax on revenue from agriculture is a good solution for several reasons. Firstly, due to its height, it encourages development of agriculture and leads to lower prices of agricultural products. Secondly, it does not affect the behaviour of farmers, because it is not paid on actual revenue. Thirdly, the tax on cadastral revenue is an 'old' tax to which taxpayers are accustomed (Begović, *et al.*, 2004). Moreover, it provides certainty in terms of the sum of tax obligation. All of this resulted in fact that taxing based on presumptive revenue is done in many countries of different level of development. Although tax conceived in this way provides relatively modest revenues, the fact that with this tax there is significantly less evasion, when compared to tax based on actual revenue, should not be disregarded (Khan 2001). On the other hand, disadvantages of the tax on revenue from agriculture whose tax base is presumptive revenue, apart from unfairness and poor revenue yield, include its static nature, so its revaluation is necessity.

## VAT

In principle, farmers in the Republic of Serbia are not VAT payers, even in cases when their total turnover is more than 8,000,000 RSD. Their entrance into the VAT system is voluntary, i.e. they can choose to pay the VAT by submitting registration application, in which case the obligation to pay the VAT lasts for at least two years (Article 34, paragraphs 5-7 of the Law on Value Added Tax). After the period of two years, the status of VAT payer does not seize by virtue of law, but a taxpayer must submit the appropriate request. Situation is somewhat different when it comes to farmers who have the status of an entrepreneur and who keep books. Namely, they acquire the status of VAT payer if they achieve the total turnover higher than 8,000,000 RSD. However, since they choose freely whether to have the status of an entrepreneur, the willingness to enter the VAT system can be seen in this choice. When they enter into the VAT system, farmers are subject to the same treatments like other VAT payers.

Privileged treatment of farmers is reflected in prescribing reduced rates for certain agricultural products. In financial literature there are stances that prescribing reduced rates for agricultural products results in negative protection of agricultural, i.e. this solution does not make distribution of income more equal, because only urban poor may have gained trough lower food price, but not rural poor (Jonson, 1993), and that pure consumption subsidies are much better solution (Alston et al., 1999).

Serbian farmers that are not in the VAT system have the right to VAT compensation. Namely, VAT payers that purchase agricultural or forestry products and agricultural services from farmers that are not VAT payers, will be discriminated when compared to other taxpayers who purchase the same goods and services from other taxpayers, because they cannot deduct the input tax (since a farmer does not calculate the VAT), from the VAT they owe (Popović, 2011). Therefore, the VAT compensation is recognised for agricultural and forestry goods, as well as agricultural services supplied by farmers

to VAT payers in the amount of 8% of the value of received goods and services. VAT payers will in return be able to deduct the VAT compensation as the input tax, providing they paid it to a farmer together with the value of received goods and services (Article 34, paragraphs 1-4 of the Law on Value Added Tax). Taking into consideration the right of a farmer to the VAT compensation on one hand, and voluntary entrance into the VAT system on the other, it is logical that those farmers, who estimate that the VAT they pay on inputs they purchase is higher than the sum of the VAT compensation in the special regime, will choose to enter the VAT system (Ilić-Popov, 2005).

Although they are not in the VAT system and, therefore, they do not have the right to deduction of the input tax, with the VAT compensation, in an indirect way, farmers compensate costs on account of the VAT paid when procuring various inputs, like agricultural machines, fertilisers and the like (Ilić-Popov, 2005). It is important to stress that farmers will not be entitled to the VAT compensation for all goods and services they placed on the market, but only for agricultural goods and services. When determining whether the goods or services can be categorised as agricultural goods, i.e. as agricultural service, the Regulation on Activity Classification is of crucial importance. Having in mind its provisions, agricultural goods are deemed to be products obtained by cultivating plants (grains, fruit, vegetables, etc.), cultivating seedlings, etc., and agricultural services are deemed to be various services in planting crops with compensation (e.g. services of sowing, reaping, pest control, pruning of orchards and vineyards, etc.). In the Regulation on Activity Classification it is stressed that agricultural activities exclude further processing of agricultural products, which is classified in special areas – production of food and tobacco products, production of drinks, except such processing which enables preparation of products for the market (cleaning, sorting, protection against rotting). This would mean that farmers will not be entitled to the VAT compensation if they sell, for example, cottage cheese, brandy, wine, etc. to a VAT payer. VAT compensation is also exempt from the taxable income (Article 9, paragraph 1, point 25) of the Law on Individual Income Tax).

Therefore, farmers in the Republic of Serbia, in terms of VAT, have a privileged treatment, which can be seen in several aspects. With these solutions, as a candidate country for the membership in the European Union, the Republic of Serbia completely follows the rules of the Sixth Directive.

## Final remarks

In order to get comprehensive picture of the support that state provides to farmers, it is necessary to take into account 'lost revenues', i.e. revenues that state loses by prescribing rules that deviate from general regime of taxation. The research confirms the largest part of the basic hypothesis – in tax system of the Republic of Serbia farmers have privileged treatment, except in the area of taxation of agricultural land. This treatment is the result of their role in providing basic life and economic needs, their number and social-economic profile, as well as their average economic power. Therefore, their tax treatment is influenced by social-politic and economic goals, which

prevail over fiscal goals. However, we should not disregard the fact that the privileged treatment of farmers in some cases is result of administrative constraints.

Serbian legislator made a radical turnaround when it comes to determining tax base of agricultural (and forestry) land, in sense that it is market value. It is important step, not only from fiscal, but also from economic aspect. Taxation of market value of agricultural land will mean more revenues for local budgets, its efficient use, as well as providing a greater degree of equity since market value of agricultural land is one of the indicators of economic power of taxpayers. However, lack of data on turnover of agricultural land in many units of local self-governments on the territory of the Republic of Serbia will lead to the state where concept of taxing market value of agricultural land will not be fully implemented. Therefore, local tax administrations should make efforts in order to find data on turnover of agricultural land. In that sense they should establish closer cooperation with Tax Administration and other subjects (real estate agencies, Register of Real Estate Turnover). When it comes to taxation objects that are intended and used only for primary agricultural production, Serbian system of property taxation still 'favours' farmers. Although it should take a stand that any real estate must be taxed, currently this is acceptable solution because these objects are not singly on the market, so their valuation would be problematic.

Unlike property tax, farmers in the Republic of Serbia in the field of income tax still have privileged treatment, which can be observed in the fact that most of them will not be obliged to pay individual income tax, which is pronouncedly unfair solution, especially when it comes to farmers who are owners of big estate. Having in mind that such solution means lost budget's revenues, it could be treated as form of hidden subsidizing of farmers. Considering that taxing real revenue of farmers is linked to serious administrative-technical difficulties, it is necessary to adopt second best solution – taxation of presumptive revenue. Having in mind the state in the Republic of Serbia, it would be best to use the existing framework – cadastral revenue, i.e. it would be best to conduct its revaluation. Although this would mean investing significant material resources and administrative efforts, it seems the greater challenges for revaluation of cadastral revenue is the lack of political willingness to make structural changes in this area, because from the point of view of fairness, i.e. equality, the existing solution is unsustainable. Full implementation of concept of taxing market value of agricultural land in the future will provide alternative to the revaluation of cadastral revenue, i.e. determined value of agricultural land for the purpose of property taxation could be parameter for determining the amount of presumptive revenue from that land.

Although comparative analysis showed that privileged treatment of farmers in the field of the property tax and VAT is common, due to the importance of agriculture in national economy, non-taxation of revenue generated in this sector is not common. Serbian legislator should be aware of this when finding solutions in this field in the future.

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# PORESKI TRETMAN POLJOPRIVREDNIKA U REPUBLICI SRBIJI

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### *Rezime*

*Predmet analize ovog rada je poreski treman fizičkih lica koja obavljaju poljoprivrednu delatnost u Republici Srbiji. Cilj rada je da se, kroz analizu zakonodavstva, ukaže ne prednosti i nedostatke normi koje se odnose na najznačajnije poreze koji terete poljoprivrednike, da se oceni njihov položaj u srpskom poreskom sistemu, kao i da se formulišu odgovarajući predlozi de lege ferenda. Istraživanje je pokazalo da u mnogim aspektima poljoprivrednici imaju privilegovani poreski tretman zbog važnosti poljoprivrede za nacionalnu ekonomiju, kao i zbog njihove brojnosti i socio-ekonomskog profila. Osim normativnog metoda, kao najvažnijeg, u radu je korišćen i sociološki, aksiološki i komparativni metod.*

**Ključne reči**: *poljoprivrednici, porez na imovinu, porez na dohodak, PDV.*

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# RESOURCES FOR DEVELOPMENTOF THE RAČA MUNICIPALITY AS A RURAL TOURISM DESTINATION

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## Summary

*The attractiveness of rural areas is the basis for development of tourist offer of rural tourism destination. Bearing in mind that the villages are ecologically and environmentally preserved integrities, it is a sustainable form of tourism, which contributes to the development of rural economy. Villages that foster traditional values are of attractive tourist destinations. Staying of tourists in the villages enables active involvement of other economic activities in the creation of the integrated tourism product. Tourism of the Rača Municipality, despite the existence of attractive resources, is not adequately developed. Tourist offer is of amodest scale and based on the sites of cultural and historical heritage and events. The development of tourism in this municipality requires institutional support of local government, investments and cooperation of holders of the tourism offer.*

*In this paper, the emphasis is on the analysis of the current situation of tourism development in the municipality of Rača, with emphasis on resources for the development of rural tourism. Based on examples of good practice - rural tourism destinations in Europe and Serbia, the contribution of labor is reflected in providing guidelines for the future development of rural tourism in Rača.*

***Keywords:*** *Rača Municipality, rural tourism, rural tourism destinations, Europe, Serbia.*

**JEL:** *L83,O13, R00,Q13*

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## Introduction

Rural areas represent a high potential for tourism development. They are characterized by natural areas, which have their own characteristics: natural landscapes, anthropological achievements, building styles in architecture, customs, traditions and languages (Hrabovski Tomić, 2008). The growing interest of tourists to stay in rural areas is directly related to their need to make contact with nature and learn about the culture and tradition of the city, in which they stay. Rural tourism includes a wide range of activities, services and additional facilities that provide hosts on family farms and ranches in order to attract tourists to their area aimed to create additional income, respecting the principles of sustainable development and conservation of natural resources (Muhi, 2013). According to the definition, rural tourism is an important factor in the recovery and development of rural areas. Rača has a wealth of resources, which are the basis for social, economic and socio-cultural prosperity. However, despite the potential, tourism in this municipality is not developed. Municipality of Rača includes 17 rural settlements, which are characterized by natural and human resources, adequate for the development of rural tourism. An attractive natural environment, combined with cultural and historical sites, manifestations and activities in the countryside, can greatly contribute to the overall economy of the Rača municipality.

## Method of research and sources of data

Several scientific research methods were used in order to perform scientific and expert analysis and reach corresponding conclusions and guidelines deriving from this paper. Analytic and synthetic method was based on the available literature from the area or rural tourism, rural tourism destinations and tourist destinations management. Official documents of the Municipality of Rača, as well as websites: Tourism Organization of Rača Municipality, National Tourism Organization of Serbia, Statistical Office of the Republic of Serbia, European Federation of Rural Tourism, European Parliament, Directorate-General for Internal Polices, European Commision, Directorate-General for Enterprise and Industry, together with those of selected rural destinations in Europe and Serbia, were used for collecting and selecting relevant data. Case Study method (Holloko in Hungary, Bregenzerwald in Austria, Kosjerić in Serbia) enabled us, through the experience of good practice examples, to reach certain conclusions and guidelines. Statistical analysis method was applied for processing available data from the statistical system of our country, as well as of other relevant international organizations. Conclusions were made based on inductive and deductive method.

## Rural tourism – concept and definition

The initial beginnings of rural tourism development are associated with the distant past when the privileged social classes spent their leisure time in rural areas (Vuković, Arsić, Cvijanović, 2010). Tourist activity in rural areas is significantly increased in 70-ies of XX century in developed countries. It played a key role in the development of rural areas, which have been weakened in economic and social terms (Perales, 2002). According to Cawley

and Gillmor (2008), rural areas in many countries have gone through a process of restructuring the economy since the early 90s of XX century as part of the transition from Fordist to post-Fordist production methods, where tourism has been recognized as an alternative to solve the problems such as declining of revenues, market failure, social problems, etc.

In the literature are represented the different interpretations of the concept of rural tourism and its manifest forms, which is determined by the characteristics of the rural area and the availability of resources for the development of rural tourism. According to Middleton (1982), rural way of life is recognized by a large part of the population as a synonym for a good life, which is based on clean air, natural rhythms and organic communities, who lives in the neighborhood. The author points out that every man deep down nurtures such a vision of their homeland or rural vision. Fleischer and Pizam (1997) emphasize the economic aspect of the development of rural tourism and define it as a vacation, during which the tourists most of their free time use for dealing with recreational activities at the farm, ranch, country home or its surroundings. For the host it is a commercial activity, which opens the doors to their homes and property to guests in order to enjoy in recreational activities in a predominantly rural area and to charge a certain price. Dernoi (1983) discusses the concept of tourism on farms, who believes that it is the appropriate type of holiday for families with children and not so high income. The difficulties that exist in defining the concept of rural tourism is pointed by Lane (1994), who believes that not all forms of tourism in rural areas are strictly rural. The author believes that rural tourism is a broader concept of tourism on farms and include: special interests in mind staying in nature and eco-tourism, hiking, climbing, horseback riding, adventure, sport and health tourism, hunting and fishing, educational travel, art and cultural tourism, and in some areas and ethnic tourism. A wide range of activities, which consists of rural tourism product indicate that this form of tourism has no precisely defined target group of tourists. Todorović and Štetić (2009) suggest that the definition of rural tourism based on the experience starts from the fact that tourists come into contact with the rural and natural areas, with rural events or goods of rural heritage. On the other hand, Kušen (2007) considers the concept of tourism on family farms, which he believes that the segment of rural tourism, which allows farmers to expand their activities and thus increase the value of their products. The authors represent different views when it comes to activities that make rural tourism product. However, they agree that rural tourism is an important generator of income for rural households and long-term successful development of this form of tourism must be based on the principles of sustainability.

Uniformity and monotony of everyday life in urban areas have caused the need of people to a specific time spend in a peaceful and healthy environment. Thanks to the natural, ecological and environmental characteristics, the different rural areas are very interesting and promising area for the development of this specific tourist vision (Vuković, Cecić, Cvijanović, 2007). Some of the reasons why rural areas are gaining in importance as an attractive destination as changes in global consumption patterns, tastes and attitudes, long-time employed people, new trends in travel which opened up new opportunities for producers in rural areas through the increasingly popular eco/rural tourism, such as, for example, production of food, wine and so on (Štrbac, Hamović, 2011). If we consider the

fact that each village has its attractions as environmental values, traditions, culture, events, gastronomy, leisure, etc., it is possible to develop a range of products that meet the needs of tourists, who want their holidays to spend in contact with nature.

## Analysis of the situation of Rača Municipality tourism

Municipality of Rača is one of the seven municipalities of Šumadija region. Through its territory leads the main road to Markovac-Rača-Natalinci-Topola-Aranđelovac-Lazarevac, which connects the highway Belgrade-Niš in the east with the Ibar highway to the west (Sustainable Development Strategy of the Municipality of Rača, 2009). In addition to the favorable geographical position, Rača has a wealth of resources, which are not properly valorized and utilized. The remainder of this paper will analyze the current state of development of tourism in the municipality of Rača, with special emphasis on the potential for development of rural tourism.

## The natural resources

Municipality of Rača is located in the eastern part of Šumadija. Due to the specific terrain configuration, it has the characteristics of moderate continental climate. Winters are relatively cold, slightly warmer autumn than spring and moderately warm summers. These temperature differences allow the cultivation of all major field crops and vegetables, as well as a large number of fruit crops (Spatial Plan of the Municipality of Rača, 2012).

Characteristics of relief (plain makes 45,8% and 54,2% mountain relief of the municipal territory) are very favorable for agricultural production, particularly from the perspective of organic production, which can take a special place when it comes to the development of rural tourism. In the central part of the municipality stands a hill Golubac with the peak Visak, composed of crystalline slates, height of 396 m. This is also the highest point in the municipality. Slightly lower peaks have the hills as: Bukovac (362 m), Sugreb (340 m) in the village of Borima, Vinogradi (332 m) in the Lower Jarušica and Košuća (326 m) in Vojinovac. The lowest point is located in the northeast, the border part of the municipality, at an altitude of 112 m (Sustainable Development Strategy of the Municipality of Rača, 2009).

Forest land occupies only 15% of the total territory of the municipality, which is extremely unfavorable. Forest vegetation is diverse and are represented by: oak, beech, linden, fir and others. Forest cover is degraded with wood mass, which is of poor quality. In the municipality there is a hunting ground "Bukovac" hunting area 21,571 ha, which is managed by Hunting Association „Gradište". The wildlife is represented by roe, rabbit, pheasant, quail, partridge, while predators jackal and fox. The most attractive wildlife in the hunting ground is roe deer (Tourism Development Strategy of the Municipality of Rača 2014-2019).

The Rača Municipality has developed hydrographic network. The most important rivers are the Rača and Jasenica. Rača River is the main waterway, and its middle and upper

part of the flow is belonging to the municipality of Rača. It is one of the longer river in Šumadija. Jasenica is the largest and richest river with water in Šumadija and flows north west part of the territory of the municipality of Rača. A significant but untapped potential is a source of mineral water in the village of Miraševac. The water from the springs is known for its healing properties, particularly for the treatment of rheumatic diseases, sight and asthma. According to tests carried out in France in the 70s of XX century, this water base on the amount of manganese was third in the world and first in Europe (Sustainable Development Strategy of the Municipality Rača, 2009).

Rača Municipality has natural resources, which are protected by the Institute for Nature Protection of the Republic of Serbia (Spatial Plan of the Municipality Rača, 2012):

- Memorial - Natural Monument „Gradište", which is located in the village of Viševac and occupies an area of about 40 ha. This protected area is dominated by trees of linden, elm and individual copies of sessile oaks.
- The site "Alija", the space - memorial complex forest, intended for recreational, tourist and excursion activities.

The proposal is to protect the old trees of oak and limits of the areas of the Miraševac, Borci, Malo Krčmare, Saranovo and Rača, as well as a spa complex in Miraševac with mineral water springs.

## Cultural and historical resources

The municipality has a wealth of cultural and historical heritage. In addition to testify about the history and tradition, represent the potential for creating an integrated tourist offer. However, all facilities need reconstruction. The most significant cultural and historical sites in the municipality are (Tourism Development Strategy of the Municipality Rača 2014-2019):

- The log cabin church in Rača - was declared a cultural monument of great importance;
- The log cabin chapel in Sepci;
- „Turkish dormitory" in Rača - was declared a cultural monument of great importance;
- The house of duke Pavle Cukić in Veliko Krčmare;
- The home of Karađorđe in Rača - although declared a cultural monument, its current purpose is accomodation of refugees;
- Ethno-complex in Viševac - "Petrovi dvori" and memorial of Karađorđe;
- Memorial on the hill of Gradište in Viševac;
- Museum of cooperatives and ethography in Sipić, etc.

Surely we must mention the many events that make up an essential element of tourism in Rača. They can be classified as traditional cultural - historical, entertainment and fairs manifestations. Manifestations in Rača have a dual role: to preserve the culture

and tradition from oblivion and with its programs attract large numbers of visitors. The most important cultural events are: "The days of Karađorđe", "Revisited church under the inscription", "Under the walnut tree" and "Goose Feather". The event of "Karađorđe's Days" is traditionally held (from 26 July to 15 November) in Viševac, the birthplace of Đorđe Petrović Karađorđe, leader of the First Serbian Uprising. In honor of Karađorđe is organized a ceremony of artistic, cultural and literary creativity, as well as competitions in football and clay pigeon shooting. Tourist Organization of Serbia is the manifestation included in the "Calendar of tourist events of Serbia" (www.srbija. travel/kalendar-dogadjaja/jul/).

The event "Revisited church under the inscription" is organized in the village Sepci at the log cabin church. The main event is a great national assembly with an accompanying cultural and artistic program. The event "under the walnut tree" is an event with the longest tradition of maintenance since 1998. It is organized on the religious feast of the Transfiguration under centuries-old walnut tree in the village of Vučić. Cultivating rural traditions, this event includes: singing original songs, folk dances, exhibitions, book promotions, poetry and prose, concerts of folk and classical music. The event "Goose Feather" is a traditional cultural event, which takes place in the small village of Malo Krčmare, the Feast of Nativity of the Virgin. It is dedicated to important people from this village (Tourism Development Strategy of the Rača Municipality 2014-2019). In addition to the traditional cultural and historical events, there are organized and many others. One of the most popular events is the "Fair of Flowers", which brings together 30 exhibitors-manufacturers of flowers from Rača and regions. Then organize a rich program dedicated to flowers and honey: conferences, lectures, a selection of the most beautiful courtyards and others. During 2014, there were about 500 visitors (http://tor. rs/sr/category/novosti/).

## The offer of accommodation capacities

The municipality has a very modest accommodation offer: hotel "Šumadija" and the Hunting Lodge in Rača. Hotel "Šumadija" has 29 rooms (54 beds). Is privately owned and is not categorized. The main problem is that the accommodation facilities are not currently in operation, but the facility offers only the services of the restaurant. In addition to the restaurant, the building has no additional facilities. Hunting Lodge in Rača provides housing, food and drinks. There are only 8 rooms (18 beds). It is intended for the local people, visitors and hunters, which offers a cage capacity for accommodation of hunting dogs. It's not categorized, and is owned by the Hunting Association „Gradište" from Rača (Tourism Development Strategy of the Municipality of Rača 2014-2019).

The involvement of the local population through the renting of private accommodation to tourists is insufficient. It would certainly have a positive impact, especially on higher employment, income and a better life of the local self-government in rural areas. That would bean additional income for the local government (of residence and other fees), which would be used to improve the quality of tourism offer in rural areas.

### Tourism circulation of the Rača Municipality

All these short comings are reflected in the tourist circulation, which is best illustrated by the following figure, showing the number of tourists in the municipality of Rača in the last 10 years.

**Figure1.** Number of visitors in the Municipality of Rača in the period 2003-2013.
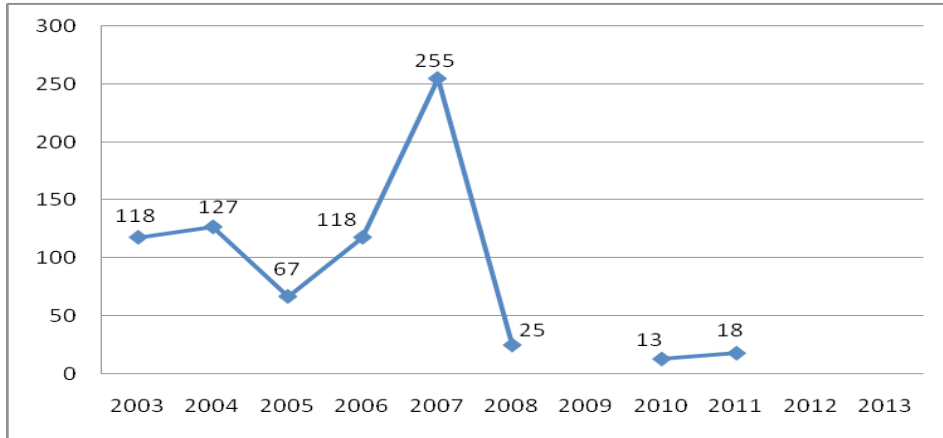


Source: *Municipalities and Regions in the Republic of Serbia, for the approppriate year*

During 2007 was recorded 255 visitors, which is a record year for the number of visitors in the last 10 years. In 2009, 2012 and 2013, there are no recorded data on tourist circulation. Regionally, the municipality of Rača do not take part in tourist circulation of the Šumadija district. In 2013, a total of 65.6103 tourists, being recorded by Šumadija district, 49% of the total tourism was realized in Kragujevac, 41% in Aranđelovac, 5% in Lapovo, 3% in Topola and 2% in Knić (Municipalities and Regions in the Republic of Serbia, 2014). If you want a more active tourist involvement, Rača Municipality needs an essential new development concept. The upcoming development of tourism in this municipality, could be rural tourism.

### The resource base for development of rural tourism of the Rača Municipality

Rural tourism is a significant factor in the development and revitalization of rural areas. The quality, structure and diversity of offer of rural tourism in Rača is not at the satisfactory level. The recent development of rural tourism based on the commitment of the rural population that this type of tourism comes to life and becomes an integral part of the tourist offer of the entire municipality. Tourism and agriculture are complementary economic activities, which enables the use of their resources in order to create an integrated products of rural tourism. Agricultural land occupies about 79% of the municipal territory, while agriculture is the leading economic sector according to the volume of production and employment of the local population. The terrain configuration, in the presence of other factors, enables the cultivation of various crops and livestock. On the other hand, the rural population accounts for 77,37% of

the total population. The total number of rural households was 2.219 in 2013 (Tourism Development Strategy of the Municipality Rača 2014-2019).

The emphasized data indicate the great potential that the municipality has in the creation of integrated tourism product and positioning of the Rača Municipality, as a destination of rural tourism. High-quality and diverse natural resources of the municipality (natural environment, air, forests, rivers, etc.), a rich cultural and historical heritage, as well as anthropogenic resources with traditional manifestations, customs, folklore, gastronomy, etc., can be combined in order to provide visitors a quality experience during their stay in rural areas.

The main problems, which slow down the development of rural tourism in Rača are: lack of accommodation facilities in rural villages, poor infrastructure in rural areas, lack of financial, legal and institutional support to local governments and other organizations, in-coordination of tourism organizations regarding to rural tourism, in existence of clearly defined tourist supply, insufficient interest of the local population for this type of tourism, the disorganization of rural households and the lack of their cooperation on this issue. The Municipality of Rača until 2005 disposed a number of rural households that have been involved in rural tourism, and today there is no household that is officially registered to work in this type of tourism (Tourism Development Strategy of the Municipality Rača 2014-2019).

In order to becomes touristic, a village must meet the following criteria (Đukić Dojčinović, 2005):

- Agricultural production in the country is the main production activity; a farmer is engaged in the farm because only in such conditions a tourist can see or together with the peasant performs tasks on the farm, because the conditions and way of life in the countryside mostly interest him.

- A countryside host house and property are in accordance with the ambient unit and rural regions.

- The village lives on the rural way: in addition to agricultural activities, there are rural traditions (get-together, gatherings, meetings), feasts, and others. Culture diet, dress and housing stems from the way of life of the rural population.

- A tourists live with the host under the same roof, and through him includes himself in the life of the family and the entire village, and therefore stay in the countryside becomes a game. Tourists behave like farmers, participating in his real life as a temporary member of the household and the entire village. The village and rural households are not only tourist facade. Households are not only rooms for rent. The village is a living economic and cultural organism, and tourist his temporary member.

- The local population is neither isolated from the tourists, nor becoming a professional provider of travel services to certain working hours. It is still engaged in the farm as usual, and the tourists are treated as part of local, everyday life.

- The village has a modern tourist infrastructure (bullet in boards, tourist trails, facilities for food, entertainment, information, culture and education, sport and recreation).

- Rural tourism does not imply that tourists to be taken from one to the other famous places: museums, cultural monuments, archaeological sites and galleries, and then being accommodated in a hotel, where they are served by hotel staff. Rural tourism is a new way of behaving and tourism providers and tourists. It is based on the observation of life behind the facade, in places where real life takes place in the community where tourists staying as their temporary member. For the tourist village tourism is observation and participation in the life of the village and the tourist workers form of tourist circulation, which requires an organized encounter between the villagers and tourists so they get to know each other better, understand and respect themselves mutually.

### Examples of rural tourism destinations in Europe and Serbia

Europe is in the last 20 years the world's leading provider of rural tourism. European Federation of Rural Tourism - Euro Gites (European Federation of Rural Tourism) represents 27 member states, including the Serbia. According to data of the Euro Gites, the member states have about 500.000 accommodation properties and approximately 5 - 6,5 million beds. The sector employs about 1,3 million people and generate revenue of around 100.000 million euros. The results achieved are directly connected with the variety of rural tourism Member States. The offer includes: accommodation in farms and private homes in rural areas, bed & breakfast offer and self-catering facilities, traditional rural gastronomy, thematic tourism in the countryside, active holidays and nature-based tourism, etc (http://www.eurogites.org/documents/).

In Europe there are a number of rural tourism destinations. A common example is a model of rural tourism development of Austria. "Urlaub am Bauernhof", which means Farm Holidays is an effective and innovative organization, which is also the most important organization to support the development of rural tourism in Austria. It was founded in 1991 in order to support the farmers, who are engaged in the development of tourism on their land, agriculturally rich environment and to create attractive products. The organization has about 2,750 members, which provides: advisory services, representation at trade fairs, market research, training programs, lobbying the Government and others. Members of this organization have about 36,000 beds, and the number of guests is about 2 million per year, with earnings of around 1-1.2 billion euro (European Parliament, 2013). The existence of this organization facilitates farmers entrepreneurial ventures in the field of promotion of rural tourism.

Bregenzerwald is located in the far west of Austria near Lake Constance in the territory of 580 square kilometers with a population of 30,000 inhabitants. The primary economic activity is agriculture, where 40% of residents are employed on farms and food processing enterprises. Special emphasis is placed on rural tourism and due to these purposes there are 15,000 beds. Annually, the region records about 1,5 million tourists, with 60% of tourists staying in the summer, while 40% of tourists come in winter for winter sports. During the 90s of the twentieth century there has been a stagnation of tourism and agriculture for which is defined and implemented strategies "Nature and Life". The strategy aimed to build the image of the environment of tourism and agriculture under a common identity with the objectives to: increase the consumption of agricultural products, promote awareness of farmers on the

protection of natural and cultural resources, network manufacturers and others. One of the initiatives was the creation of a route "Paths of cheese", which created the possibility for a visit to the site, the purchase of local products to create the impression of the destination on the basis of local gastronomy. The development of routes and the provision of services for tourists were included cheese producers, hotels, restaurants, farms, tourism organizations and others. Turnover in stores has increased by 20% in the first year, which allowed an increase in price of the product, while the organization of approximately 150 manifestations associated with cheese attracted about 90.000 visitors (Towards Quality Rural Tourism, 2000). This destination is an example of how the connected tourism sector and manufacturers of cheese contribute to increasing tourist turnover and revenue on the basis of creating an authentic tourist product.

Rural tourism in Hungary began to be developed in the last century. Before World War II, in the rural areas was spent 35-45% of total rest. However, after 1945, rural tourism has disappeared, due to numerous problems, primarily the lack of an institutional framework, poor financial situation, lack of interest tourism organizations, unfavorable age structure of the local population, etc (Kulcsár, 2009). From the 80's, measures were taken to revitalize rural areas, leading to an increase in the number of foreign tourists interested in the tourist offer due to low prices, but also because of folklore, which is specific to the regions of Central and Eastern Europe (Ogârlaci, 2014). One of the most attractive villages of Hungary is Holloko, the so-called Village Museum, which is far from Budapest, about 100 km. At the World Heritage List is located since 1987 in order to preserve the unique value of folklore and applied arts. The offer combines folklore manifestations, gastronomic specialties, a tour of the village, observing and learning of weaving, decorating of ginger bread, painting of eggs and others (www.hollokotourism.hu). A special attraction of this village is the 58 protected facilities, then traditional rural architecture, crafts, traditional way of life of 17th and 18th century. Holloko annually is visited by up to 120.000 tourists. As a      tourist attraction, this village contributes to economic development and employment. Holloko is an example of a destination that combines activities in rural areas and cultural facilities. However, the main problem is the unfavorable aging of the population. Therefore, municipalities tend to provide health and social services improving the status of the local population with the aim of further development (www.heritagealive.eu).

Although solidly developed, especially in some parts of Vojvodina, Central and Western Serbia, rural tourism is still under developed and under-recognized tourism products of Serbia. The Kosjerić Municipality, which is rich in natural, cultural and historical wealth, but also manifestations, in which presenting the ethnographic values, traditional folk customs, costumes, folklore and cuisine, is increasingly becoming known for its rural tourism. Hospitable hosts of the villages: Mionica, Skakavci, Stojići, Subjel, Mušići, Seča Reka, Radanovci i Donji Taor, two and a half decades began receiving guests in their homes (http://odmorukosjericu.rs/). The village Seča Reka, is the prize winner of "Tourist Flower" for tourism development. It is only 7 km from Kosjerić, has about 1.100 inhabitants in 332 households. Touristic value of the village is increased by many cultural and historical monuments, most notably is the log cabin church from the 15th century. Ethnographic values

and traditional folk customs are presented at manifestations, most notably is the "Shepherds' Days", organized more than three decades (www.kosjeric.rs/turistickivodic/secareka.html). In addition to the parade of "Traditional Serbian Singing" competition of children's folklore groups, flute festival, competitions in cooking traditional dishes, exhibitions of handicrafts, an integral part of the events are the "Shepherds' game" in which the young shepherds compete in wrestling, tow ropes and piston, throwing stones from shoulders, jumping up in the air from the place and climbing up the tree. A special attraction is the choice for the most beautiful shepherdess (Ilić, 2007a).

In the villages of Kosjerić is represented exclusively accommodation in rural households, which is offered with a full-board meals. This does not exclude the possibility of private catering in the area. Tourists who come to one of the villages of the municipality, there is a range of activities in which they can be active participants or observers. Tourists are most attracted to walk in nature and in the fresh air, since it is unreachable in the cities. For this purpose there are marked hiking trails. By the way, visitors can pick herbs and wild berries. They can join the hosts in the works in a field such as mowing, making hay or collecting plums, or participate in distilling of brandy, making juices and sweet. They can learn from the hostess how to prepare a traditional food of this region. For the children in particular is interesting the country atmosphere, because for the first time they meet with some farm animals.

Renting of rooms to tourists is done through the Tourist Organization of Kosjerić, which for their service charges a fee which partially cover the costs on the organization and accommodation of guests. This activity, for all households is a supplementary activity and supplementary income. Particularly noteworthy is the policy of the municipality whose villages are include in tourism. The taxation policy is of great importance which farmers, through tax exemption or reduction of tax rates, can stimulate the provision of services in tourism, then the policy problem solving of infrastructure equipment of the village and policy supply (Ilić, 2007b).

## Guidelines for the developmentof rural tourism of the Rača Municipality

The emphasized destinations of rural tourism, could be examples of local self-government and tourism organization of Rača Municipality. The development of rural tourism of Rača in future should be based on traditional values of the region, manifestations, gastronomy, cultural, historical and natural resources. Based on the above, we can define the basic guidelines for the future development of rural tourism in the Rača Municipality:

- Organizing training programs of the rural population for involvement in tourism development;
- Improvement of rural infrastructure;
- Suggesting the departamnetal Ministries for the allocation of favorable loans or subsidies for building of authentic accommodation facilities in the ethnic style, which characterizes the Šumadija area (or the adaptation of existing);

- Develop facilities that will complement the rural tourism offer;

- Require help from the state in the form of legislation, institutional and advisory support for the development of rural tourism;

- Support the development of SMEs in rural areas (open wineries, farms of organic food, production and sales of organic products, production and sales of typical rural products: homemade brandy, cheese, cream cheese, smoked ham, honey and homemade sweet, etc., souvenir based on old traditional crafts and handicrafts). Also, it is necessary to ensure an institutional, organizational and financial support to women's entrepreneurship in the villages of Rača Municipality. The inclusion of women in the development of rural tourism should contribute to the preservation of traditional values and provide better position of women in the rural environment.

- Cluster development of rural tourism in cooperation with other rural areas in Šumadija, following the example of other clusters, eg: Cluster of rural tourism in Eastern Serbia "The magic of the East" (http://www.carolijaistoka.com/).

- Support of local tourism organizations in the design, branding, promotion and marketing of rural tourism products. The product has to be authentic, that in the best way to present the richness of the culture, customs, traditions, traditional crafts, cuisine, folklore and music of the people who live there, as well as typical architectural heritage of the region. The product should also include recreational activities - horse riding, cycling, fishing, bird watching, tours health, etc., But also able to relax in nature, peace and quiet. Therefore, the product should be unique, to attract tourists to come and live in these villages.

- Development and support of the public-private partnerships in rural areas, with the aim of creating the possibility to connect rural households to public institutions and companies.

- The development of rural tourism will generate new jobs in villages, thus stimulating the youth, women and the unemployed to remain in rural areas and contribute to the development of the municipality of Rača. It will also affect the marketing of local products, as well as to raise awareness about the necessity of preserving the environment.

## Conclusion

The original nature, cultural and historical heritage, original architecture, authentic experience of life in the countryside (farm work, gatherings, local gastronomy), opportunities for active and passive vacation, would be the basis of an integrated rural tourism product of Rača. Based on the performed analysis of resources, it can be concluded that Rača is a potential for development of rural tourism. However, in order Rača to position itself as a destination of rural tourism, it is important to create a positive climate and increasing interest of local people and businesses to be engaged in the development of this form of tourism. Accordingly, rural tourism can be a significant factor in the development of the villages of the municipality. For the future development of rural tourism in Rača, of crucial importance as an effective legal and institutional framework, support for local government, education of personnel, quality infra and superstructure, promotion policy and others. Contemporary trends in the tourism market point to the growing demands of tourism demand when it

comes to stay in rural areas and ecologically preserved areas. Expressed are opportunities to combine activities of different forms of tourism. Therefore, it is important to consolidate natural resources, cultural and historical sites, traditional events, sports facilities, activities on rural households and other activities, which provide a complete experience for tourists**.**

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# RESURSI ZA RAZVOJ OPŠTINE RAČA KAO DESTINACIJE RURALNOG TURIZMA

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## *Apstrakt*

*Atraktivnost ruralnog prostora je polazna osnova za kreiranje turističke ponude destinacija ruralnog turizma. Imajući u vidu da su sela ekološki i ambijentalno očuvane celine, reč je o održivom obliku turizma, koji doprinosi razvoju ruralne ekonomije. Sela u kojima se neguju tradicionalne vrednosti, predstavljaju aktraktivne turističke destinacije. Boravak turista na selima omogućava aktivno uključivanje drugih privrednih delatnosti u kreiranje integrisanog turističkog proizvoda. Turizam opštine Rača, i pored postojanja atraktivnih resursa, nije na adekvatan način razvijen. Turistička ponuda je skromnih razmera i zasnovana na lokalitetima kulturno-istorijskog nasleđa i manifestacijama. Razvoj turizma ove opštine zahteva institucionalnu podršku lokalne samouprave, investiciona ulaganja i saradnju nosilaca turističke ponude.*

*U ovom radu, akcenat je na analizi postojećeg stanja razvoja turizma u opštini Rača, sa akcentom na resurse za razvoj ruralnog turizma. Na osnovu primera dobre prakse – destinacija ruralnog turizma u Evropi i Srbiji, doprinos rada se ogleda u davanju smernica za budući razvoj ruralnog turizma opštine Rača.*

**Ključne reči:** *Op*ština *Rača, ruralni turizam, destinacija ruralnog turizma, Evropa, Srbija.*

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# TAX BALANCE IN AGRIBUSINESS AS A TYPE OF SPECIAL BALANCE

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## Resume

*The tendency of continuous compounding of business processes inevitably leads to application of increasingly complex instruments for the purposes of financial reporting in agribusiness. In this system the existential place and role of individual elements that alter the existing and acquire new functions comes into question.*

*Balancing implies a regulated and consistent system in which every change leads to the creation of new relations and changing already established relationships. In this regard, in this paper we will focus on the place and role of tax balance in the group of special balances in agribusiness, as a very significant group of accounting instruments. Displaying information for users and situations in which they are used, balances gain their place in this classification.*

*For the purposes of applying financial instruments, referring primarily to balances in agribusiness, it is necessary to know the way of their classification according to their functions. From this aspect, tax balance in agribusiness is a specific report, both in terms of its formal and material structure, which gives it the basis to belong to ordinary as well as special types of balances in agribusiness.*

***Key words:*** *taxes, balancing, financial reports, agribusiness, company.*

**JEL:** M41, H25, Q13.

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## Introduction

Balance occupies a special place in financial reporting in agribusiness when it comes to instruments that include business events. Tax balance in agribusiness as a specific type of balance in financial reporting represents the feedback between a business (trade) and tax law, which is the basis for functioning of all agribusiness subjects on the territory which is under jurisdiction of this kind of legislation.

It crucial to mention that knowing tax balancing in agribusiness, its structure and basic characteristics is the basis for successful management of agribusiness subjects. Tax balance in agribusiness belongs to a wide family of balances, and as such it can and must be classified by relevant criteria in groups as related wholes. The classification criteria can be numerous, but for us the most important ones are those based on which balances are differentiated, depending on when they are drafted whether they are being based on tax or business law norms. Tax balance in agribusiness by its formal and material base belongs to a group of balances that are based on tax regulations and as such is undisputed in this group.

By reviewing this criterion of differentiation the question of whether tax balance sheet is in fact a special balance cannot be omitted. A number of authors who have discussed this problem have tried to find an answer this question. According to some, tax balance should be classified in the group of special balances, while for others tax balance can be classified into regular balances.

We will look for the answer to this question in the criterion that is used during classification of tax balance in the group of special balances. This would mean that if tax balance was looked at from the standpoint of regularity of preparation in a company, we would classify it as a regular balance. On the other hand, we have the fact that it actually respects tax regulation norms and must therefore be in the group of special balances. In our case, tax balance due to its material characteristics is classified into a broader group of special balances, balances on the character of the income sheet of an agribusiness.

Features that characterize tax balance sheet in agribusiness will most easily be identified by comparing this balance sheet with related balances, which will, by comparative method give a complete picture of this type of balance. Respecting tax legal norms, the role of tax balance in agribusiness as a special type of balance arises.

Because tax balance in agribusiness belongs to the group of balances, as such it has the characteristics and principles that apply to other balances.

## Balance in agribusiness as an accounting instrument

Name tax balance refers to a word of Latin origin "bilancia" which indicates a balancing scale with two weighing pans. In economic theory, different definitions of balance are used, in order to represent and in the clearest way bring closer to the public the meaning of balance, so among a wide range of definitions some can be extracted:

1. The word balance is used to show formally leveled parts of assets and capital (Rankovic, 2013);

2. Balance shows the situation at a given point in time (Žager, Žager, 1999).

The most comprehensive definition of balance that is used is that the balance is a two-sided tabular summary overview of state of assets and their sources or expenditures and revenues (Milojevic, 2010).

All of this which was brought out goes for the tax balance in agribusiness as well, but to that extent in which tax balance in agribusiness is actually sustainable.

From the name, next to the guideline which it is about, we can see that it contains the word tax which gives it another guideline that determines the purpose of its existence as well. The word tax points to the function that it performs or the goal that was set before it in agribusiness.

The goal that was set before tax balance in agribusiness is for it to clearly display and determine the taxable basis of the taxpayer in agribusiness. Within tax balances in agribusiness, revenues and expenses are clearly defined and shown in order to determine taxes. Tax balance contains information that is important not only for determining income tax, but also other types of taxes in agribusiness that will in perspective constitute one common format that will be conjoined.

From the goal of tax balance in agribusiness its functions are derived, which at first glance aren't recognizable. Functions of tax balance in agribusiness are different and we can classify them depending on the users of this report.

1. **Country** as the user of tax balance in agribusiness, in the foreground points out the function of ***determining taxable income and total tax***, which represents budget revenue for the country. Governments and their agencies are interested in resource allocation and therefore for the activities of a company (Milojević, Pejić, 2010). The reasons of why they are interested in tax reports are numerous: help in lending, assistance in export promotion, privatization and the like which at first glance are not a priority.

2. **Management of an agribusiness company** can most accurately gain insight into the company's operations and the amount of income tax from tax statements, which for the company represents one of the more serious expenses. These users point out the ***comparison feature*** of the balance, in order to be able to manage it, on the position of their company compared to other companies in agribusiness (Savić, et. al. 2014) because the precision of expressing positions makes that possible and leaves the choice when planning revenue and expenditure for a tax period to managing bodies.

3. **Owners** view tax balance in agribusiness as a report that gives them a true picture on the state of revenue and expenditure, which puts the ***allocative function*** in the foreground, which from the point of view of the owner is very important when nvesting capital.

4. **The creditors** are interested in information, so the *informative function* of the tax balance in agribusiness is put in the foreground, which enables them to analyze and assess whether the amounts that are due are going to be paid until the deadline.

5. *The investors* - Bringers of risky capital and their advisers are focused on risks that are characteristic to the investment and return of income of those investments (Škarić Jovanović, 2015), so the *allocative function* of tax balance sheet in agribusiness is highlighted there as well.

6. *Employees* - Employees and their representing groups are interested in information on stability and performance of their employers for their security and amount of their earnings, so the *informative function* of the tax balance sheet in agribusiness is in the foreground.

7. *Lenders* - Lenders are interested in information which enables them to perform an analysis on whether their loans and corresponding interest will be paid on time and make a decision about it.

8. *Customers* - Customers are interested in information on the continuation of business operations of the company, especially when they have long-term business relations with it or dependent on that company.

9. *Public* – Agribusiness companies affect individuals and public in various ways. Companies, for example, can contribute significantly to the local economy in many ways, including hiring more people and procurement of raw materials and consumables from local suppliers, especially when one takes into account the tendency of decentralization of the state apparatus, so the *redistribution function* of tax balance in agribusiness is in the foreground.

The role of tax balance in agribusiness can be displayed through provision of funds necessary for financing state needs. Since tax balance in agribusiness is seen as a regular and special balance it can be said that if it's a tax balance on company profits or income then it can then be regarded as regular balance. If it is tax balance of establishment, tax balance of legal form change of companies or liquidation tax balance sheet, then it is tax balance as a special balance.

## Relation of tax and business balances in agribusiness

Tax balance in agribusiness is not an independent balance, it respects the principle of jurisdiction of business balances that is, principle of dependence of tax balance in agribusiness compared to business balance. In some cases reverse jurisdiction occurs. If a business balance isn't made, then tax balance is the only and basic financial statement and if the provisions of tax law are more favorable to the agribusiness company from the provisions of trade law.

The principles during evaluation of balance values in tax balance sheet respect the principle of minimum values for evaluating positions of assets and maximum values for evaluating positions of liabilities.

Principles of dependence of business to tax balance are applied in some European countries, for example Ireland, Netherland, so that the taxable income is determined by correcting business results from the balance sheet (Radovanovic, 1999).

The principle of reverse jurisdiction of business to tax balance in agribusiness is applied in some other countries, for example Italy, Spain. In these countries there is a request to combine business and tax balance, because according to this request balance values determined for tax purposes should be entered in the business balance as well (Radovanovic, 1999).

The central issue for tax balance sheet in agribusiness is the inclusion of latent reserves.[4] Mainly two methods of inclusion of these reserves are applied. The first is the method of separation in business periods which is applied in Italy, Belgium etc. and according to it tax expenses in agribusinesses are allocated to that accounting period in which it was created. The second method is a static method applied in Netherlands, Ireland etc. According to this method the principle of real separation of business results into business periods is violated in sense that if the changes in tax rates are known on the day of balancing they should be taken into account, regardless if the reserves were created in an earlier accounting period. In the Republic of Serbia until 1991 the principle of reverse jurisdiction was in force, but after the adoption of Corporate Income Tax Law, this principle is no longer valid.

### Tax balance in agribusiness in the group of special balances

In order to determine the correct position for tax balance in agribusiness among other balances and primarily among special balances, one must start from certain limitations that arise during this process.

In the first place restrictions related to normative regulations that regulate this field occur. When we said that tax balance in agribusiness is a member of a group of special balances we mentioned that it is determined by tax norms. For other special balances the characteristic is that they are regulated by commercial law norms.

The following restriction that occurs in expressing relations of tax balance in agribusiness with other special balances is the regularity of preparation. According to this criterion tax balance can be observed as a regular balance. Regular balances are compiled in a predetermined or long-term repeated time periods. The deadline for preparation of these balances is determined by legal norms or internal regulations of a particular agribusiness company. On the other hand, special balances (Vasiljevic, 1970) appear on a case-by-case basis, i.e. when certain conditions occur and circumstances which demand undertaking certain measures. They are compiled in special circumstances that an agribusiness subject may come to during their course of business.

These limitations lead to a conclusion that the sphere of tax balance in agribusiness in the family of special balances is narrowed from certain aspects of observation. This

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4    Latent reserves- hidden - have resulted in underestimation of the value of assets of a business entity.

relation of tax balance in agribusiness with other balances leads us to the field in which certain parallels can be drawn based on balancing procedures.

Tax balance in agribusiness can be observed from the aspect of time dimension, formal and material characteristics compared to other special balances. These dimensions of tax balance in agribusiness will be perceived in the most appropriate way if we primarily start from the characteristics of these balancing groups which are the basis of special balances.

The family of special balances can be observed based on conditionality of individual balances. Such a division of special balances can be found within the division of: status balances and balances with the character of income statement (Rankovic, 1996). Status balances are special balances that show the state in a particular moment, i.e. the overview on a particular day in the business life of an agribusiness subject. Unlike status balances, balances with the character of income statement observe the state and changes which happened in the business life of an agribusiness subject observed from the interval aspect.

Within such observed groups of special balances we will consider the most important characteristics of individual balances in order to show their importance in comparison with tax balance.

Thus observed special balance can be characterized through groups: establishment balance, legal form change balance, fusion balance, separation balance, liquidity balance, financial recovery balance, bankruptcy balance (Škarić Jovanović, Spasić, 2012) and liquidation balance.

Establishment balance precedes the beginning of operations of each agribusiness subject. In order to characterize the formal side of this special balance we must note that the establishment balance is nothing more than a balance sheet. It represents an overview of values of an agribusiness subject's property parts through its foundation. This special balance is enclosed during the establishment of an agribusiness subject. The formal reason for drafting this special balance is the obligation of bookkeeping, and the establishment balance is the necessary condition for opening business records of the subject's business.[5]

The material reason for drafting this kind of special balance is that there is a legal and business need for identifying the financial structure of an agribusiness subject during its foundation, as well as the need of satisfying certain legal minimums in investment

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5   The main purpose of business books is for expressing the state and changes in assets, capital and liabilities, to track income and expenses and other business changes. Transferring data from accounting documents into business books is the process of booking. For business books it is characteristic that they are concluded at the end of the financial year (31.12.), and that they are opened at the beginning of the next financial year (01.01.), based on the initial balance. Business books should be managed so that the control of accuracy of booking, storing and usage of data as well as insight into the chronology of time of booking should be available at any time.

of capital for respective business forms of founding an economic subject.

The basis for preparation of this kind of special balance is an inventory list[6] of an agribusiness subject that provides another entry of this balance which puts it in the inventories special balances.

Establishment balance depends on the procedures of establishment of an agribusiness subject, and on based on that it must follow the criteria for evaluation of the formation of an agribusiness subject. Accordingly these criteria, we divided (Radovanovic, 178):

1. by the type of investment:
   · investment in money;
   · investment in natural forms;
   · mixed investment;

2. according to the scope of actions taken by the founders:
   · single or simultaneous;
   · gradual or successive establishment;

3. according to legal starting point:
   · new establishment;
   · legal form change.

These criteria for establishment of an agribusiness subject affect the establishment balance which forms the basis for its material side.

The following within special balances is legal form change balance of agribusiness subject. It is made in cases when an agribusiness subject changes its legal status and form. Legal form change balance should show the financial status of an agribusiness subject on the day of its legal form change and create a realistic basis for a transparent assessment of its position by the users of balance sheet information (Ignjatijević, et. al., 2015). Precise identification of the date of legal form change of an agribusiness subject is of great importance, because it directly affects the composition of tax balance in agribusiness. It can happen that legal form change of an agribusiness subject occurs at the beginning or end of a business year, in which case the final balance sheet receives the status of legal form change balance sheet. During preparation of a legal form change balance sheet of an agribusiness subject, value stated in the balance deviates from the market value at least for the amount of goodwill.[7]

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6  Inventory list is a detailed list of assets of a company on a particular day. In the inventory list assets are expressed individually by type, quantity, price and value. In the global procedure for newly established companies inventory is the first accounting document generated. Its task is to show the property that the newly created company possesses. Balance of establishment is the only balance which is directly derived from the inventory in normal circumstances.

7  Goodwill is the amount paid in excess of the stated bookkeeping value of capital of the purchased legal entity.

Fusion balance sheet is the following within special balances which is drawn up in cases when integration or merger of two or more agribusiness subjects occurs (Vasiljevic, 1970).

Within fusion balance we differentiate: fusion as assimilation or absorption and fusion as joining or merger. Fusion as absorption represents a process of shutting down one agribusiness subject and a takeover of its assets by the respective agribusiness subject. In this case the economic-legal independence of the absorbed subjects is lost.

Fusion as merger is the process of shutting down two or more agribusiness subjects and the creation of an entirely new agribusiness subject that is entered in a register. In this case, all agribusiness subjects lose their economic-legal independence. During the fusion process the assets of the fused agribusiness subjects is transferred to the newly created agribusiness subject. Agribusiness subjects become tax heirs of the fused agribusiness subjects. In this way the country prevents non-taxation of latent reserves of the fused agribusiness subjects. By expressing the reserves in fusion balance sheet these reserves become the basis for taxation.

Fusion balance sheet is made on the date on which the fusion process of agribusiness subjects was executed. The operating results of the fused agribusiness subjects, from the day of preparation of new fusion balance sheet to the date of completion of the fusion process, are assigned to the newly created agribusiness subject.

During the creation of fusion balance the biggest problem is the question of the amount of equity ownership in the merged agribusiness subject from the fused of agribusiness subjects. This problem is solved by determining the real values of the fused agribusiness subjects, as follows: based on property values, based on the present value of expected cash flows (yield value), based on market value, based on yield value and book value.

In certain cases fusion balance allows the application of a relevant method for determining the amount of equity ownership.

Separation balance sheet is a special balance that shows the value of assets of an agribusiness subject which is the object of separation. In this balance the bookkeeping value of assets and liabilities is adjusted to the actual situation.

This special balance reflects the state that is contrary to the fusion balance sheet, and the most frequent reasons for separation are: with separation of an agribusiness subject its size is reduced with the goal to ensure a more efficient management, separation occurs when a member withdraws from the association etc.

During separation of an agribusiness subject, two types of separation balances appear:
1. balance sheet of a complete agribusiness subject before separation;
2. balance sheet of separated agribusiness subjects.

Balance sheet of a complete agribusiness subject is made on the date of separation, and represents an overview of the entire property and its sources of financing. This balance represents the closing balance of the previous agribusiness subject. As with the fusion balance, the biggest problem here is evaluating property parts. The relevant property parts

aren't valued by their liquidation values because the agribusiness subject is not liquidated in the classical form. Purchase value isn't adequate either, because with its application latent reserves or hidden losses[8] can be created, which leads to unequal positions of owners of capital who remain in the old agribusiness subject from the owners who are separated from it. In the event that the separation balance is drawn up at the end of a business year of an agribusiness subject, it is identical to the regular closing balance.

Balance sheets of selected agribusiness subjects are drafted after completed separation, and they are in fact the founding balances of newly established agribusiness subjects. The relations between these two types of separation balances are regulated by respecting the principle of identity.[9] The relation between these two balances is analogous to the relation between the whole and the parts of a set. By respecting this principle legal security of division of agribusiness subjects is secured and control of separation is ensured. By respecting this principle in this balance, elimination of tax evasion of separated agribusiness entities is ensured. This is in direct accordance with tax balance.

Liquidity balance can be viewed in two ways. According to first this balance is constituted by a lender or a creditor of a particular business entity. The difference that is determined between the value of assets and obligations of a business entity represents the basis of security for loans. This balance is different from regular balances in that way that prices based on which the value of a property is determined are essentially liquidation prices.[10] According to the second concept, liquidity balance is made for the purpose of determining the state of liquidity of a business entity (Radović, Vitomir, Radaković, 2013) on a specific day of balancing. Assets and liabilities of the balance sheet are grouped in a certain way.[11] Such grouping allows determining liquidity of a business entity based on this balance. According to this way of grouping, positions of assets are systematized on the principle of increasing liquidity[12], and the positions of liabilities on the principle of diminishing maturity[13], or in contrast if the positions of assets are grouped according to the principle of diminishing liquidity, positions of liabilities are grouped according to the principle of increasing maturity.

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8    Hidden Losses - latent - have resulted in overestimation of the value of assets of a business entity

9    The principle of identity – represents a requirement that the sum of balances of opening of selected agribusiness subjects, i.e. the sum of their initial balances is equal to the balance of a whole of the separate business entity.

10    Liquidation prices - prices of property parts of a business entity in the event of its liquidation or termination of work.

11    The way of harmonized grouping positions within a balance arises from the request for reviewing the correspondence degree of liquidity of respective assets and due dates for payment of certain obligations of an agribusiness subject.

12    Increasing liquidity of the assets of a balance sheet is achieved by stacking positions that range from fixed assets over inventories and claims all the way to funds.

13    Declining maturity in liabilities of a balance sheet is achieved by stacking positions of own capital through long-term obligations and short-term obligations and all the way to current obligations.

Financial recovery balance is kind of a special balance, as it is drawn up in a situation where an agribusiness subject is in a financially bad shape. This poor financial situation is the product of momentary lack of funds, which does not necessarily mean that this state will be reflected in long term. Financial recovery balance is the basis for a recovery program (Ranković, 2009), which is adopted for the relevant agribusiness subject. Financial recovery balance, drawn up in accordance with ethical rules of balancing is a statement on the financial position of an agribusiness subject. It gives insight into the structure and scope of financial resources based on which decisions about repair are made.

This balance provides the basis for: write-off of assets and liabilities, which leads to the reduction of both assets and liabilities, additional debt to creditors, which results in an increase in both assets and liabilities, use of reserves to cover losses in order to maintain liquidity of a business entity, reduction of basic capital, conversion of debts of agribusiness subjects in permanent stake of creditors, sale of surplus funds, withdrawal of long-term investments etc.

As the recovery process binds to a specific period of time, so we highlight two types of financial recovery balances: balance before the process of recovery and balance after the recovery process of an agribusiness subject.

Balance before recovery of an agribusiness subject shows the level of indebtedness and the performance of an agribusiness subject and the amount of funds necessary to continue operations, i.e. maintenance of liquidity. The problem when compiling this balance is the expression of hidden losses that are required to be shown in order to create a transparent basis for the rehabilitation process.

Balance after the recovery process depicts the effects of taken measures of restoration on the relevant business entity. This balance should demonstrate that financial position of the business entity which guarantees maintaining liquidity.

Liquidation balance is a special balance sheet that is inevitable at the end of the business entity's operations and its occurrence is more and more common in economic practice. It presents an overview of assets and liabilities of a business entity in the event of liquidation.[14] The liquidation process represents (Hajnrih, 2012) liquidation of assets of the entity in order to form liquid assets to settle debts.

As liquidation is a process which lasts from the moment that it's decided on liquidation of a business entity to its full liquidation, two types of liquidation balances appear: opening of liquidation balance or initial liquidation balance sheet and completion of liquidation balance or final liquidation balance sheet.

In the process of liquidation, a business entity converts all of its property into liquid assets (money) in order to meet maturing obligations, so the possibility of drafting an in between liquidation balance in the process of liquidation occurs.

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14  Liquidation of an agribusiness subjects appears in the event that a business entity doesn't have economic and legal conditions for the continued performance of activity for which it is registered.

The initial liquidation balance sheet is drawn up before the start of the liquidation process and represents the accounting basis for deciding on liquidation of a business entity. This balance provides data on the real amount of assets, i.e. fixed assets, supplies, claims and cash assets of a business entity on one side and liabilities and own equity on the other. Liquidation balance sheet has to show us the operating results of a business entity for the last accounting period. In this balance assets are valued at liquidation prices, which are lower than purchase prices and especially market prices. The difference between the value of assets valued at liquidation prices and the bookkeeping value of property is entered in the income statement of an agribusiness subject in the liquidation process.

Final liquidation balance is the plan of settlement of liabilities of a business entity in the process of liquidation from the formed liquidation mass[15]. This balance is made after the sale of real property of a business entity and billing of claims.[16] This balance's assets are comprised of cash and unpaid claims, and liabilities of own equity and obligations.

Bankruptcy balance is a type of special balance that is made with respect to bankruptcy proceedings. It recognizes two types of bankruptcy balances: first is the balance of opening bankruptcy, while the second is closing bankruptcy balance. Initial bankruptcy balance is drawn up by a bankruptcy trustee based on inventory which is also drawn up by him, and not the agribusiness subject in bankruptcy, as is the case with the liquidation balance. The agribusiness subject who is in bankruptcy (Malinić, 2013) doesn't dispose with the property from the moment of entering into the bankruptcy process. In this case, the bankruptcy balance is differentiated from the liquidation balance in relation to the balance user.

## Types of tax balances in agribusinesses

The scientific contribution of this work is in the systematization of forms of tax balances in agribusinesses. The essence of an approach to a problem is in his identification, which in this case represents an overview of tax balances in agribusinesses in one place, their material and formal side. Tax balance in agribusiness viewed from several aspects contributes to its better identification, of which it is necessary to single out that tax balance in relation to the type of agribusiness entity that makes it, can be: tax balance of agribusiness subjects, tax balance of companies and tax balance of corporations i.e. consolidated (Milojevic, Vukoje, Mihajlovic, 2013) tax balance in agribusiness. When we look at tax balance in terms of residence of the agribusiness subject it can be: tax balance of residents and non-residents of the state in whose territory profit is made. When we look in relation to the situation in which tax balance in agribusiness is created it can be: special and regular balance. And finally, if we look at tax balance in agribusiness in terms of business goals of an agribusiness entity it can be: tax balance of profitable and non-profit organizations, and within non-profit organizations two subgroups can be distinguished: tax balance of a non-profit organization that uses the budgetary chart of accounts and non-profit organizations that use chart of accounts for businesses, agribusiness subjects,

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15  Assets generated by selling real property of an agribusiness subject out of which due obligations should be paid.

16  Unpaid claims are declared permanently uncollectible and written off in full.

cooperatives and other organizations. It is important to respect the principle of balancing when drafting a tax balance, where it is particularly important to take into account relevant risks that may occur during tax balancing.

**Figure 1.** Division of tax balances
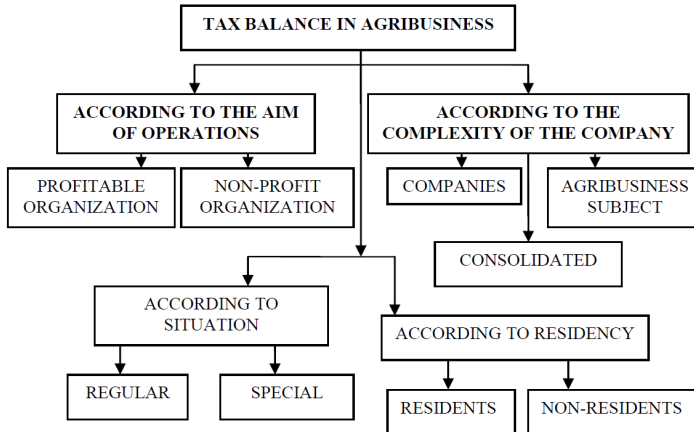


Source: Work of authors

Identification of the tax balance in agribusiness in the system of business organization comes from the purpose and function that satisfies.

## Conclusion

The need for differentiating and precisely determining tax balance in agribusiness refers to adherence to certain principles that are important for that category of balancing. By studying the position of tax balance in agribusiness within many regular and special balances we can conclude that balance as an economic category and its size gives importance to the elements that apply to it by classifying them in a certain order.

When the primary importance is given to the formal and material base of tax balance in agribusiness as a special balance, looking at it through a time dimension we can see that tax balance in agribusiness in its essence belongs to the group of ordinary balances because it is compiled regularly each year, but viewed from the other side, we can find a normative side of tax balance in agribusiness that puts it in special balances. The essence of preparation represents the basis for balancing events that occur in an agribusiness subject. For example, in fusion balance sheet the essence is combining agribusiness subjects and the need to express a new situation, with the liquidation balance sheet the essence is the termination of an agribusiness subject and the need to show the liquidation mass that it owns etc. The same is with tax balance in agribusiness whose preparation depends on the situation which is characteristic to an agribusiness subject. It is known that tax balance in agribusiness is used for determining corporate income tax, and whether the company has to operate the entire year, respectively whether the operating period of a business has to match with the calendar or fiscal year, the answer is that it doesn't. From this we see

that when liquidation of a company occurs, in addition to liquidation balance sheet, tax balance in agribusiness has to be drawn up as well, due to the necessity of taxing profits. Fusion and separation delay the writing of a tax balance, because the essence of taxing profits no longer refers to one but several persons and vice versa.

From the abovementioned, we can conclude that the importance of tax balance in agribusiness is inasmuch greater because it is linked to all of the moments that occur in the life cycle of an enterprise so the connection with other balances is extremely high. Even though little attention is paid to this balance, its importance is greater because of it, because the unknowns in the field of taxing profits of a company remained incomplete. By defining and theoretically determining tax balance in agribusiness represents the basis in studying this part of accounting balance for easier use, in both theoretical and practical part. Theoretical contribution is to its positioning for easier studying of its characteristics, and practical is the possibility of selecting principles and legal norms in making this kind of balance.

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# PORESKI BILANS KAO VRSTA SPECIJALNOG BILANSA

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### Rezime

*Tendencija konstantnog usložavanja poslovnih procesa neminovno dovodi do primene sve složenijih instrumenata za potrebe finansijskog izveštavanja u agrobiznisu. U tom sistemu dovodi se u pitanje egzistencijalno mesto i uloga pojedinih elemenata koji menjaju postojeće i dobijaju nove funkcije.*

*Bilansiranje podrazumeva uređen i konzistentan sistem u kome svaka promena dovodi do nastanka novih relacija menjajući već uspostavljene odnose. S tim u vezi u ovom radu ćemo se fokusirati na mesto i ulogu poreskog bilansa u skupini specijalnih bilansa u agrobiznisu kao veoma značajnoj grupi računovodstvenih instrumenata. Prikazujući korisnike informacija i situacije u kojima se koriste bilansi dobijaju svoje mesto u ovoj klasifikaciji.*

*Za potrebe primene finanisjskih instrumenata misleći prvenstveno na bilanse u agrobiznisu, neophodno je poznavanje načina njihovog klasifikovanja u zavisnosti od njihove funkcije. Sa ovog aspekta poreski bilans u agrobiznisu je specifičan izveštaj kako po svojoj formalonoj tako i po materijalnoj strukturi, što mu daje osnov za pripadanje kako redovnim tako i specijalnim vrstama bilansa u agrobiznisu.*

**Ključne reči:** *porezi, bilansiranje, finanisjski izveštaji, agrobiznis, preduzeće.*

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# ASSESSMENT OF BUSINESS EFFICIENCY OF AGRICULTURAL HOLDINGS WITH DIFFERENT PRODUCTIONS[1]

*Dragan Orović[2], Ivana Ljubanović Ralević[3], Ana Anokić[4]*

## Summary

*The subject of this paper is the use of DEA methodology for the evaluation and analysis of the total technical efficiency (TE) which also includes the pure technical efficiency (PTE) and scale efficiency (SE). The operations of three groups of 20 individual farms, with different primary production, field crops, fruit and livestock, are analysed in the present paper. The necessary data for the development of the basic model have been collected by the survey conducted on 60 agricultural households on the territory of Toplice region. Surveyed households have 92 tractors, 108 different ploughs, 63 sprayers and other necessary mechanization. In addition, 677.7 ha of agricultural land, which is located at 1,201 plots, are cultivated by surveyed households. These farms keep 291 cows, 118 bulls, 366 pigs, 459 sheep and others. 91 workers and farm members are engaged in operation of the farms. The aim of the paper is to determine whether there is a difference in the technical efficiency of different types of households.*

***Key words:*** *DEA methodology, technical efficiency, scale efficiency, family farms, primary production.*

**JEL:** *Q12, M24*

## Introduction

The evaluation of efficiency of various types of business organizations is of great importance. The idea of defining the limits of efficiency was proposed by (Farrell, 1957), who described two types of economic efficiency: technical efficiency (TE) and allocative

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efficiency (AE) or price efficiency. Various methods have been used for calculating or evaluating the efficiency limits, since then. They can be classified into two groups: parametric, which are based on econometric evaluation of the production function and nonparametric, which are based on the technique of mathematical programming. Nonparametric models, of which the DEA (Data Envelopment Analysis) methodology is the best known, are widely used for the efficiency assessing. Its advantage compared to parametric methods lies in the fact that it is not based on assumptions about the functional relation between input and output, as is the case in the regression analysis, but it deals with the analysis of the efficiency limits. In addition to the determination of the technical efficiency and the analysis of changes in inputs/outputs, the rank of the organizations, the calculation of the index for changing efficiency coefficients and other are used for improvement of this method. It is common that the investigated organization or unit is identified as DMU (Decision Making Unit) or decision unit. The improvement of the technical efficiency enables the observed DMU to realize higher output with the available input.

There are a number of studies that have applied DEA methodology in agriculture. Agricultural production is characterized by the input factors that are fixed or quasi-fixed, and very slow to adapt. Such factors include the lease of land for a longer period, the share of labour in the production and similar. The existence of such production factors can influence the technical inefficiency and encourage their correction through agricultural policy. Based on Farrell's efficiency measure this correction refers to the proportional reduction of all factors involved in production. Due to the specific structure of agricultural production that proportional reduction of all inputs will have no effect on the proportional reduction of outputs.

The majority of papers, studies are related to the analysis of the efficiency of various forms of farm production in different organizations. For the analysis and decomposition of the overall efficiency of sheep farms in Greece, Fousekis and associates (2001) have used data for 101 farms of the three mountainous regions, based on data for 1997 from the FADN base. Production technology was characterized by two outputs (meat and milk) and five inputs (labour, capital, cost of forage, produced fodder and herd size), which were analysed using input-oriented CRS and VRS DEA model. In the study of (Galanopoulos et al., 2006), the technical and scale efficiency of commercial pig farms in Greece are analysed. The study used 100 of a total of 358 commercial pig farms in several areas, classified into three groups according to the number of sows. DEA methodology is used (Haji, 2007) for evaluation of the technical, allocative and economic efficiency in small mixed farms with crop production in eastern Ethiopia. This study indicates that income, household size, counselling services and the number of household members significantly affect the technical efficiency. Hansson and Öhlmér (2008) have investigated how managerial practices relating to health, breeding and animal nutrition can affect the efficiency of the farm. In the paper of Bojnec and Latruffe (2009) the technical efficiency of Slovenian farms is analysed during the ten-year period (1994-2003) of the transition to a market economy, before joining the European Union. In this paper, the output-oriented model with single output (total revenue) and four inputs (land used, annual work units, the value of total assets in equity and the

value of the variable input) is used. Artukoglu and associates (2010) have analysed the efficiency of 62 farms with organic and 62 farms with conventional production of olives. The CRS and VRS input and output-oriented models were used for the analysis of six inputs (land (ha), the cost of fertilizer (YTL), organic controls for pests and diseases (YTL) and for conventional production - pesticide costs, fuel costs (YTL), labour costs (YTL) and other costs) and one output (the amount of olives). The obtained result was that farms with conventional production method have lower efficiency. The aggregate data of the FADN (Farm Accountancy Data Network) have been used for analysing of the dynamics of productivity efficiency of 8 types of farms and an average value in Lithuania for the period from 2003 to 2010 (Baležentis, Kriščiukaitienė, 2012). The analysis has shown that the average efficiency of a Lithuanian farm ranges from 76.5% to 92.2% during 2003-2010. Mixed cattle and plant production showed the highest technical efficiency for the given period. The analysis showed the low level of productivity of land, depreciation of assets and consumption of intermediate production mainly affect the inefficiency. Large farms operate more efficiently.

There are a number of studies that have analysed the operation of farms/holdings. Jankovic and associates (2006) has used the gross margin for the evaluation of operation of farms/holdings. The study was conducted on 300 family farms in 2006 in order to obtain gross margin of some production lines. The research has shown that the best manufacturers pay much more attention to every stage of production and sales, use smaller quantities of seeds, fertilizers and pesticides per ha and purchase them at lower prices, and they achieve significant revenues with good yield and sell at higher prices. De Bont and associates (2003) in their report, determine the economic size of agricultural holdings of the Netherlands. The main source of data for the calculation of the standard gross margin is a national system of accounting data (FADN). The value of standard gross margin of crop products was reduced by the value of the straw, while the straw value was included in the value of other crops. In that time, the average gross margin of crop production was 1,000 EUR/ha. The basic division of mathematical programming models in animal husbandry can be carried out on optimization and simulation models (Stygar, Makulska, 2010). This research was conducted using the mathematical programming in production management in beef fattening. Optimization models are used in cases where it is necessary to determine the optimal structure of production, and simulation models are used for studying the behaviour of the system over time under various conditions. A model of farm that deals with cattle production, with the focus on the production of milk production was analysed (Vico, 2012). The farm focuses on milk production represent production system with livestock and crop production lines, which are forage base for dairy cattle and breeding offspring. Applying linear programming the optimal production structure was obtained and it will greatly contribute to the realization of the extreme values of a given optimality criterion. Krasnić (2008) was involved in formulating a model for optimizing the structure of vegetable production. Model for optimizing the structure of vegetable production worked in two ways. One is the optimization of the structure of vegetable production for industrial processing and is applicable to agricultural enterprises.

Second variant is related to the optimization of the structure of vegetable production for direct consumption in the fresh condition, and is applicable to private farms. In addition to providing quality and relevant brand of vegetable products for the European market, it would mean the reality of enlargement area and yield increase under vegetables to the real participation from 10% to 18% of arable land. The FADN data were successfully used for estimation the efficiency of different region in Turkish (Atici, Podinovski, 2015). They used four inputs: land, labour, crop production costs and capital expenditures. The productions of 36 different crops were used as outputs in their DEA model. Another example is the research done in India, where agriculture depends mostly on the efficiency of using the groundwater for irrigation. Manjunatha and associates (2011) considered the three groups of water users: water sellers, water buyers and control group and estimated their efficiency. The first group-water sellers are proved to be less efficient than the second but more efficient than control group, consisting of farmers which have their own water and are not engaged in selling and buying water. They used the data relating to the amount of water, irrigated area, labour, machine power, manure, fertilizers and gross returns. The energy efficiency is the topic that attracts much attention nowadays. Bolandnazar and associates (2014) used data envelopment analisys approach to calculate the efficiency of the cucumber greenhouses production from energy consumption point of view.

## Method of research and data sources

Nonparametric DEA method is based on a linear programming model for evaluation of the efficiency limits. The basic DEA model was set in 1978 (Charnes et al., 1978). It has been modified and expanded over years, so the model proposed by them is denoted now as CCR. By this model the multiple inputs are reduced to a single 'virtual' input and multiple outputs are reduced to a single 'virtual' output using weights (weight coefficients). In the defined model, the organizational unit for which the efficiency is being estimated is called DMU (decision Making Unit) or decision unit or units to be decided. DEA method enables to determine the relative efficiency in comparison to other entities that are involved in the analysis for each one of the entities on the basis of its input and output data. While selecting units for evaluation of efficiency it should be taken into account the fact that they have to be of the same type. In fact, small and large organizational units in this model should not be compared, because they are qualitatively different and it can distort the measure of the efficiency comparisons.

For output-oriented models, which are used in the present paper, the goal is to maximize output for a given level of inputs. In this model, $DMU_k$ is considered relatively inefficient if it is possible to increase any output without increasing input and without decreasing any other output. Inefficient unit becomes efficient if it increases each output proportional to the factor of intensity $\theta_k$ from the dual model. In addition to these two orientations there is a so called un-oriented model (Cooper et al., 2007).

CCR model assumes that the increment of output relative to the input is constant [constant returns to scale (CRS)], meaning that the relationship is linear. The first extension of CCR model was given by (Banker et al., 1984), and designated/identified

as BCC. This model assumes that the response is variable [*variable return to scale -* (VRS)], meaning that the relationship is curvilinear and it is a non-increasing response model [*non-increasing return to scale* (NIRS)].

For definition of this model, the $n$ DMU$_k$; $k=1,2,...,n$ with $m$ inputs $x_{jk}>0$; $j=1,2,...,m$ and $s$ outputs for each of them, are observed.

For each DMU$_k$, $k=1,2,...,n$ the relative efficiency is defined as

$$h_k = \frac{\sum_{r=1}^{s} u_{rk} y_{rk}}{\sum_{i=1}^{m} v_{ik} x_{ik}} ; k = 1,2,...,n$$

Where the weights $v_{ik}$ present the value (quantitatively expressed importance) of the *i-th* input for each DMU$_k$, and $u_{rk}$ present the value (quantitatively expressed importance) of the *r-th* output for each DMU$_k$. Thus defined efficiency refers to the set of observed DMU, and therefore reflects the relative efficiency and it is a number between 0 and 1. The weights are determined for each DMU$k$ independently to maximize its efficiency relative to other DMU that are included in the analysis.

In this paper, the CCR and BCC models will be used to determine the efficiency. CCR model determines the total technical efficiency (TE), which includes pure technical efficiency (PTE) and scale efficiency (SE), which is a consequence of the different business volume. The measure of efficiency obtained by this model is still less or equal to those obtained by the CCR model.

The dual task of the input-oriented model is used for evaluation of efficiency measure

$$[min] \theta_k - \varepsilon \left( \sum_{r=1}^{s} s_{rk}^+ + \sum_{i=1}^{m} s_{ik}^- \right)$$

With constraints

$$\theta_k \cdot x_{ik} - \sum_{j=1}^{n} \lambda_{jk} x_{ij} - s_{ik}^- = 0; i = 1,2,...,m$$

$$\sum_{j=1}^{n} \lambda_{jk} y_{rj} - s_{ik}^+ = y_{rk}; r = 1,2,...,s$$

$$\lambda_{jk} \geq 0; j = 1,2,...,n; r = 1,2,...,s; i = 1,2,...,m; \theta_k - \text{no restrictions}$$

For the BCC model, there is a further restriction, namely: $\sum_{j=1}^{n} \lambda_{jk} = 1$ when there is no

restriction for variable increment or $\sum_{j=1}^{n} \lambda_{jk} \leq 1$ for non-increasing gain or $\sum_{j=1}^{n} \lambda_{jk} \geq 1$

for non-decreasing gain.

If $\theta_k^* = 1$ and when all the additional variables $s_{ik}^{-*}$ and $s_{ik}^{+*}$ are equal to zero, it will be $h_k^* = 1$ and the corresponding DMU$k$ is completely (strong) efficient, it is so called *Pareto-Koopman's* efficiency: DMU fully efficient if and only if it is not possible to improve any input or output without violating another input or output. If $\theta_k^* = 1$ and there are also $s_{rk}^{+*}$ and $s_{ik}^{-*}$ which are nonzero values, then DMU$_k$ is border point but is not efficient (not fully enveloped). Such DMU is said to be weakly efficient.

For each inefficient DMU, moving towards the limits of efficiency, in the input-oriented model, is determined by the system of equations

$$\sum_{j=1}^{n} \lambda_{jk}^* x_{ij} + s_{ik}^{-*} = \theta_k^* \cdot x_{ik} ; i = 1,2,...,m$$

$$\sum_{j=1}^{n} \lambda_{jk}^* y_{rj} - s_{ik}^{+*} = y_{rk} ; r=1,2,...,n$$

Scale efficiency can be obtained as the quotient of measure of the efficiency obtained by the CCR model and measure of the efficiency obtained by the BCC model.

$$SE_k = \frac{h_{k(CCR)}^*}{h_{k(BCC)}^*}$$

If $SE_k=1$ then the corresponding DMU$_k$ is scale efficient, and if $SE_k<1$ it is scale inefficient.

Thus determined measure of efficiency is relative because it depends on the number of entities involved in the analysis and the number and structure of inputs and outputs. The main disadvantage of this analysis is that the introduction of a new DMU requires re-calculation of the relative efficiency and previously obtained conclusions can be completely changed. Also, the efficiency limit evaluated with DEA is sensitive to measurement errors or other problems that may arise with the data. DEA assessment does not provide any guidance on statistical reasoning.

In this paper the data relate to three groups of 20 individual farms with different types of production from the municipalities of Prokuplje, Žitorađa, Blace and Kursumlija were analysed as the main data source. The planned selection of farms enabled the definition of several farm models of different sizes and different production structures. Surveyed farms/holdings were selected according to the total agricultural area per municipality as well as the dominant productions in certain municipalities and urban areas. Thus, in the largest municipality of Prokuplje, a total of 22 farms were surveyed, from which 8 were with dominant fruit production, 7 with a dominant crop and vegetable productions and 7 with the dominant livestock production. In the municipality of Blace, a total of 14 farms were surveyed and that is 6 with dominant fruit production, 3 with the dominant crop and vegetable productions and 5 with the dominant livestock production. In the

municipality of Kursumlija, the survey covered a total of 11 farms, 3 with the dominant fruit production, 3 with the dominant crop and vegetable productions and 5 with the dominant livestock production. The municipality Žitorađa covered a total of 13 farms, of which 3 with the dominant fruit production, 7 with the dominant crop and vegetable productions, and 3 with the dominant livestock production.

Data were collected in 2011 through a survey, which was designed so that the owners or managers answer the questions. Questions were related to the input elements of the system as well as to the output elements. Establishing of realized operating results and the calculation of income and expense of family households were done by analytical calculations. All calculations were obtained in period from 2013 to 2014, based on prices from 2010 (Orović, 2014).

## Empirical implementation

In this paper, the variables used as input for the implementation of the chosen model, and based on the data obtained in the survey were:

- · total land used ha (I1)
- · material costs from non-primary production RSD (I2)
- · total cost of materials and maintenance of RSD (I3)
- · the total cost of services RSD (I4),

and the output variables observed, depending on the model, were:

- · the value of primary production RSD (O1)
- · the value of non-primary production RSD (O2)

For the DMU mark, first two characters represent the number of the farm 1-60, the third character specifies the type of production (f-fruit, c-crop and vegetable, l-livestock) and the fourth is the first letter of the municipality. The data was processed using software DEA-Solver-Pro (Professional Version 9.0) and Statistica 12. During the calculation, Dea Solver Pro replaced negative values with a small positive number which is not counted in efficiency.

Descriptive statistics for the analysed inputs and outputs for each group of holdings are given in Table1.

**Table 1.** Descriptive Statistics

| $tp^0$ | I/O | Min | Max | Mean | Std. Dev. | Cf.var % | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| F | Total land used ha (I1) | 2.2 | 20 | 9 | 4 | 45.99 | 0.643 | 0.617 |
| | Material cost from non-primary production RSD (I2) | 0.0 | 916,800 | 249,390 | 241,739 | 96.93 | 1.165 | 1.384 |
| | Total cost of material and maintenance RSD (I3) | 251,600 | 1,666,800 | 831,926 | 368,461 | 44.29 | 0.346 | -0.237 |
| | Total cost of services RSD (I4) | 110,000 | 1,485,000 | 711,675 | 422,950 | 59.43 | 0.418 | -1.054 |
| | The value of primary production RSD (O1) | 625,000 | 7,800,000 | 3,173,575 | 1,911,495 | 60.23 | 0.612 | 0.072 |
| | The value of non-primary production RSD (O2) | 0.0 | 2,513,200 | 808,348 | 736,951 | 91.17 | 0.782 | -0.253 |
| C | Total land used *ha* (I1) | 4.0 | 22 | 8 | 4 | 57.76 | 2.142 | 4.905 |
| | Material cost from non-primary production RSD (I2) | 0.0 | 120,000 | 33,750 | 40,681 | 120.54 | 0.867 | -0.515 |
| | Total cost of material and maintenance RSD (I3) | 333,000.0 | 1,719,750 | 810,295 | 435,024 | 53.69 | 0.832 | -0.580 |
| | Total cost of services RSD (I4) | 190,000.0 | 1,030,000 | 427,950 | 241,731 | 56.49 | 1,391 | 1.232 |
| | The value of primary production RSD (O1) | 339,000.0 | 6,062,500 | 1,798,600 | 2,012,805 | 111.91 | 1.362 | 0.248 |
| | The value of non-primary production RSD (O2) | 0.0 | 4,558,000 | 1,014,500 | 1,084,143 | 106.86 | 2.135 | 5.519 |
| L | Total land used *ha* (I1) | 5.5 | 35 | 17 | 8 | 49.38 | 0.595 | -0.652 |
| | Material cost from non-primary production RSD (I2) | 220,000.0 | 1,658,000 | 847,010 | 477,527 | 56.38 | 0.241 | -1.176 |
| | Total cost of material and maintenance RSD (I3) | 412,550.0 | 9,992,000 | 1,486,898 | 2,036,540 | 136.97 | 4.224 | 18.454 |
| | Total cost of services RSD (I4) | 130,000.0 | 1,140,000 | 553,025 | 298,282 | 53.94 | 0.566 | -0.545 |
| | The value of primary production RSD (O1) | 726,000.0 | 11,280,000 | 3,301,440 | 2,454,228 | 74.34 | 1.801 | 4.997 |
| | The value of non-primary production RSD (O2) | 331,000.0 | 2,533,500 | 1,483,828 | 626,149 | 42.20 | -0.141 | -0.489 |

*Note:* $tp^0$=type of production

*Source:* Authors' calculation according to data from Orović (2014).

Considering the deviation from the normal of the observed distribution, Spearman's rank correlation coefficients were calculated (Table 2), and based on them it is obvious that there was no correlation between the selected outputs.

**Table2**. Correlations

| Type of Production | I/O | I1 | I2 | I3 | I4 | O1 | O2 |
|---|---|---|---|---|---|---|---|
| F | I1 | 1.0000 | 0.3379 | 0.7094** | 0.6000** | 0.5668** | 0.4370 |
| | I2 | 0.3379 | 1.0000 | 0.0994 | 0.0482 | -0.1928 | 0.5316** |
| | I3 | 0.7094** | 0.0994 | 1.0000 | 0.9083** | 0.7759** | 0.1308** |
| | I4 | 0.6000** | 0.0482 | 0.9083** | 1.000000 | 0.8722** | -0.0105 |
| | O1 | 0.5668** | -0.1923 | 0.7759** | 0.8722** | 1.0000 | -0.1383 |
| | O2 | 0.4370 | 0.5316** | 0.130827 | -0.0105 | -0.1383 | 1.0000 |
| C | I1 | 1.0000 | 0.5508** | 0.6244** | 0.6113** | 0.2514 | 0.7153** |
| | I2 | 0.5508* | 1.0000 | 0.3083 | 0.1131 | -0.1703 | 0.7538** |
| | I3 | 0.6244** | 0.3083 | 1.0000 | 0.7133** | 0.6752** | 0.3148 |
| | I4 | 0.6113** | 0.1131 | 0.7133** | 1.0000 | 0.5576* | 0.3253 |
| | O1 | 0.2514 | -0.1703 | 0.6752** | 0.5576* | 1.0000 | -0.1442 |
| | O2 | 0.7153** | 0.7538** | 0.3148 | 0.3253 | -0.1442 | 1.0000 |
| L | I1 | 1.0000 | 0.7722** | 0.5284* | 0.6436** | 0.6724** | 0.5450* |
| | I2 | 0.7722** | 1.0000 | 0.3091 | 0.6604** | 0.7931** | 0.3182 |
| | I3 | 0.5284* | 0.3091 | 1.0000 | 0.2195 | 0.5318* | 0.1985 |
| | I4 | 0.6436** | 0.6604** | 0.2195 | 1.0000 | 0.7424** | 0.6150** |
| | O1 | 0.6724** | 0.7931** | 0.5318** | 0.7424** | 1.0000 | 0.4325 |
| | O2 | 0.5450* | 0.3182 | 0.1985 | 0.6150 | 0.4324 | 1.0000 |

*Note:* the significance is marked with * for the $p < 0.05$, and ** for the $p < 0.01$

*Source:* Authors' calculation according to data from Orović (2014).

Table 3 shows the results of the analysis for the observed DEA group.

**Table 3.** Efficiency and corresponding DMU for the observed models

| $tp^0$ | DMU | TE | CTE | SE | Corresponding set for CCR | RTS | RTS of Proj DMU |
|---|---|---|---|---|---|---|---|
| F | 1fp | 0.8374 | 0.8458 | 0.9901 | 8fp (0.726); 10fp (0.321) | | dcr[1] |
| | 2fp | 1 | 1 | 1 | 2fp – **0**[4] | con[2] | |
| | 3fp | 0.9016 | 0.9294 | 0.97 | 8fp (0.570);10fp (0.057) | | con |
| | 4fp | 1 | 1 | 1 | 4fp - **4** | con | |
| | 5fp | 0.7878 | 0.7912 | 0.9957 | 4fp (0.02); 10fp (0.634);19fp (0.187) | | con |
| | 6fp | 0.5560 | 0.5735 | 0.9694 | 4fp (0.558); 13fp (0.103);19fp (0.688) | | dcr |
| | 7fp | 0.8008 | 0.8155 | 0.9819 | 4fp (0.543); 19fp (0.616) | | dcr |
| | 8fp | 1 | 1 | 1 | 8fp - **6** | con | |
| | 9fz | 0.6843 | 0.6888 | 0.9935 | 8fp (0.450); 13fp (0.067); 19fp (0.444) | | con |
| | 10fz | 1 | 1 | 1 | 10fp - **5** | con | |
| | 11fz | 0.7244 | 0.7248 | 0.9994 | 8fp (0.533); 10fp (0.215); 13fp (0.0157) | | con |
| | 12fb | 1 | 1 | 1 | 12fp - **1** | con | |
| | 13fb | 1 | 1 | 1 | 13fp - **6** | con | |
| | 14fb | 0.6178 | 0.6530 | 0.9461 | 19fp (0.150); 20fp (0.703) | | con |
| | 15fb | 0.4530 | 0.5720 | 0.792 | 4fp (0.069); 13fp (0.517); 19fp (0.150) | | con |
| | 16fb | 0.9079 | 1 | 0.9079 | 8fp (0.699); 19fp (1.389) | dcr | |
| | 17fb | 0.5447 | 0.5465 | 0.9968 | 8fp (0.206); 10fp (0.347); 13fp (0.111) | | con |
| | 18fk | 0.6805 | 0.8288 | 0.8211 | 12fp (0.191); 13fp (0.316); 19fp (0.160) | | con |
| | 19fk | 1 | 1 | 1 | 19fp - **8** | con | |
| | 20fk | 1 | 1 | 1 | 20fp - **1** | con | |
| | Mean | 0.8248 | 0.8485 | 0.9682 | | | |
| | SD | 0.1793 | 0.1643 | 0.0586 | | | |
| | Max | 1 | 1 | 1 | | | |
| | Min | 0.4530 | 0.5465 | 0.792 | | | |

| tp⁰ | DMU | TE | CTE | SE | Corresponding set for CCR | RTS | RTS of Proj DMU |
|---|---|---|---|---|---|---|---|
| C | 21cp | 0.6433 | 0.7919 | 0.8124 | 28cz (0.024); 37cp (0.751) | | icr[3] |
| | 22cp | 0.5430 | 0.6763 | 0.8029 | 25cp (0.134); 28cz (0.027); 33cz (0.051); 36cb (0.086); 37cb (0.033) | | Icr |
| | | | | | | | |
| | 23cp | 0.3736 | 0.7948 | 0.4701 | 25cp (0.056); 32cz (0.046); 36cb (0.0447); 37cb (0.072) | | icr |
| | 24cp | 0.8065 | 1 | 0.8065 | 25cp (0.035); 32cz (0.024); 36cb (0.223) | icr | |
| | 25cp | 1 | 1 | 1 | 25cp - **4** | con | |
| | 26cp | 0.7417 | 0.8466 | 0.8761 | 32cz (0.141); 36cb (0.327) | | icr |
| | 27cp | 0.7035 | 0.7465 | 0.9424 | 33cz (0.053); 36cb (0.437) | | icr |
| | 28cz | 1 | 1 | 1 | 28cz - **3** | con | |
| | 29cz | 0.7232 | 1 | 0.7232 | 28cz (0.267); 32cz (0.470);33cz (0.197);37cb (0.618) | dcr | |
| | 30cz | 0.3505 | 1 | 0.3505 | 32cz (0.019); 33cz (0.116) | icr | |
| | 31cz | 0.5867 | 0.7398 | 0.7931 | 32cz (0.043); 33cz (0.05); 37cb (0.566) | | icr |
| | 32cz | 1 | 1 | 1 | 32cz - **9** | con | |
| | 33cz | 1 | 1 | 1 | 33cz - **9** | con | |
| | 34cz | 0.6672 | 0.8648 | 0.7715 | 32cz (0.169); 33cz (0.345) | | icr |
| | 35cb | 0.5835 | 0.965 | 0.6046 | 25cp (0.082); 32cz (0.011); 33cz (0.017);36cb (0.09) | | icr |
| | 36cb | 1 | 1 | 1 | 36cb - **7** | con | |
| | 37cb | 1 | 1 | 1 | 37cb - **6** | con | |
| | 38ck | 1 | 1 | 1 | 38ck - **0** | con | |
| | 39ck | 0.6623 | 0.9737 | 0.6801 | 33cz (0.62); 36cb (0.151) | | icr |
| | 40ck | 0.5292 | 1 | 0.5292 | 32cz (0.0004);33cz (0.03);37cb (0.400) | icr | |
| | Mean | 0.7457 | 0.9200 | 0.8081 | | | |
| | SD | 0.2140 | 0.1090 | 0.1934 | | | |
| | Max | 1 | 1 | 1 | | | |
| | Min | 0.3505 | 0.6763 | 0.3505 | | | |

| tp[0] | DMU | TE | CTE | SE | Corresponding set for CCR | RTS | RTS of Proj DMU |
|---|---|---|---|---|---|---|---|
| L | 41lp | 1 | 1 | 1 | 41lp - **2** | con | |
| | 42lp | 1 | 1 | 1 | 42lp - **4** | con | |
| | 43lp | 0.8743 | 1 | 0.8743 | 42lp (0.025);54lb (1.123); 59lk (0.294) | dcr | |
| | 44lp | 1 | 1 | 1 | 44lp - **3** | con | |
| | 45lp | 0.8949 | 0.9932 | 0.901 | 44lp (0.081); 46lp (0.106); 47lp (0.382);59lk (0.039) | | icr |
| | 46lp | 1 | 1 | 1 | 46lp - **3** | con | |
| | 47lp | 1 | 1 | 1 | 47lp - **6** | con | |
| | 48lz | 1 | 1 | 1 | 48lz - **0** | con | |
| | 49lz | 1 | 1 | 1 | 49lz - **1** | con | |
| | 50lz | 1 | 1 | 1 | 50lz - **5** | con | |
| | 51lb | 1 | 1 | 1 | 51lb - **1** | con | |
| | 52lb | 0.8093 | 0.8166 | 0.9912 | 44lp (0.113); 46lp (0.222); 47lp (0.229); 54lb (0.190); 59lk (0.087) | | icr |
| | 53lb | 0.9876 | 1 | 0.9876 | 41lp (0.627); 50lz (0.008); 59lk (0.681) | dcr | |
| | 54lb | 1 | 1 | 1 | 54lb - **5** | con | |
| | 55lb | 0.9217 | 1 | 0.9217 | 41lp (0.037); 47lp (0.636); 50lz (0.020); 59lk (0.535) | dcr | |
| | 56lk | 0.6687 | 0.6689 | 0.9998 | 44lp (0.133); 47lp (0.547); 51lb (0.054); 59lk (0.261) | | con |
| | 57lk | 0.5383 | 0.8824 | 0.61 | 42lp (0.128); 46lp (0.098); 49lz (0.018); 50lz (0.0006);54lb (0.113) | | icr |
| | 58lk | 0.6387 | 1 | 0.6387 | 42lp (0.015); 47lp (0.098); 50lz (0.006); 54lb (0.092); 59lk (0.031) | ict | |
| | 59lk | 1 | 1 | 1 | 59lk - **8** | con | |
| | 60lk | 0.4811 | 0.6449 | 0.7461 | 42lp (0.151); 47lp (0.177); 50lz(0.015); 54lb (0.015); 59lk (0.014) | | icr |
| | Mean | 0.8907 | 0.9503 | 0.9335 | | | |
| | SD | 0.1663 | 0.1081 | 0.1206 | | | |
| | Max | 1 | 1 | 1 | | | |
| | Min | 0.4811 | 0.6449 | 0.61 | | | |

*Note:* [0]tp=type of production; [1]dcr=decreasing; [2]con= constant; [3]icr = increasing; [4]frequency in Reference Set

*Source:* Authors' calculation according to data from Orović (2014).

Results indicate that in the observed group, agricultural holdings 2fp, 4fp, 8fp, 10fz, 12fb, 13fb, 19fk, 20fk are efficient, the remaining 12 holdings (1fp, 3fp, 5fp, 6fp, 7fp, 9fz, 11fz, 14fb, 15fb, 16fb, 17fb and 18fk) are inefficient. The results for the surveyed rural holdings from Toplice region with dominant fruit production show that it has an enviable efficiency score, but it can be even better if the input variables (cost) are reduced. An example of good practice could be agricultural holdings 10fz, 13fb, 19fk and 20fk which are reference for most households.

The main characteristics of the holding 10fz are: it is in Žitorađa and it has a dominant

cherry production, two-thirds of total fruit production, with good yield of 15,000 kg per hectare and with a price of 80.00 dinars per kilogram. This holding also produces peppers on 1.5 ha, as non-dominant production. It has all the necessary machinery for cultivation, it works with three family members, redistribution of land on this farm provided smaller cost of land cultivation, and the fact that it is in urban area reduces the transportation cost of product delivery to the market.

The farm 13fb is located in the vicinity of Blace at a slightly higher altitude, it has a small area of land on which mostly late fruit is grown and this holding is achieving a higher price in the market (cherry 90 RSD, apple 40 RSD and plum 27 RSD for kg), it has all the equipment and family labour (three members).

Holding 19fk is located in the vicinity of Kuršumlija. It has plums as the dominant production and it achieves high yield and good price. In addition to plum production, there are 120 beehives as a non-dominant production of honey which has a high yield and low cost due to natural advantages of the farm location.

There are 7 efficient farms in crop production. The results have shown that in the observed group, 7 agricultural holdings (25cp, 28cz, 32cz, 33cz, 36cb, 37cb, 38ck) achieve efficiency in business, and the remaining 13 holdings (21cp, 22cp, 23cp, 24CP, 26cp, 27cp, 29cz, 30cz, 31cz, 34cz, 35cb, 39ck and 40ck) are inefficient. The results of the surveyed rural holdings engaged in crop and vegetable production from Toplice region have shown that they have an enviable efficiency score, but it can be even better if the input variables (cost) are reduced. An example of good practice could be agricultural holdings 28cz, 32cz, 33cz, 36cb and 37cb which are reference for most households.

The holding 28cz is located in the vicinity of Žitoradja, it is engaged in vegetable production on half of its agricultural land (melons, tomatoes, tomato greenhouse), and the other half is planted with corn and wheat, this is mainly due to crop rotation. It achieves good prices in the market, and also in direct sale on the farm. It has all the necessary machinery for cultivation, five family members engaged in the production, redistribution of land on this farm has reduced the cost of land cultivation. The average plot is 1 ha.

The farm 32cz is also located in the vicinity of Žitoradja. It is engaged in vegetable production of greenhouse peppers, greenhouse tomatoes and melons and also the corn and wheat are present, mainly due to crop rotation. Greenhouse production enables a good profit, and melon completes the season with high yields due to the use of modern agricultural technology.

The farm 33cz, as the previous two farms, is near Žitoradja and it is mainly engaged in vegetable production - melon on 4ha, and corn and wheat, mainly due to crop rotation.

The farm 36cb is in the vicinity of Blace. It is engaged in crop production mainly for the supply of feed for own dairy farm, and the surplus is sold. This farm produces plum on 4 ha. The input costs are reduced due to ownership of the land/farm. It has all the necessary machinery for cultivation and eight family members who are engaged in the production.

The farm 37cb is in the vicinity of Blace. It is engaged in crop production of corn, wheat, clover, etc. and it is not engaged in livestock. The products are sold in the market. In addition to crop production, it is engaged in production of fruit, plums and cherries. It has all the necessary machinery for cultivation and five family members who are engaged in the production.

There are 11 efficient livestock farms. Holdings 47lp, 50lz, 54lb and 59lk are reference for most holdings. The results have shown that in the observed set, 11 agricultural holdings (41lp, 42lp, 44lp, 46lp, 47lp, 48lz, 49lz, 50lz, 51lb, 54lb, 59lk) were efficient, and the remaining 9 farms (43lp, 45lp, 52lb, 53lb, 55lb, 56lk, 57lk, 58lk, 60lk) were inefficient. The results of the surveyed rural holdings with the dominant livestock production from Toplice region show that it has an enviable efficiency score. An example of good practice could be agricultural holdings 46lp, 47lp, 49lz, 50lz, 51lb, 54lb, 59lk which are reference for most holdings. All of these farms have all the machinery necessary for agricultural operation.

Holdings 46lp and 47lp are located in the vicinity of Prokuplje, engaged in livestock production (milk, meat and lambs) and both holdings are at equal distance from the market. On their own property, they produce feed for their farms, and use manure for fertilization of field and fruit crops. There are ten family members working on the farm 46lp, and five family members on the 47lp.

Holdings 49lz are 50lz, located near Žitoradja, are engaged in livestock production. Farm 49lz produces milk and calves. The entire amount of feed needed for the farm is produced on own land, and in addition peppers are cultivated on 0.5ha, while holding 50lz is engaged in fattening of beef and produces up to 50% of the necessary feed on the holding, and the rest is purchased in the market. There are four members of the family working on the first farm, and six on the second.

Farms 51lb and 54lb are located in the vicinity of Blace and they are engaged in livestock production, milk and calves. They cooperate with the dairy from Blace, produce feed on their farms and they are also engaged in plum production. Proximity to markets makes them stand out from other farms. There are three family members working on the first farm and four on the second.

The farm 59lk is located in the vicinity of Kuršumlija. It is engaged in livestock production, milk, calves and lambs. This holding is in transition to organic production. Livestock feeds mainly on pasture so the cost of food is generally low, and for the winter period feed is prepared on the farm. There are three family members working on this farm.

The Kruskal-Wallis statistics is used for testing the hypothesis of equality of the average efficiency of the observed primary productions and it was obtained that there was no significant difference in the efficiency of these three groups of individual farms.

## The analysis of projected values

In the previous paragraphs it is suggested that some farms which are less efficient could become more efficient if they follow the example of similar but more efficient farms. Based on the projected values, which are not shown in the paper due to the large amount of data, models of input elements can be proposed in order for output elements, in this case the value of production, to remain unchanged.

Each holding may have impact on the input elements which we take into consideration and the following conclusions can be made for holdings according to the type of dominant production.

The projected values for farms with dominant fruit production show that 12 of 20 analysed farms are inefficient. Based on the projected values it can be observed that

- the biggest problem is the cost of non-primary production which in inefficient holdings ranges from 52,300 RSD to 533,000 RSD, and should be reduced to a range between 31.95% and 98.71%,
- the land cultivated by these farms should be reduced by 9.84% to 62.01%,
- the cost of materials and maintenance should be reduced by 9.84% to 62.03%,
- the service cost should be reduced by 9.21% to 54.70%,
- in regard to output elements, it is possible to increase the values of non-primary production although, at the same time, the cost of non-primary production is reduced.

In regard to the projected values of the holdings with the dominant crop and vegetable productions, it is noticeable that 13 of 20 analysed farms are inefficient. Based on the projected values it can be observed that

- the land cultivated by these farms should be reduced by 19.35% to 74.59%.
- the cost of non-primary production in inefficient holdings should be reduced in a range between 32.45% and 69.83%,
- the cost of materials and maintenance should be reduced by 27.68% to 64.95%,
- the service cost should be reduced by 19.35% to 64.95%,
- in regard to output elements, it is possible only in two cases (30cz and 34cz) to increase the value of non-primary production and at the same time to reduce the cost of non-primary production.

The projected values of the holdings with the dominant livestock production show that 9 of 20 analysed farms are inefficient. Based on the projected values it can be seen that

- the land cultivated by these farms should be reduced by 1.24% to 51.89%,
- the cost of non-primary production in inefficient holdings should be reduced in a range between 3.25% and 51.89%,
- the cost of materials and maintenance should be reduced by 1.24% to 51.89%,

- the service cost should be reduced by 7.83% to 51.89%,
- in regard to output elements, it is possible only in case of 56lk to increase the value of non-primary production and at the same time to reduce the cost of non-primary production.

## Conclusion

Agro-economic analysis provides the answer to many questions that are crucial for the initiation of agricultural production, as well as its maintenance and improvement. The rational use of all production factors is one of the important conditions of economy in agricultural production. The following analyses are particularly important and necessary: analysis of profitability, cost and cost price analysis, analysis of the market and the prices of agricultural products and analysis of gross margin. Each of these analyses is in a function of productivity, profitability, economic and environmental sustainability as key principles in the modern economy.

In regard to economics and business organization of agricultural holdings, it is necessary to constantly monitor and analyse the experience of the European Union, especially some of the developed countries of the successful economic groupings. This experience shows, shortly, that it is necessary to constantly encourage and support this production (the policy of price) using measures of agricultural policy and other methods. Only in this way, in conjunction of internal efficiency and external support from the state, it is possible to maintain and develop this important and promising production.

Based on the analysis of the farm efficiency with different types of production, it can be concluded that:

- Agricultural holdings with dominant fruit production mainly produce cherries and plums, and less apples and pears, mainly on the territory of municipality Blace. Non-primary production includes the production of corn and wheat, and less livestock production, milk and calves. In the future, they should be more focused on specialty fruit production in order to reduce cost and improve product quality which provides better position in the market.

- Agricultural holdings with dominant crop production mainly grow corn and wheat, and less sown grasses and clover, this mainly applies for farms that produce feed for their livestock. Holdings with dominant vegetable production mainly produce tomatoes, peppers and melons. Non-primary production in this case is the production of cherries and plums, and less livestock, production of milk and calves. In the future they should be more focused on production of feed for their own livestock. Such farms are more efficient. In the vegetable production, they should focus on production of vegetables in closed spaces to reduce the cost and improve product quality which provides a better position in the market. Vegetable production is mainly organized on the territory of municipality Žitorađa, so that is a place where it should be expended.

- Agricultural holdings with dominant livestock production are mainly engaged in the

production of milk, calves and lambs, and one of them is engaged in the fattening of beef cattle. As non-dominant productions, mostly on the farms that produce feed for their livestock, corn, wheat, sown grass and clover are grown. Non-primary production in this case is the production of cherries and plums, and less apples and pears. In the future they should be more focused on production of feed for their own livestock. Such farms are more efficient.

·  Based on the analysis of 60 holdings it can be concluded that the more efficient farms are those involved in the dominant livestock production, which have their own machines, so the cost of services to them is somewhat lower. Only a small share of feed for livestock is purchased by these on the market, and most of the feed is produced on their own farms.

·  For holdings with dominant fruit production, more efficient farms are those engaged in production of cherries. In regard to the input elements of this type of production, the highest cost is occasional labour hired during the harvest season.

·  In holdings with dominant field crop production, if it is not accompanied by appropriate livestock production, the land surface should be increased in order to provide more efficient production. In vegetable production, production in closed production facilities is more efficient than production in the open field. Harvest time and a good price can affect the efficiency of these farms.

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# OCENA EFIKASNOSTI POSLOVANJA POLJOPRIVREDNIH GAZDINSTAVA SA RAZLIČITIM PROIZVODNJAMA

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## Sažetak

*Predmet ovog rada je korišćenje DEA metodologija za ocenu i analizu ukupne tehničke efikasnost (TE) koja u sebi uključuje čistu tehničku efikasnost (CTE) i skala efikasnost (SE). U radu je analizirano poslovanje tri grupe po 20 individualnih gazdinstava sa različitim primarnim proizvodnjama, ratarskom, voćarskom i stočarskom. Potrebni podaci za izradu osnovnog modela prikupljeni su tako što je sprovedena anketa na 60 poljoprivrednih gazdinstava sa teritorije Topličkog okruga. Anketirana gazdinstva poseduju 92 traktora, 108 raznih plugova, 63 prskalice i drugu potrebnu mehanizaciju. Pored toga obrađuju 677,7 ha poljoprivrednog zemljišta što se nalazi na 1201 parcelu. Ova gazdinstva drže 291 kravu, 118 bikova, 366 svinje, 459 ovce i dr. Sve ovo rade 91 član gazdinstva. Cilj rada je da se utvrdi da li postoji razlika u tehničkoj efikasnosti različitih tipova gazdinstava.*

***Ključne reči:*** *DEA metodologija, tehnička efikasnost, skala efikasnost, porodična gazdinstva, primarna proizvodnja.*

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# MEASURING FOOD SECURITY IN THE REPUBLIC OF SERBIA[1][2]

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## Summary

*The overall goal of this paper is analysis of Serbian food security system across a set of indicators, with special emphasis to 2012 Global Food Security Index (GFSI). The results generally provided two major weakness of the Serbian food system: Gross domestic product (GDP) per capita based on purchasing power parity and Corruption. Paper points out the need to improve the current food security system and proposed a number of measures for its improvement. Among other things appropriate nutritional standards and strategies will have to be adopted; investors' confidence must be strengthened and must be dealt with in a serious fight against corruption in the agriculture and food sector. The development of rural areas, reducing regional disparities and stabilization of agricultural production will certainly contribute to the tough battle against poverty.*

***Key words:*** *Food security, Poverty, GDP Purchasing power parity, Corruption*

**JEL:** *Q18, I31, D73.*

## Introduction

The 2007 global food price crisis encouraged political and scientific interest in food security. In their July 2009 joint statement, the G8 heads of state agreed "to act with the scale and urgency needed to achieve sustainable global food security" (AFSI, 2009). Despite the fact that more than enough food is currently produced *per capita* to adequately feed the global population (Ingram, 2011), about 842 million people (12 percent of the global population) were unable to meet their dietary energy requirements in 2011-13 (FAO, 2013).

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For each of the physical, psychological and socio familial manifestations of food insecurity important social implications have been identified. Therefore, the key aspects of human development depend on food security (Hamelin et al., 1999). Even before the food and financial crises pushed hunger to unprecedented highs, malnutrition was the underlying cause of nearly 4.5 million child deaths every year (ActionAid, 2010). The loss of life caused by hunger is dwarfed by the invisible and permanent loss of human potential. Lack of food raises healthcare costs and reduces workforce productivity (Shepard et al., 2011; FAO, 2011; IMF, 2012). Food insecurity is correlated with a range of health-related outcomes: anemia (Eicher-Miller et al., 2009; Skaliky et al. 2006), aggression and anxiety (Whitaker et al., 2006) cognitive problems (Howard, 2011), lower nutrient intakes (Cook et al., 2004), dysthymia and other mental health issues (Alaimo et al., 2002), asthma (Kirkpatrick et al., 2007), behavioral problems (Huang et al., 2010), depression (Whitaker et al., 2006), diabetes (Seligman et al., 2007) etc.

Apart from this, food insecurity causes reduction of overall economic outputs and threatens political stability. Some estimates suggest that food insecurity costs developing economics around US$450bn in lost GDP each year (ActionAid, 2010), what is more than 10 times the amount the UN estimates would be needed to achieve the Millennium Development Goals (MDGs) hunger targets. A food shortage is correlated with a significant deterioration of democratic institutions and a significant increase in the incidence of anti-government demonstrations, riots, and civil conflict in low-income countries (Arezki et al., 2010).

### The food security outcomes and their elements

There are many definitions of food security. Commonly used definition from the 1996 World Food Summit (WFS) (FAO, 1996) states that food security exists when "all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life". Food security outcomes are grouped into three components: Availability, Accessibility and Utilization. Each component comprises three elements (Figure 1).

All nine elements have to be satisfied and stable over time for food security to be met. The stability of the three dimension over time is very important because adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on the food security status.

**Figure 1.** Food System outcomes
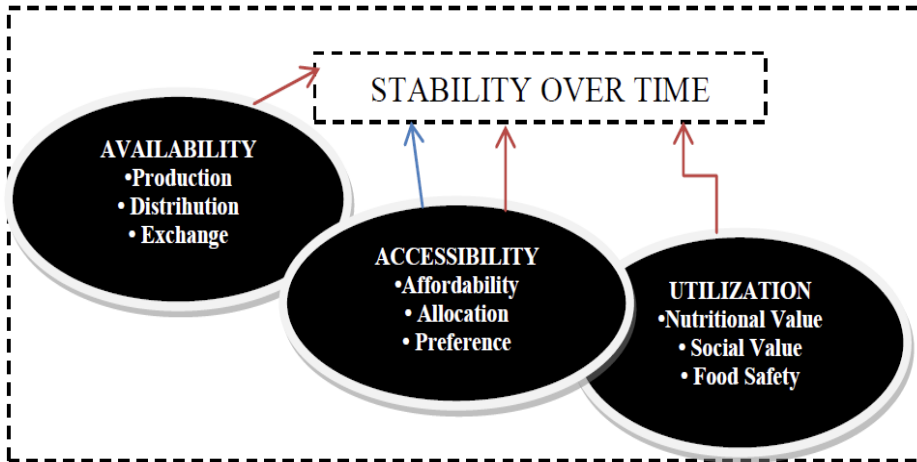


Source: Ingram (2011), modified by the authors.

Upon existing research of food security, in 2012, The Economist Intelligence Unit (EIU) has created Global Food Security Index (GFSI). Based on previously mentioned WFS definition EIU experts developed a modified definition of food security: "When people at all times have physical, social and economic access to sufficient and nutritious food that meets their dietary needs for a healthy and active life" (GFSI, 2012). They also modified internationally designed dimensions (FAO, 2006) of food security (Figure 1) and assessed food security across following three categories: Affordability and Financial Access, Availability, and Food Quality and Safety. These categories are further divided into a set of indicators that evaluate programmes, policies or practices that influence food security across a set of 107 countries. *Affordability* measures the ability of consumers to purchase food, their vulnerability to price shocks, and the presence of programmers and policies to support them when shocks occur. It is measured by six indicators: 1) Food consumption as a proportion of total household expenditure; 2) Proportion of population living under or close to the global poverty line; 3) GDP per capita (at purchasing power parity, exchange rates); 4) Agricultural import tariffs; 5) Presence of food safety net programmes; 6) Access to financing for farmers. *Availability* measures the sufficiency of the national food supply, the risk of supply disruption, national capacity to disseminate food, and research efforts to expand agricultural output. This category is measured across five indicators: 1) Sufficiency of supply; 2) Public expenditure on agricultural research and development (R&D); 3) Agricultural infrastructure; 4) Volatility of agricultural production; 5) Political stability risk. Additionally, in 2013 two new indicators Corruption and Urban absorption capacity have been added to the availability category. *Quality and safety* measures what is sometimes called "utilization" in food security parlance. It assesses the variety and nutritional quality of average diets, as well as the safety of food. It is measured across five indicators: 1) Diet diversification; 2) Government commitment to increasing

nutritional standards; 3) Micronutrient availability; 4) Protein quality; 5) Food safety. GFSI scores are calculated from the weighted mean of underlying indicators and scaled from 0-100, where 100=most favorable.

### The situation in Serbia: Serbia GFSI overview

Overall GFSI results based on relevant sources (FAO, WB, WTO, EIU, WHO) placed Serbia in the second out of four group of countries[5]. This was due to obtained general score of 56.8 in 2013 and somewhat slightly higher 59.6 score in 2012. By the number of points in the category of Affordability Serbia is ranked the place 44th out of 107 countries. In the same competition for parameters: Availability, and the Quality and Safety, Serbia ranks 51st and 41st, respectively. In the reporting period (2012-2013) Serbia has improved a parameter Quality and Safety (by 0.8), while two other parameters has regressed, Availability by 3.7 score and Affordability by 0.4 (Table 1).

**Table 1.** Serbia GFSI (July2012- July2013)

| Score/100 | 2012 | 2013 | Difference 2013 vs.2012 | Rank 2013/107 | Difference rank 2013 vs.2012 |
|---|---|---|---|---|---|
| Overall | 59.6 | 56.8 | -2.8 | 49 | -3.0 |
| Affordability | 62.1 | 61.7 | -0.4 | 44 | |
| Availability | 55.1 | 51.4 | -3.7 | 51 | |
| Quality and Safety | 65.5 | 66.3 | +0.8 | 41 | |

Source: GFSI, 2012, 2013.

The EIU researcher analysed and gived differents scores for different elements of the Serbian food system as presented in Table 2. Three indicators: Proportion of population under global poverty line (0.6%), Food safety and Diet diversification representing the strongest side of the system. On the other hand, the indicators which were evaluated worst are: Gross domestic product (GDP) per capita based on purchasing power parity, Corruption and Nutritional standards. Indicators with moderate score which should be improved are: Sufficienty of supply, Agricultural infrastructure, Urban absorption capacity, Protein quality, Public expenditure on agricultural R&D, Micronutrient availability, Volatility of agricultural production, Political stability risk and Food consumption as a share of household expenditure.

### Weaknesses of food security system in Serbia

As already mentioned, the biggest weakness of food security system in Serbia is GDP per capita PPP. As could be seen in Table 3 Serbian GDP purchasing power parity

5   Countries are grouped  into quartiles so that the best scoring 25% (top 27 countries, scores 70.1-87.3) are placed into a first group („Best environment"), the next 25% into the second group (scores 52.7-70.0), the next 25% are placed into the third group (scores 35.6-52.6) and the worst scoring 25% are placed into the fourth group.

is significantly lower than in presented countries. The 2013 Serbian GDP purchasing power parity level was reached by Croatia in 2000, Hungary in 1999, Romania in 2007, Austria and EU in 1981 as well as major advanced economies (G7). In 2013 Austria and G7 have almost four times higher GDP per capita purchasing power parity than Serbia, while EU had the same indicator nearly three times higher than Serbia. Serbia is significantly falling behind even in comparisons to the newest member of EU- Croatia. Croatia in 2013 had a 1.6 times higher GDP purchasing power parity. Value of GDP purchasing power parity is in line with national poverty indicators. Dramatic decline in economic activity during the previous decade had an enormous impact on the increase in the number of the poor until 2000 (IMF, 2014). Research on poverty rates has shown that unemployment and inactivity are the basic causes of poverty and social exclusion in Serbia (Krstić, 2008).

**Table 2.** Analysis of the Serbian food system

|  |  | Score |
|---|---|---|
| Strengths (score 75 or more) | •Proportion of population under global poverty line<br>• Food safety<br>•Diet diversification<br>•Agricultural import tariffs<br>•Presence of food safety net programs<br>•Access to financing for farmers | •99.3<br>•99.2<br>•96.5<br>•78.8<br>•75.0<br>•75.0 |
| Moderate (score 25 to 75) | •Sufficiency of supply<br>•Agricultural infrastructure<br>•Urban absorption capacity<br>• Protein quality<br>• Public expenditure on agricultural R&D<br>• Micronutrient availability<br>•Volatility of agricultural production<br>• Political stability risk<br>• Food consumption as a share of household expenditure<br>• Nutritional standards<br>• Corruption | •67.4<br>•61.1<br>•56.5<br>•55.0<br>•50.0<br>•47.6<br>•40.5<br>•38.9<br>•36.2<br>•34.6<br>•25.0 |
| Weaknesses (score less than 25) | •Gross domestic product per capita (PPP) | •17.2 |

Source: GFSI, 2013

**Table 3.** GDP* purchasing power parity in Serbia and other countries (Int. $), comparison

|  | 1981 | 1985 | 1999 | 2000 | 2001 | 2002 | 2007 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serbia | - | - | - | 5.7 | 6.1 | 6.5 | 9.7 | 10.0 | 10.3 | 10.7 | 10.7 | **11.1** |
| Croatia | - | - | 10.1 | **11.2** | 11.7 | 12.4 | 17.8 | 17.4 | 17.3 | 17.7 | 17.6 | 17.7 |
| Romania | - | - | 5.8 | 6.1 | 6.6 | 7.1 | **11.4** | 11.8 | 11.9 | 12.4 | 12.7 | 13.2 |
| Hungary | - | - | **11.3** | 12.0 | 12.8 | 13.6 | 18.7 | 18.2 | 18.6 | 19.4 | 19.5 | 19.8 |
| Austria | **11.3** | - | 27.3 | 28.8 | 29.6 | 30.4 | 38.5 | 38.3 | 39.3 | 41.0 | 41.9 | 42.5 |
| EU | - | **11.2** | 20.6 | 21.9 | 22.8 | 23.4 | 30,0 | 29.3 | 30.2 | 31.2 | 31.6 | 31.9 |
| G7 | **11.6** | 15.1 | 26.7 | 30.2 | 31.1 | 31.8 | 39.8 | 38.8 | 40.2 | 41.4 | 42.7 | 43.6 |

*GDP based on purchasing power parity per capita is calculated in International Dollars and obtained from the World Economic Outlook Database

Statistical data show that area differences in poverty are permanently present between rural and urban areas, and between different regions of Serbia[6]. In 2008, rural poverty decreased to 7.5% (compared to 11.2% in 2007), which was the lowest figure in the period 2002–2009. However, rural areas responded to the economic crisis and the percentage of the poor below the consumption-based absolute poverty line in rural areas increased from 7.5% to 9.6%, which is twice as high as in urban areas (4.9%). This trend continues in 2010, too. Regional disparities between Belgrade and Central Serbia are very huge. Percentage of the poor in Central Serbia (12%) in 2010 was more than double higher than in Belgrade (5.3%). The absolute poverty profile shows a strong correlation between poverty and the level of education. The most vulnerable groups are the least educated groups. Data in Table 4 is presented until 2010, because there is no official data available for the period after 2010. Only newspaper articles highlighted that the number of hungry children in 2013 is by 1.000 higher than in 2012 (Večernje novosti online, 2013).

**Table 4.** Absolute poverty line (CPI)[7]

|  | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Poverty line, RSD/month/consumer unit | 6.221 | 6.625 | 7.401 | 8.022 | 8.544 |
| % of the poor in RS | 8.8 | 8.3 | 6.1 | 6.9 | 9.2 |
| % of the poor by region: |  |  |  |  |  |
| Belgrade | 4.3 | 2.4 | 2.9 | 3.8 | 5.3 |
| Central Serbia | 10.7 | 9.0 | 7.0 | 9.3 | 12.0 |
| Vojvodina | 8.6 | 11.9 | 6.8 | 4.9 | 6.8 |
| % of the poor by type of settlement |  |  |  |  |  |
| Urban area | 5.3 | 6.0 | 5.0 | 4.9 | 5.7 |
| Other area | 13.3 | 11.2 | 7.5 | 9.6 | 13.6 |
| % of the poor by level of education of head of household: |  |  |  |  |  |
| Incomplete primary school | 21.0 | 18.1 | 9.0 | 14.8 | 14.2 |
| Primary school | 13.7 | 13.2 | 10.5 | 9.2 | 12.7 |
| Secondary school | 5.5 | 5.4 | 4.8 | 3.0 | 4.8 |
| College | 0.6 | 0.1 | 2.7 | 1.8 | 2.4 |
| University | 1.8 | 0.4 | 1.9 | 0.6 | 0.8 |

Source: Government of the Republic of Serbia, 2012 **(http://www.inkluzija.gov.rs/wp-content/uploads/2013/07/Monitoring-Social-Inclusion-in-Serbia-Aug-2012-ENG-revizija.pdf**.

Question of malnutrition as an alternative poverty indicator (Setboonsarng, 2005) is very interesting in the case of Serbia. Analysis of Micronutrient availability indicator has shown that in contrast with vitamin A availability (100 score), availability of animal

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6    The Republic of Serbia does not have a definition of rural areas based on standard indicators used internationally, so „other area" is usually considered as rural areas.

7    Absolute poverty line defined on the basis of food line, raised for the amount of other expenditures (clothing, footwear, housing, health care, education, transport, sports, culture, other goods and services), computed in 2006 raised for the amount of inflation (Index of Consumer Prices) for each year.

(30.6 score) and vegetal iron in mg/person/day is insufficient (12.1 score). According to FAO in 2001, prevalence of anemia among children under five was 18.8%. Similarly, Institute for Public Health "Dr Milan Jovanovic Batut" pointed out that every third child in Serbia under the age of six is suffering from anemia (Večernje novosti online, 2013). This can be correlated with the increasing consumption of fast food as well as total absence of nutritional dietary guidelines and nutritional plan or strategy. Sufficiency of supply has been analyzed through dependency on chronic food aid and average food supply. Serbia is not dependent on food aid since 2004, when World Food Programme (WFP) ends operations in Serbia and Montenegro. FAO data indicate that dietary energy supply in 2011-13 in Serbia was 2.890 kcal/capita/day (55.5 scores). If we take into consideration average adult needs of 2.300 calories per day to lead a healthy and active life, this means that Serbia is sufficiently supplied, but many less than developed countries. For example, dietary energy supply in the same period was 3.470 kcal/capita/day in Norway, 3.610 kcal/capita/day in Italy, and 3.650 kcal/capita/day in Greece. Supply is lower than in other Balkan countries (3.180 kcal/capita/day in Croatia, Albania- 3.000 kcal/capita/day, Montenegro - 3.040 kcal/capita/day, Bosnia and Herzegovina- 3.030 kcal/capita/day).

Second biggest weakness of the system is corruption with a moderate score of 25.0. Corruption interferes with a government′s ability to develop and utilize effective agricultural policies and has a pernicious effect on food security, reducing available supply and raising costs. The destructive decisions against public benefit are taken (Aziz, 2001). This can lead to misuse of land and other resources (Papic Brankov et al., 2013). Three types of corruption, individual, business and political are observed in the agricultural sector of Serbia. For example, land registry officials are third most corrupt public officials, with nearly 6% of citizens who had interactions with them, resulting in a bribe being paid (UNODC, 2011). Transition in Serbia provided the opportunity for various forms of abuse and illegal behavior through the privatization of public ownership in the economy. Privatization of Serbian agribusiness was not being transparent, with frequent changes of legislation, in a kind of legal vacuum. During this process, in the past decade, more than 50.000 workers lost their jobs, which directly caused the increase of the hungry and poor. Thus, we can conclude that the level of corruption in Serbia is very high. After the democratic changes in 2000 Corruption Perceptions Index was 1.3, and in the meantime, this index increased almost three times to 3.5, but the fight against corruption has not produce significant results still (Table 5).

**Table 5.** Serbia Corruption perception index [8]

|  | 2000 (Yu) | 2005 (S&M) | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Score | 1.3 | 2.8 | 3.0 | 3.4 | 3.4 | 3.5 | 3.5 | 3.3 | 39 | 42 |
| Rank | 89/90 | 102/159 | 90/163 | 79/179 | 85/180 | 83/180 | 78/178 | 86/182 | 80/176 | 72/177 |

Source: www.transparency.org

Foreign investors, some of them personally affected by the global financial crisis, still hesitate to inject fresh capital into the Serbian market, waiting for better conditions, reflected in the harmonization of laws with EU standards, transparent operation of public services, easier and uniform administration procedures and most importantly, a stable political situation. Table 6 shows that Serbia is characterized by fluctuations in the volume of Foreign direct investment (FDI). The largest FDI net inflow is achieved in 2006 (4.153 million), after which there is a gradual reduction. Companies from the EU have been the leading investors in Serbia for the past eight years.

**Table 6.** Serbia: Foreign Direct Investments, in Cash *(*in 000 EUR)

|  | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|
| Net | 1.162.3 | 3.242.6 | 1.448.1 | 1.590.0 | 1.305.0 | 830.525 | 1.798.5 | 220.4 | 755.9 |
| Inflow | 1.215.4 | **4.153.0** | 2.458.5 | 2.193.0 | 1.743.0 | 1.107.6 | 2.206.8 | 2.126.2 | 1.021.3 |
| % of EU FDI from Total FDI | 89.67 | 62.92 | 84.63 | 81.33 | 67.2 | 78.63 | 88.31 | 64.28 | 78.4 |

Source: National Bank of Serbia (www.nbs.rs); EU (2013).

Further on observing, insufficient investment is one of the main causes (apart from unfavorable weather conditions - drought and floods) of high Volatility of agricultural production. Instability in production is presented in Table 7 through Agriculture production volume index of goods and services (producer prices, previous year=100) and Food production index.

**Table 7.** Agriculture and food production index

|  | 2001 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| Agriculture production volume index of goods and services (producer prices, previous year=100) | 118.0 | 108.0 | 101.0 | 99.4 | 100.9 | 82.3 |
| Food production index | 90.7 | 100.9 | 107.7 | 101.5 | 106.6 | 92.4 |

Source: FAOSTAT (www.fao.org)

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8    The Corruption Perceptions Index ranks countries/territories based on how corrupt a country's public sector is perceived to be. It is a composite index, drawing on corruption-related data from expert and business surveys carried out by a variety of independent and reputable institutions. Scores range from 0 (highly corrupt) to 100 (very clean) for years 2012 and 2013. For other years scores going from 0 to 10. 0 - 10, where 0 means that a country is perceived as highly corrupt and 10 means that a country is perceived as very clean.

## Discussion and conclusion

In this paper we have analyzed food security system in Serbia using relevant data from Food and Agriculture Organization (FAO), World Bank (WB), European Commission (EC), and National Statistical Offices, with special emphasis to 2012 indicator Global Food Security Index (GFSI).

The results generally provided two major weaknesses of food security system GDP power purchasing parity per capita and corruption. Observing slow growth of GDP power purchasing parity Serbia is significantly falling behind many neighboring countries, even in comparison to the newest member of EU, Croatia. In the same time corruption remain widespread since the fight against it has not produced significant results. As a consequence Serbia is characterized by fluctuation in the volume of FDI. The largest FDI net inflow is achieved in 2006, after which there is a gradual reduction. Insufficient investment contributes to adverse fluctuations in the level of agricultural production. Analysis of agriculture and food production volume index showed that stability of crop production year by year should be improved.

Difficulties that Serbia is facing lead to the increase of poverty. Poverty in rural areas is twice as high as in urban areas. Similarly, percentage of poor in Central Serbia is more than double higher than in Belgrade. So, we can conclude that poverty in Serbia has become a rural phenomenon and phenomenon of a certain part of country. Child malnutrition as an alternative poverty indicator is worrying issue. Increasing consumption of fast food and total absence of nutritional strategy has contributed to dramatic growth of anemia in children.

Finally, we can conclude that there is a need for food security improvement in Serbia. The greatest responsibility lies on the government which must establish an adequate system. To that aim, first of all, it is necessary to regularly monitor and publish all data indicators. Apart from this, appropriate nutritional standards and strategies will have to be adopted; investors' confidence must be strengthened and must be dealt with in a serious fight against corruption in the agriculture and food sector. The development of rural areas, reducing regional disparities and stabilization of agricultural production will certainly contribute to the tough battle against poverty.

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# PROCENA PREHRAMBENE SIGURNOSTI U REPUBLICI SRBIJI[9] [10]

*Tatjana Papić Brankov[11], Miloš Milovanović[12]*

## Apstrakt

*Opšti cilj ovog rada je analiza sistema sigurnosti hrane u Srbiji preko skupa indikatora sa posebnim osvrtom na globalni indeks sigurnosti hrane (GFSI). Istraživanje je pokazalo da su dve glavne slabosti prehrambenog sistema u Srbiji: bruto domaći proizvod (BDP) po stanovniku zasnovan na paritetu kupovne moći i korupcija. U ovom radu se ukazuje na potrebu unapređenja postojećeg sistema sigurnosti hrane i u tom cilju predlažu se brojne mere. Između ostalog, potrebno je usvojiti odgovarajuće prehrambene strategije i standarde, ojačati poverenje investitora i ozbiljno se pozabaviti borbom protiv korupcije u poljoprivrednom i prehrambenom sektoru. Razvoj ruralnih oblasti, smanjivanje regionalnih dispariteta i stabilizacija poljoprivredne proizvodnje će sigurno doprineti borbi protiv siromaštva.*

***Ključne reči:*** *prehrambena sigurnost, siromaštvo BDP paritet kupovne moći, korupcija.*

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# ANALYSIS OF PRODUCTION POTENTIAL AND COMPETITIVE POSITION OF SERBIA ON THE INTERNATIONAL WINE MARKET[1]

*Jelena Petrović[2], Bojan Krstić[3], Tanja Stanišić[4]*

## Summary

*The purpose of this research is analysis and forecasting of the most important trends on the international wine market, as well as identifying opportunities for wine export from Serbia. The aim of the research is to analyse the movement of the wine production and trade on the international market by applying the appropriate methodology. The paper is structured in the following segments: 1) examining the impact of number of vines and yields per vine on the acheved volume of grape production in the Republic of Serbia in the observed period; 2) examining the competitive position of the Republic of Serbia on the international wine market; and 3) analysis of the value and structure of foreign trade of wine between the Republic of Serbia and other countries. Comparative analysis, correlation analysis and regression analysis are used in the paper. The results of this paper indicate: 1) higher impact of yields per vine on the volume of grape production in relation to the impact of the number of vines on the volume of grape production; 2) increasing deficit of foreign trade of wine between Serbia and other world countries; and 3) that Serbia reduced coverage of import of wine by export of wine in the observed period.*

***Keywords:*** *wine, production, market, foreign exchange.*

**JEL:** *Q1, F1.*

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## Introduction

Favourable climatic conditions and geographic location of Serbia are its main comparative advantage in the production and placement of wine. Serbia is a continental country located in Southeastern Europe, in the central part of the Balkan Peninsula, between 41°53' and 46°11' of north geographic latitude and 18°49' and 23°00' of east geographic longitude. Because of the Pannonian Plain in the north, Serbia belongs to the region of Central Europe. Good geographic latitude contribute to adequate temperature conditions that are crucial to the amount of sugar that grapes contain, that is further important for the production of high quality wine. The climate of Serbia is moderately continental, with more or less expressed local characteristics and a gradual change between seasons. Serbia has a good regime of light, which is, in addition to temperature, a decisive factor for a sufficient amount of extract which is transformed into wine. The average volume of rainfall is partly satisfactory for grape production. Insufficient volume of rainfall during the vegetation can be overcome with sprinkler systems.

Given the very favourable climatic - geographical conditions, it is not surprising that viticulture has a long tradition in Serbia. According to numerous historical sources, viticulture and enology in Serbia have been developing more than a thousand years. Start of viticulture development is related to the formation of the Serbian state in the VIII and IX century and its significant development is linked to the reign of Nemanjić dynasty from the XI to the XIV century. Today, the viticulture and enology are widespread in Serbia and wine culture is a part of the tradition. Climate and soil in Serbia are favourable for vine growing, therefore it is grown in several regions with its' wine grooving sub-regions and areas (the most famous are Subotica, Bačka, South-Banat, Belgrade, Šumadija, Mlava, Niš, Knjaževac, Leskovac, Vranje, South and North Kosovo and Metohija, as well as sub-regions of Tri Morave and Negotinska Krajina) (Vlahović et al., 2012).

However, it comes to a reduction in the vineyards in the late XX and the early XXI century. According to data of the Statistical Office of the Republic of Serbia, the vineyards in Serbia are reduced from 70,634 hectares to about 22,150 hectares during the last decade. It is necessary to point out that there was as much as 100,000 hectares under the vineyards in Serbia in the eighties of the XX century (Statistical Office of the Republic of Serbia, 1998). Another trend, that characterized the first decade of the XXI century, is the formation of significant areas with contemporary assortment, as well as with varieties adapted to our circumstances. It is necessary to point out that the establishment of new wineries and wine cellars that are characterized by the quality of grapes planted and production of high quality wines. It is anticipated that if Serbia success to restore a few of denary thousand hectares of vineyards in the next seven to ten years, with continuity of state stimulation and with good development policy, the production and export of wine can significantly increase. However, the limit of the achievement of this goal is the fact that the costs of raising new vineyards are high. It takes averagely from €12,000 to €15,000 of investment per hectare, depending on what kind of equipment and infrastructure producer has (Vlahović et al., 2008). Due to limited financial and other resources, it is necessary a strategic approach and a serious analysis of all options, but, in particular, limitations of Serbia to promote and further develop viticulture and enology.

The international wine market is subject of the changes. Globalization is not new to the world wine markets, but its influence has increased significantly. One indicator of that is the growth in the share of global production of wine that is exported (Anderson et al., 2001). The decisive potential in the global wine trade will, however, vary among the individual countries, also depending on the volume of production and the possibilities of its expansion (Kucerova, 2014). In the modern business world, which is characterized by a dynamic and continuous changes, the competitive ability of the company depends on the speed with which it can introduce new, superior products/services and innovate various business processes in relation to its rivals on the market (Krstić, Petrović, 2012). Wine producers should adapt the production, distribution and implement innovated strategies in line with future changes on the international wine market. It can be expected that Serbia's entry into the European Union will increase market opportunities for Serbian producers through potentially increasing sales of local wines. On the other hand, a larger market means more competition, and the only producers of quality wines and recognizable brands can expect increases of sales and profitability. Being competitive in export markets is, however, only a partial measure of an industry's overall performance; it also depends on its ability to defend its domestic market share (Fleming et al., 2014). Within the grape and wine sectors in many regions, there are fears of rising import competition and shrinking consumer demand (Wittwer, Rothfield, 2005). Wine producers in Serbia are necessary to increase the wine production with the simultaneous change of structure from the point of view of quality, and according to the market demands (Vlahović et al., 2011). They can achieve their business objectives in terms of target groups of buyers and consumers (Prdić et al., 2014).

Wine producers must recognize that the most effective way to compete on the global market is to trigger a systemic organization and produce consistently high-quality product at a reasonable price (Fronkova, 2011). The concept of profitability has been widely debated in the international scientific economic community (Vita, Amico, 2013). According to Harward, Upto (1961) "profitability is the ability of a given investment to earn a return from its use" which applied to the profitability of agricultural holdings, regional and traditional foods have been conceptualised as a form of cultural and social capital, providing rural areas with social and economic benefits (Tregear et al., 2007; Arfini et al. 2011). One of the ways of improving wine production is mutual communication and cooperation between producers. This cooperation enable coordinated approach to research and development, a well-developed supply chain, sustainable alliances between growers, producers and support industries, significant public and private sector partnership and a unified marketing strategy (Fronkova, 2011). As consumers around the world become more educated, the wine industry may grow increasingly – like the best wine (Cox, Bridwell, 2007). Modern conditions, in addition to a number of limitations, offer great opportunities for improving production of individual wine producers.

## Research methodology and hypotheses

Alcoholic drinks are very important and special group of agricultural products in the overall development of the economy, and in particular, in the development of agriculture and rural areas (Đorović et al., 2012). In this paper, the scope and dynamics of production of wine in the world and in some countries which are leading wine producers in the world are analysed as an important market indicators. Special attention is devoted to the production of grapes and wine in Serbia, as well as to its competitive position in the international wine market. It is especially pointed out the characteristics of wine foreign trade of Serbia with other countries. The main goal of this research is to apply the appropriate methodology to estimate the volume of grape production in the Republic of Serbia, but also to analyse the movement of production and trade of wine on the domestic and international wine market. The specific objectives of the research are: a) examining the correlation between the volume of production, on the one hand, and the number of vines and yields per vine, on the other hand; b) analyzing the tendencies on the international wine market, as well as the competitive position of Serbia in it; c) determining the existence of a deficit or surplus of Serbian wine foreign trade with other countries of the world, starting from the relationship between the volume of import and export of wine; d) consideration of the coverage of wine import by wine export from 2004 to 2013; and 5) pointing to the nessesary measures and actions which should be taken in order to increase wine export from Serbia to the international market.

The basic starting hypothesis of the research are:

*H1: There is a greater impact of yield per vine on the total volume of grape production, compared with the impact of the number of vines on the total volume of grape production in Serbia;*

*H2: The structure of the international wine market has changed in the observed period;*

*H3: Deficit of wine foreign trade of Serbia with the other countries in the world is increased;*

*H4: More intensive increase of wine import in relation to the increase of wine export is recorded in Serbia, or the coverage of wine import by wine export is reduced in the observed period.*

In addition to national sources, international statistical publications of importance for the production and distribution of wine are used as information bases of this research.

According to the sources and characteristics of the data, but in order to test the basic hypothesis and research questions, the relevant following methods are applied in this paper: comparative analysis, correlation analysis and regression analysis.

## Determinants of grape production in the Republic of Serbia

Grape production is widespread in the world, especially in Europe. Viticulture represents a highly intensive agricultural branch, which requires significant capital and labor investment

per unit of output. Therefore, its development may affect the reduction of unemployment rate in rural areas.

Viticulture is a traditional agricultural branch in Serbia. Serbia has favorable natural conditions for the growing of this crop plant. Serbia was known as a wine-growing country in the Middle Ages. Newer period of development of viticulture production began in the sixties of the last century. Changes in demand on the domestic and international market have caused changes in the production of grapes. Plantation of vineyards with a different of high-yield varieties have been made. Modern machinery in processing, protection and grape harvest is emploed on new rased vineyards. Table 1 shows the results achieved in grape production in Serbia from 2004 to 2013.

There was a tendency of decreasing the number of vines at an average annual rate of 3.83% in the Republic of Serbia from 2004 to 2013. This caused that the total grape production was reduced by 24.50%. The yield per vine was varied from 0.7 kilograms per vine (in 2005) to 1.5 kilograms per vine (in 2009).

**Table 1.** Vines, production and yield of grapes in the Republic of Serbia

| Year | Number of vines (in thousands) | Total production (in tonnes) | Yield per unit (in kilograms) |
|------|-------------------------------|------------------------------|-------------------------------|
| 2004 | 347,000 | 424,511 | 1.3 |
| 2005 | 337,000 | 240,643 | 0.7 |
| 2006 | 322,000 | 359,454 | 1.1 |
| 2007 | 309,000 | 353,343 | 1.1 |
| 2008 | 300,000 | 372,967 | 1.2 |
| 2009 | 291,000 | 431,306 | 1.5 |
| 2010 | 292,000 | 330,070 | 1.1 |
| 2011 | 273,614 | 324,919 | 1.2 |
| 2012 | 267,356 | 263,419 | 1.0 |
| 2013 | 244,087 | 320,491 | 1.3 |

*Source:* Statistical Office of the Republic of Serbia, Crop Production, available at: http://webrzs.stat.gov.rs/WebSite/public/ReportView.aspx

Interdependence between the volume of grape production (in tonnes) and the number of vines, as well as between the volume of grape production and yield per vine is tested in Table 2.

**Table 2.** Correlation between the volume of grape production, number of vines and yields per vine

| Correlations | | Number of vines | Grape production | Yield per vine |
|---|---|---|---|---|
| Number of vines | Pearson Correlation | 1 | **0.236** | -0.307 |
| | Sig. (1-tailed) | | 0.512 | 0.388 |
| | N | 10 | 10 | 10 |
| Grape production | Pearson Correlation | 0.236 | 1 | **0.838(\*\*)** |
| | Sig. (1-tailed) | 0.512 | | 0.002 |
| | N | 10 | 10 | 10 |
| Yield per vine | Pearson Correlation | -0.307 | 0.838(\*\*) | 1 |
| | Sig. (1-tailed) | 0.388 | 0.002 | |
| | N | 10 | 10 | 10 |

*\*\* Correlation is significant at the 0.01 level (2-tailed).*
*Source:* Authors' calculation

Based on the values in Table 2, it can be concluded that there is a positive correlation between the volume of grape production and number vines, but also between the volume of grape production and yield per vine. However, correlations between the volume of grape production and yield per vine is stronger and this factor has a greater impact on the volume of production achieved. There is a strong positive correlation between the achieved volume of grape production and yield per vine (correlation coefficient of 0.838), while there is a weak positive correlation between the volume of grape production and yield per vine (correlation coefficient of 0.236).

The common impact of the number of vines and yield per vine on the achieved volume of grape production in Serbia from 2004 to 2013 is tested in Table 3.

**Table 3.** The common impact of the number of vines and yield per vine on production volume

| Model Summary[b] | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | 0.985[a] | 0.970 | 0.961 | 1.201E7 |
| a. Predictors: (Constant), Yields, Vines | | | | |
| b. Dependent Variable: Production | | | | |

*Source:* Authors' calculation

The determination coefficient shows which part of the variance of the dependent variable explains the model. The determination coefficient is 0.970. When we express this ratio in percentage, we can conclude that the common impact of the number of vines and yield per vine on total grape production ammounts 97%.

The individual impact of the number of vines and yield per vine on the achieved volume of grape production in Serbia from 2004 to 2013 is tested in Table 4.

**Table 4.** The individual impact of observed factors (number of vines and yield per vine) on the grape production

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Correlations | | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Zero-order | Partial | Part | Tolerance | VIF |
| 1 | (Constant) | -2.850E8 | 5.129E7 | | -5.557 | 0.001 | | | | | |
| | Vines | 0.994 | 0.132 | 0.522 | 7.538 | 0.000 | 0.213 | 0.944 | 0.497 | 0.906 | 1.103 |
| | Yield | 2.891E8 | 1.983E7 | 1.010 | 14.580 | 0.000 | 0.850 | 0.984 | 0.961 | 0.906 | 1.103 |
| a. Dependent Variable: Production R Square: 0.971 | | | | | | | | | | | |

*Source:* Authors' calculation

Based on the values of Beta coefficients in Table 4, it can be concluded that there is a greater impact of yield per vine in relation to the impact of number of vines on the production volume. When Sig. value is less than 0.05, variable gives a significant unique contribution to the prediction of the dependent variable. When this value is greater than 0.05, it must be concluded that this variable does not give a significant unique contribution to the prediction of the dependent variable. Based on the results of the regression method, it can be concluded that both factors have a significant impact on the volume of grape production, with the higher impact of yield per vine, or it can be concluded that the hypothesis H1 is confirmed.

## Serbia on the international wine market

Regions with vineyard production can be found on the northern and, also, on the southern hemisphere, between 30 and 50 degrees of geographical latitude. The different climatic conditions, soil types and grape varieties were observed among continents, but also within the continents. Table 5 presents data on wine production at the global level, in 15 countries with the largest wine production, wine production in Serbia and wine production in the rest of the world.

**Table 5.** Wine production in the world, in 15 countries that are the largest wine producers, in Serbia and in the rest of the world from 2004 to 2014 (expressed in thousands of hectoliters)

| Country | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| France | 57,386 | 52,105 | 52,127 | 45,672 | 42,654 | 46,269 | 44,381 | 50,757 | 41,548 | 42,004 |
| Italy | 49,935 | 50,566 | 52,036 | 45,981 | 46,970 | 47,314 | 48,525 | 42,772 | 45,616 | 52,429 |
| Spain | 42,988 | 36,158 | 38,273 | 36,408 | 35,913 | 36,093 | 35,353 | 33,397 | 31,123 | 45,650 |
| U. States | 20,109 | 22,888 | 19,440 | 19,870 | 19,340 | 21,965 | 20,890 | 19,140 | 21,740 | 23,500 |
| Argentina | 15,464 | 15,222 | 15,396 | 15,046 | 14,676 | 12,135 | 16,250 | 15,473 | 11,778 | 14,984 |
| Australia | 14,679 | 14,301 | 14,263 | 9,620 | 12,448 | 11,784 | 11,420 | 11,180 | 12,260 | 12,310 |
| China | 11,700 | 11,800 | 11,900 | 12,500 | 12,600 | 12,800 | 13,000 | 13,200 | 13,810 | 11,780 |
| S. Africa | 9,279 | 8,406 | 9,398 | 9,783 | 10,165 | 9,986 | 9,327 | 9,725 | 10,568 | 10,980 |
| Chile | 6,301 | 7,885 | 8,448 | 8,227 | 8,683 | 10,093 | 8,844 | 10,464 | 12,554 | 12,846 |
| Germany | 10,007 | 9,153 | 8,916 | 10,261 | 9,991 | 9,228 | 6,906 | 9,132 | 9,012 | 8,409 |
| Russia | 5,120 | 4,590 | 6,280 | 7,280 | 7,110 | 7,126 | 6,400 | 6,353 | 6,400 | 6,200 |
| Portugal | 7,481 | 7,266 | 7,542 | 6,074 | 5,689 | 5,868 | 7,148 | 5,622 | 6,327 | 6,238 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Romania | 6,166 | 2,602 | 5,014 | 5,289 | 5,159 | 6,703 | 3,287 | 4,058 | 3,311 | 5,113 |
| N. Zealand | 1,192 | 1,020 | 1,332 | 1,476 | 2,052 | 2,050 | 1,900 | 2,350 | 1,940 | 2,484 |
| Greece | 4,248 | 4,027 | 3,938 | 3,511 | 3,869 | 3,366 | 2,950 | 2,750 | 3,115 | 3,343 |
| *Serbia* | - | - | *1,292* | *1,670* | *1,929* | *2,392* | *2,382* | *2,244* | *2,196* | *2,306* |
| Rest of World | 33,945 | 29,969 | 27,024 | 28,823 | 29,450 | 26,999 | 25,409 | 28,626 | 22,924 | 27,024 |
| World | 296,000 | 277,958 | 282,619 | 267,491 | 268,698 | 272,171 | 264,372 | 267,243 | 256,222 | 287,600 |

*Source:* Italian Wine Centar, available at: http://italianwinecentral.com/top-ten-wine-exporting-countries/; International Organisation of Vine and Wine, available at: http://www.oiv.int/oiv/info/enstatoivextracts2

World wine production was at a level of 287,600 hectolitres in 2013. Production was reduced by 2.84% from 2004 to 2013. Regionally, Europe provides the highest part of the world wine production (66.01%), followed by America (19.20%) and Asia (5.65%).

Observed by the countries, the largest fifteen producers of wine makes around about 89.80% of the total world wine production. In the period from 2004 to 2013, the share of the fifteen largest wine producers slightly increased from 88.53% to 89.80%, while the share of France, Italy and Spain decreased from 50.78% to 48.71%. France (14.61%), Italy (18.23%) and Spain (15.87%) have the largest share in the world wine production.

Participation of Serbia in the total world production of wine increased from 0.46% to 0.80% from 2006 to 2013. Serbia achieved the largest share in 2010 (0.90%). In the reporting period, Serbia has recorded a growth of wine production at an average annual rate of 8.63%.

Table 6 shows the wine export for the countries that are the largest exporter of wine, in Serbia, in the rest of the world, and the world import/export trade in the observed period.

**Table 6.** The largest exporters of wine in the world, export in Serbia, in the rest of the world and world import/export trade from 2004 to 2013 (in thousands of hectoliters)

| Country | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Italy | 14,123 | 15,721 | 18,390 | 18,507 | 18,067 | 19,519 | 21,841 | 23,238 | 21,200 | 20,343 |
| Spain | 14,042 | 14,439 | 14,340 | 15,079 | 16,914 | 14,607 | 17,685 | 22,549 | 19,472 | 16,012 |
| France | 14,210 | 13,834 | 14,861 | 14,506 | 12,798 | 12,556 | 13,504 | 14,194 | 14,992 | 14,557 |
| Chile | 4,740 | 4,209 | 4,740 | 6,100 | 5,885 | 6,935 | 7,333 | 6,666 | 7,517 | 8,834 |
| Australia | 6,426 | 7,019 | 7,598 | 7,862 | 6,985 | 7,716 | 7,811 | 7,205 | 7,349 | 7,117 |
| South Africa | 2,677 | 2,811 | 2,717 | 3,126 | 4,117 | 3,956 | 3,786 | 3,752 | 4,128 | 5,544 |
| United States | 3,874 | 3,459 | 3,761 | 4,231 | 4,638 | 3,983 | 3,965 | 4,218 | 4,009 | 4,149 |
| Germany | 2,709 | 2,970 | 3,197 | 3,543 | 3,580 | 3,557 | 3,929 | 4,151 | 3,960 | 4,011 |
| Argentina | 1,553 | 2,148 | 2,934 | 3,598 | 4,141 | 2,831 | 2,744 | 3,171 | 3,647 | 3,156 |
| Portugal | 3,229 | 2,627 | 2,930 | 3,442 | 2,911 | 2,309 | 2,557 | 3,076 | 3,386 | 3,115 |
| Serbia | - | 77 | 84 | 98 | 92 | 112 | 113 | 152 | - | - |
| Rest of world | 9,014 | 9,550 | 9,069 | 8,952 | 9,663 | 9,419 | 10,632 | 6,672 | 9,373 | 11,012 |
| World import/export trade | 76,597 | 78,864 | 84,621 | 89,044 | 89,791 | 87,500 | 95,900 | 100,726 | 99,033 | 97,850 |

*Source*: Italian Wine Centar, available at: http://italianwinecentral.com/top-ten-wine-exporting-countries/; International Organisation of Vine and Wine, available at: http://www.oiv.int/oiv/info/enstatoivextracts2

The largest wine producers and the largest exporters of wine in the world are the following countries: Italy (20.79%), Spain (16.36%) and France (14.88%). The share of these countries in the world export of wine is 52.03%. This share dropped from 55.32% to 52.03% from 2004 to 2013. The share of the ten largest exporter of wine in the world wine trade is 88.75%. The share of these countries in the world trade of wine increased slightly from 88.23% to 88.75%. The market share of Serbia in the world export of wine ranged from 0.097% to 0.151% from 2005 to 2011. Although the Serbian wine export increased in the observed period at an average annual rate of 12%, the share of Serbia in the global wine market is very small.

The share of the ten largest importers of wine in total import is 70.17%. Germany, the United Kingdom and the United States of America are the three largest importers of wine. In the observed period, these countries have increased the volume of imported wine. Germany and the United Kingdom have reduced the share in total import of wines on the world market from 17.68% to 15.93% and from 16.19% to 13.84%, while the United States increased share from 8.6% to 11.6%. The Republic of Serbia has increased the import of wine for more than 150% from 2005 to 2011. During this period, share of Serbia in total import of wine increased from 0.16% to 0.30%. In the same period, coverage of import by export decreased from 63% to 51%, or import grew faster than export, and import dependence of Serbia, when it comes to wine, increased.

Table 7 shows the import of wine for the countries that are the largest importers, in Serbia, in the rest of the world, as well as at the global level from 2004 to 2013.

**Table 7.** The largest importers of wine in the world (in thousands of hectoliters)

| Country | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Germany | 13,043 | 13,262 | 14,553 | 14,553 | 13,708 | 14,110 | 14,778 | 16,132 | 15,261 | 15,002 |
| United Kingdom | 11,945 | 11,727 | 11,287 | 11,677 | 11,515 | 11,859 | 12,861 | 13,295 | 13,124 | 13,032 |
| United States of America | 6,415 | 7,052 | 7,718 | 8,373 | 8,250 | 9,219 | 9,320 | 10,155 | 11,666 | 10,966 |
| France | 5,514 | 5,495 | 5,321 | 5,362 | 5,719 | 5,755 | 6,405 | 6,467 | 5,889 | 5,241 |
| Russian Federation | 5,051 | 6,227 | 6,112 | 6,434 | 5,733 | 4,520 | 5,466 | 5,112 | 4,844 | 4,922 |
| China | 712 | 868 | 1,528 | 1,959 | 2,151 | 2,235 | 3,482 | 4,412 | 3,939 | 3,766 |
| Canada | 2,668 | 2,809 | 3,043 | 3,118 | 3,200 | 3,284 | 3,500 | 3,584 | 3,767 | 3,729 |
| Netherlands | 3,227 | 3,799 | 3,417 | 3,823 | 3,631 | 3,669 | 3,692 | 3,647 | 3,560 | 3,667 |
| Belgium | 2,801 | 2,897 | 2,938 | 3,106 | 3,097 | 3,061 | 2,984 | 3,158 | 3,134 | 3,140 |
| Japan | 1,665 | 1,585 | 1,662 | 1,667 | 1,718 | 1,807 | 1,939 | 2,083 | 2,570 | 2,632 |
| *Serbia* | - | *122* | *268* | *306* | *245* | *215* | *205* | *298* | - | - |
| Rest of world | 20,739 | 21,701 | 23,491 | 25,345 | 26,333 | 24,702 | 26,717 | 29,727 | 27,102 | 28,094 |
| WORLD TOTAL | 73,779 | 77,543 | 80,556 | 85,722 | 85,300 | 84,436 | 91,349 | 98,071 | 94,856 | 94,192 |

*Source:* Italian Wine Centar, available at: http://italianwinecentral.com/top-ten-wine-exporting-countries/; International Organisation of Vine and Wine, available at: http://www.oiv.int/oiv/info/enstatoivextracts2

Regional territorial distribution of production and trade of wine is very different and unequal across the continents and by country. Developed countries in relation to the

underdeveloped and developing countries achieve greater participation not only in the world production, but also in trade and export and import of wine. In the observed period, the developed countries have maintained share in world production and trade of wine on the international market. Based on the above mentioned, it can be concluded that there is no change in the structure of the international wine market in the observed period. The hypothesis H2 is confirmed. The largest exporters of wine have maintained its dominant market share on the international wine market. At the same time, the largest importers of wine slightly have increased its import in the analyzed period from 2004 to 2013.

During this period, wine consumption has been increasing at an average annual rate of 0.05%. The ten largest customers absorbed about 68.79% of the total world consumption of wine. If we look at the total amount of wine consumed (expressed in thousands of hectoliters), the largest consumers are the USA, France and Italy. However, if we look consumption in litres per capita, the largest consumers are Luxembourg (49.81 *l*/per capita), France (46.45 *l*/per capita), Portugal (43.84 *l*/per capita) and Italy (37.92 *l*/per capita). Recorded consumption in the USA is 9.08 *l*/per capita. Serbia records the consumption in the amount of 13.11 *l*/per capita, while its share in the total world consumption of wine is around 0.53%.

Table 8 shows the consumption of wine in the countries that are the biggest consumers of wine, as well as a comparative overview of the consumption of wine in Serbia, in the rest of the world and at the global level.

**Table 8.** The largest consumers of wine in the world (in thousands of hectoliters)

| Country | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| U. States | 24,750 | 25,850 | 26,700 | 27,850 | 27,700 | 27,250 | 27,600 | 28,425 | 29,000 | 29,145 |
| France | 33,218 | 33,530 | 33,003 | 32,169 | 30,800 | 30,215 | 29,272 | 29,322 | 30,269 | 28,181 |
| Italy | 28,300 | 27,016 | 27,332 | 26,700 | 26,166 | 24,100 | 24,624 | 23,052 | 22,633 | 21,795 |
| Germany | 19,845 | 19,848 | 20,210 | 20,782 | 20,747 | 20,224 | 20,200 | 19,707 | 20,000 | 20,300 |
| China | 12,367 | 12,611 | 13,339 | 14,292 | 14,460 | 14,514 | 15,180 | 16,339 | 17,477 | 16,815 |
| UK | 12,742 | 13,143 | 12,672 | 13,702 | 13,483 | 12,680 | 12,900 | 12,860 | 12,801 | 12,738 |
| Russia | 9,159 | 9,809 | 11,251 | 12,690 | 11,840 | 10,368 | 12,197 | 11,276 | 10,394 | 10,500 |
| Argentina | 11,113 | 10,972 | 11,103 | 11,166 | 10,677 | 10,342 | 9,753 | 9,809 | 10,051 | 10,337 |
| Spain | 13,898 | 13,686 | 13,514 | 13,100 | 12,168 | 11,271 | 10,896 | 9,894 | 9,300 | 9,100 |
| Australia | 4,361 | 4,523 | 4,567 | 4,903 | 4,932 | 5,120 | 5,351 | 5,325 | 5,396 | 5,289 |
| *Serbia* | *-* | *-* | *1,476* | *1,878* | *2,082* | *2,495* | *1,292* | *1,292* | *-* | *-* |
| Rest of world | 67,881 | 65,894 | 71,776 | 75,939 | 76,197 | 74,721 | 72,,535 | 76,499 | 75,679 | 74,500 |
| World | 237,634 | 236,882 | 246,943 | 255,171 | 251,252 | 243,300 | 241,800 | 243,800 | 243,000 | 238,700 |

*Source:* Italian Wine Centar, available at: http://italianwinecentral.com/top-ten-wine-exporting-countries/; International Organisation of Vine and Wine, available at: http://www.oiv.int/oiv/info/enstatoivextracts2

Serbia reduced consumption of wines from 1,476,000 to 1,292,000 hectolitres in the analysed period. Participation of Serbia in the global wine consumption declined from 0.59 to 0.53%% in this period. The largest share was recorded in

2009 (1.025%), when the highest per capita consumption of wine in Serbia was recorded also (25.33 *l*/per capita).

Significantly higher consumption of wine in relation to the wine production was recorded in Serbia from 2006 to 2009. During this period, the production covered about 90% of wine consumption in Serbia. However, wine production in Serbia was higher by about 80% in relation to wine consumption in 2010 and 2011. In the period from 2006 to 2011, the share of export in total wine production ranged from 4.7% (2009 and 2010) to 6.7% (2011). In the same period, import of wine was two or three times higher than the export of wines from Serbia.

### Wine import and export of the Republic of Serbia

Based on the data from Figure 1, it can be concluded that the import was increasing at an average annual rate of 12.94%, while wine export was increasing at an average annual rate of 8.41% in the same period. In the observed period, the wine foreign trade deficit of Serbia with the other world countries was increasing at an average rate of 21.47%. This confirms the hypothesis H3.

**Figure 1.** Movement of the Serbian import and export of wines (in thousands of dollars)



*Source:* Statistical Office of the Republic of Serbia, aviable at: http://webrzs.stat.gov.rs/WebSite/public/ReportView.aspx
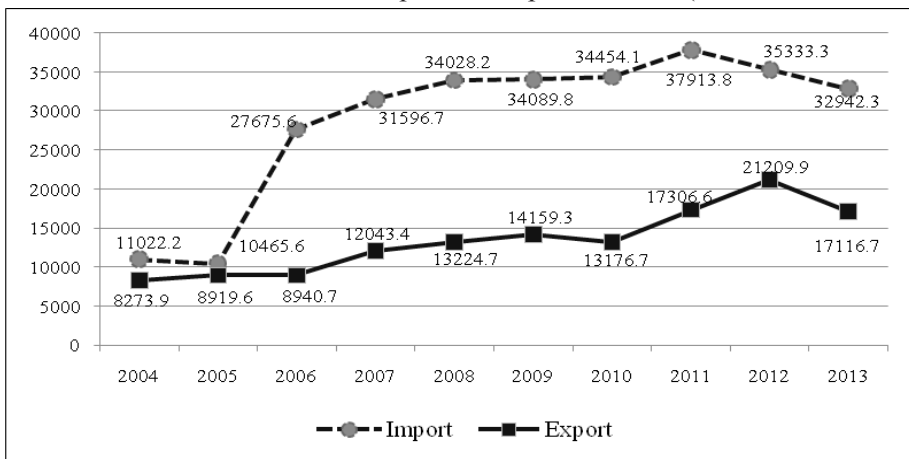
In order to accurately determine the position of Serbia regarding import and export of wine, we calculate the coefficient of coverage of wine import by wine export in the period from 2004 to 2013. For the state is acceptable the situation when the value of this ratio is greater than one. In our case, the coefficient is less than one. The ratio ranged from 0.751 (2004) to 0.520 (2013) in the observed period, or the coverage of import by export decreased. Based on the above mentioned, it can be concluded that the hypothesis H4 is confirmed.

Figure 2 shows the structure of the wine export from Serbia by importing countries. The largest wine export from Serbia in 2004 was recorded in the following countries: Bosnia and Herzegovina (5183.4 thousand dollars, or which represented 62.65% of the total export of Serbia), Austria (949.9 thousand dollars, or 11.76%) and Germany (927.7 thousand dollars, or 11.48%). Export from Serbia to Bosnia and Herzegovina (5124 thousands of dollars, or 29.94% of the total export of Serbia), Austria (127.8 thousand dollars, or 0.75%) and Germany (66.9 thousand dollars, or 0.39 %) reduced in 2013. However, export to the Russian Federation (14.1 to 5704.2 thousand dollars, or from 0.17% to 33.33%) and to the Czech Republic (from 71.9 to 785.5 thousand dollars, or with 0.87% at 4.59%) increased. Important export to Montenegro in the amount of 3051.2 thousand dollars was recorded in 2013.

**Figure 2.** Structure of wine export from Serbia by countries in 2004 and 2013 (in %)
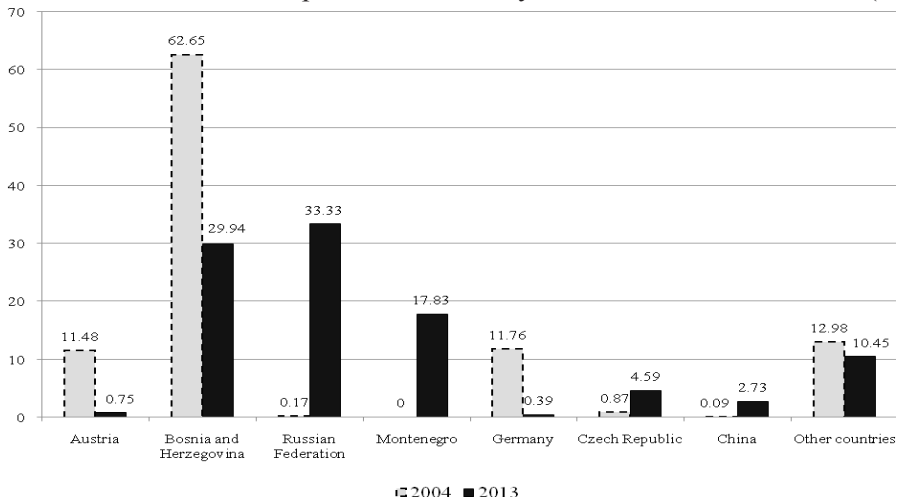


*Source:* Authors' calculation based on data of the Statistical Office of the Republic of Serbia, available at: http://webrzs.stat.gov.rs/WebSite/public/ReportView.aspx.

When it comes to the structure of wine import by countries (Figure 3), Serbia has the highest wine import from the Republic of Macedonia.

**Figure 3.** Structure of wine import of Serbia by countries in 2004 and 2013 (in %)
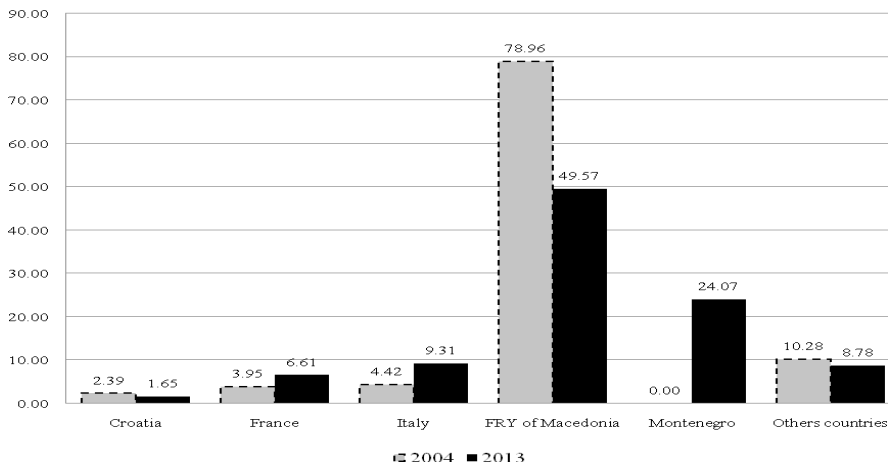


*Source:* Authors' calculation based on data of the Statistical Office of the Republic of Serbia, available at: http://webrzs.stat.gov.rs/WebSite/public/ReportView.aspx.

Serbia realized the import of wine from Macedonia in the amount of 8,702.6 thousand dollars in 2004, and in the amount of 16,329.7 thousand dollars in 2013. The share of import of wine from Macedonia to Serbia in total import was reduced in 2013 (49.57%) compared to the total import recorded in 2004 (78.96%).

## Conclusion

Given that Serbia has favourable conditions for growing vines, viticulture is a traditional branch of agriculture. Tendency of reducing the number of vines was observed in the nineties of the last century. Although the formation of large surfaces with an innovative, modern and adapted to our circumstances growing forms of vines marked the first decade of the XXI century, the tendency to reduce the number of vines in Serbia is continued. This impacted on the reduction of grape production in this period. Using the regression and correlation analysis, we determined that, in the observed period, the yield per vine has a greater impact on the volume of production of grapes, in relation to the impact of number of vines.

The tendency of reducing the area under vines was also recorded in the most important wine producers in the world (France, Spain and Italy), as a result of the qualitative changes that were apparent in the last few years in viticulture, which relate to the reduction of the area under the existing plantations and the formation the plantations which are the basis for the production of high quality wines. Reduction in vineyard area did not significantly reduce wine production in these countries, and they have retained an important place as producers on the international wine market. Based on trends in production, export and import of wine on the international market, we conclude that there has been no significant change in the structure of the international wine market

in the observed period. Countries that were leaders at the beginning of the period, have maintained its leadership position at the end of the period.

In addition to the very favourable conditions for grape growing, wine production in Serbia is at a significantly lower level than in countries with similar natural conditions. Serbia has very favourable, but not sufficiently used, both natural and other resources for achieving the much larger, more stable, higher quality, more structurally adequate and to market better adapted production of wine. Negative tendencies in production and export are the resultant of direct and indirect impacts of numerous causes and circumstances, those in the nineties of the twentieth century, as well as those from the most recent period. As a particularly important causes in the XXI century, we can mention: reducing the number of vines, inefficient transition process, insufficient investment in the development of viticulture and wine production, the lack of adequate integrated development program for the production and processing of agricultural products, inadequate organization and insufficient material and technical equipment of family farms engaged in the grape and wine production, a low level of labor productivity of farms and wineries, inadequate organization of marketing surpluses of grapes and ineffective implementation of international standards.

The above mentioned causes of unfavourable development in the domestic production of wine strongly influenced the current situation in the foreign trade of wines from Serbia with the other countries in the world. Based on the analysis of foreign trade of wines from Serbia with other countries, we have proved that the foreign trade deficit of wines increased, while the ratio of coverage of import by export decreased in the observed period. According to previous, the elimination of the causes of the current negative trends of the observed phenomenon is a priority task in achieving faster development not only the domestic production of grapes and wine, but also in reducing the deficit of foreign trade of wine, or achieving a surplus over a longer period of time and reducing import dependence of Serbia.

The intention of the authors was to obtain research results that can have practical significance. In this sense, the analysis of the tendencies and patterns in the production of grapes, as the basic resources of wine production, can serve to the business decision makers at the micro level, such as enterprises and family farms. Analysis of trends and position of Serbia on the international wine market is valid for making decisions by the creators of agro-economic policies in order to stimulate production and improve the competitive position of the country on the international market.

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# ANALIZA PROIZVODNIH POTENCIJALA I KONKURENTSKE POZICIJE SRBIJE NA MEĐUNARODNOM TRŽIŠTU VINA[5]

**Jelena Petrović[6], Bojan Krstić[7], Tanja Stanišić[8]**

## Rezime

*Svrha istraživanja je analiziranje i prognoziranje najvažnijih trendova na međunarodnom tržištu vina, kao i sagledavanje mogućnosti za povećanje izvoza vina iz Srbije. Cilj istraživanja je da se primenom odgovarajuće metodologije analizira kretanje proizvodnje i prometa vina na međunarodnom tržištu. Rad je strukturiran iz sledećih segmenata: 1) ispitivanje uticaja broja čokota i prinosa po čokotu na ostvareni obim proizvodnje grožđa u posmatranom periodu u Republici Srbiji;2) ispitivanje konkurentskog položaja Republike Srbije na međunarodnom tržištu vina; i 3) analiza vrednosti i strukture spoljnotrgovinske razmene vina Srbije sa drugim državama. U radu su korišćene komparativna, korelaciona i regresiona analiza. Rezultati u radu su ukazali: 1) na veći uticaj prinosa po čokotu na obim proizvodnje grožđa u odnosu na uticaj broj čokota na obim proizvodnje grozdja; 2) da se povećava deficit spoljnotrgovinske razmene vina Srbije sa drugim državama sveta; i 3) da je u posmatranom periodu Srbija smanjila pokrivenost uvoza izvozom vina.*

***Ključne reči:*** *vino, proizvodnja, tržište, spoljnotrgovinska razmena.*

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# SERIES OF AGRICULTURE IN THE STATISTICAL OFFICE OF THE REPUBLIC OF SERBIA DATABASE[1]

*Jelena Radović – Stojanović[2], Aleksandra Zečević[3], Zorica Kojčin[4]*

## Summary

*The objectives of this Paper have been to examine which data on agriculture can be found in the Statistical Office of the Republic of Serbia Database, and what are the possibilities for the use of the Database in the research and analysis of agriculture. The Statistical Office of the Republic of Serbia Database physically represents normalized database formed in DBMS SQL Server. The methodological approach to the Paper subject is primarily related to modelling and the way of using Database. The options of accession, filtering and downloading of data from the Database are explained. The technical characteristics of the Database were described, indicators of agriculture listed and the possibilities of using Database were analysed. We examined whether these possibilities could be improved. It was concluded that improvements were possible, first, by e*nriching Database with data that are now only available in printed publications of the Office, and then, through methodological and technical improvements by re-designing the Database modelled on cloud founded databases. Also, the application of the achievements of the new multidisciplinary scientific field - Visual Analytics would improve visualization, interactive data analysis and data management.*

***Key words:*** *database, agriculture indicators, structure series, time series, Serbia*

**JEL:** *Q10, C81*

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# Introduction

Statistical data on agriculture in the Republic of Serbia are collected, processed and published by the Statistical Office of the Republic of Serbia which, as the only state authorized institution performs tasks under the current Law on Statistics through its regional offices. On the other hand, the Ministry of Agriculture, Forestry and Water Management, according to their needs and requirements in the process of research and the adoption of appropriate regulations and within their competence and their own requirements collects data on agricultural production, handles a large number of registers and records and submits data to the Statistical Office of the Republic of Serbia. Collected and analyzed statistical data are published in the publications of the Statistical Office of the Republic of Serbia.

Office publications are available in printed and electronic form. However, modern tendencies in the development of information technology on one hand and analysts requirements on the other, imposed the need for statistical data to be available to all users, and that is why the access to statistical data has been provided via Internet and they are stored in the projected database. Consequently, at the beginning of 2010, the Statistical Office of the Republic of Serbia Database was formed. The database was formed with about 400 indicators and in the meantime it has been developed and amended with data, so that today it contains data for 735 indicators in all areas of social and economic life from which the Office collects and processes statistical data.

The objectives of the Paper have been to examine data availability in the agriculture area in the Statistical Office of the Republic of Serbia Database and to explore the possibilities of using Database in the agriculture research and analysis. This could not be done without an analysis of the model, structure and organization of the Database, on the one hand, and the analysis of the number and type of data available in the field of agriculture, on the other hand. The basic hypothesis was that it is possible to improve the Database so as to improve existing performance and after analyzing the Database, we proposed the solutions in this regard. Another hypothesis was that the latest achievements in information technology could be applied in the redesigning of the Statistical Office of the Republic of Serbia Database.

The methodology used in the analysis has been presented in the first part of the study. In the second part, *The Statistics of Agriculture in the Republic of Serbia*, it has been shown what is the coverage of agricultural statistics in the Republic of Serbia. In the third part, entitled *Agriculture in the Statistical Office of the Republic of Serbia Database,* it is described how the data on agriculture are classified in the database. In the fourth part of the paper, entitled *The Possibilities of Using the Database in the Analysis*, it has been shown what are the possibilities of using the database regarding the ways of displaying data and generating the desired series and how the choice of qualitative and numerical characteristics, time period and territory observation can provide series of structures and the time series for indicators of agriculture as an output record from the database. In the fifth part of the paper, *The Results of the 2012 Agriculture Census in the Database*, it is described how the data of the 2012 Agriculture Census are modelled and presented in the database. In the sixth part of the

paper, *Agriculture Development Indicators*, we have explored what economic indicators and indicators of agricultural development can be found in the database. The seventh part, *Results and Discussion,* has briefly pointed to the possibility of redefining the Web application through which otherwise, we access the database to allow the crossing of different indicators at several different conditions and criteria. The existence of multidimensions in databases becomes evident and that is certainly of great benefit to the end-user. In addition, a system to improve the storage and accessing data of the Statistical Office of the Republic of Serbia was proposed. Finally, in *Conclusions*, the summary has been given and it was pointed to the need to supplement the database with indicators obtained by the methods of calculation and analysis, considering the fact that these indicators are currently available only in the publications of the Statistical Office of the Republic of Serbia.

## Methodology

Databases are physically formed in database management systems (Data Base Management Systems - DBMS). When it comes to the DBMS, database management system used by the Republic Statistical Office is SQL Server[5], which as any other database management system has its specifics in the domain of usage.

Methodological assumption on the subject matter requires the definition of the so-called entity-relation model (E-R Model) in the database. This model is highly usable and it defines the interaction between the real world and conceptual scheme that is presented in the form of diagram. E-R Model consists of an entity, attribute and relations between entities. Stable and proper database structure means properly designed database thus creating the basis for functional data use by a user. Operation speed, redundancy elimination and data integrity achievement are the features that indicate normalized database which generates quality data structure.

Setting queries over data in a database requires the implementation of procedures relating to the scope of activities involved in getting and retrieving data from a database. Before a query is activated, the system translates the query into a form that is understandable to the database management system. The language used to make a query to obtain data from a database and is user oriented is SQL (Structured Query Language). In addition to setting a query, an important step in obtaining valid data from database is query optimization. There are tools used for query optimization which involve complex strategies including specific indices. In the framework of indices related to the optimization the entire functionality comes down to database tuning. Specifically, in the case of SQL Server there is a tool called Index Tuning Wizard (Chaudhuri et al., 1999) which contributes to better quality and easier access and obtaining data.

Methodological approach to the area in the database domain is specific because it requires a series of logical explanations and captures. The Statistical Office of the Republic of Serbia Database physically represents normalized database formed in

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5   SQL is an abbreviation of Structured Query Language, the language used to query in order to obtain data from the database.

DBMS SQL Server. Designing, modelling and setting of database are not related to an end user. The end user should neither be able to update existing data nor change any data structure. The end user is allowed to access the parts of database through web application. Since the Office has had many areas that are not correlated among themselves, data are classified by areas.

The Paper subject refers to the data in the area of agriculture. Data are offered to interested users and researchers through web application. Through forms that allow data filtering and selecting the offered criteria, there is actually a query made over data which drives SQL code and thus defines the query which then has to present the required data in relation to the set task.

### The Statistics of Agriculture in the Republic of Serbia

The Statistics of agriculture in Serbia is very developed: "Within the area of agricultural statistics compiled are the data on agricultural land areas, categories of land use, sown and planted areas – by species/kinds of crops and plants, production and yields for about 60 cultures, number of livestock – by species and categories, output of animal products (meat, milk, eggs, wool, honey), as well as the data on slaughter of animals – by species. The above mentioned data are compiled through regular surveys (18), in accordance with the prescribed methodology, and also applying the method of accounting and analysis (accounting of agricultural production physical volume, accounting of crop production – livestock increase and meat production, by kinds), in accordance with the Official Statistics Law and the Regulation stipulation the plan of official statistics for the respective year."(Statistical Office of the Republic of Serbia, 2013). The description of statistical area  Agriculture and Fishery, the review of publications and information in the area of agriculture, as well as survey methodology in this area can be found on the website of the Office (www.stat.gov.rs).

The Statistics of agriculture in Serbia include: statistics of crop production, livestock breeding, fishery, calculation of the physical volume index of agricultural production   and price statistics. *Statistics of crop production* collects data on agricultural land, sown areas, harvested areas, yields and production of agricultural products in the Republic of Serbia. *Livestock Breeding Statistics* includes data on livestock number and livestock products - eggs, honey, milk and wool. The data for these statistics are obtained through regular annual surveys, in cooperation with the Ministry of Agriculture, Forestry and Water Management, together with a monthly survey on livestock slaughter and meat production. *Fishery Statistics* collect data on fish production, area and number of fishing households, assets and number of employees on them, information on the number of professional fishermen and the quantity of fish caught and about restocking. Data from these three areas are available as preliminary data in electronic and printed forms in the edition of the Office "Communications" and in the publication "Monthly Statistical Bulletin", while the final data are published in the regular publications of the Office "Statistical Yearbook of the Republic of Serbia" and "Municipalities in the Republic of Serbia ".

*Indices of agricultural production physical volume* are obtained from regular surveys in the

scope of the Statistics of Agriculture on produced quantities of plant and livestock products, as well as data on average prices of agricultural products in the Republic of Serbia. The product list includes all economically important agricultural products. Indices are published in the Statistical Yearbook of Serbia. Besides, they are available in electronic form, on the website of the Office, but only for the year 2011.

*Price statistics in agriculture* include: Producer price indices of agricultural and fishery products, as well as the price indices of reproductive material, labour tools and services in agriculture. Price indices of agricultural and fishery products are calculated on monthly and annual basis, in accordance with the methodology of the European Union and are published in the "Monthly Statistical Bulletin". In addition to the price indices, average monthly purchase prices of producers of agriculture and fishery products are also published in the Bulletin.

A special group of data in the area of agriculture consists of Agriculture Census data, which was conducted in 2012. The Census data can be found on the website of the Office and on the website www.popispoljoprivrede.stat.rs, and the Office published several specialized publications dealing with the analysis of the Census results.

### Agriculture in the Statistical Office of the Republic of Serbia Database

The indicators in the database of the Statistical Office of the Republic of Serbia are classified into 24 areas. The database can be accessed through the website of the Statistical Office of the Republic of Serbia or directly via the web page (http://webrzs.stat.gov.rs/WebSite/Public/ ReportView.aspx), where access to the database is enabled to every visitor. In addition to the indicators, methodological explanations and the most important definitions are available for each indicator. Indicators in the database can be observed by different qualitative and numerical characteristics. Furthermore, there is a choice of territory, a period of observation and the type of data to be displayed. After the selection of characteristics, time period and data types, a report in the form of a series of data, or two-dimensional tables containing series of structures and time series are generated from the database.

Agriculture indicators in the database can be found within the area of *Agriculture and Fishery*. This area is divided into three sub-areas: *Agriculture Census* sub-area which contains data from the 2012 Census of Agriculture, *Crop Farming* sub-area, within which there are data on crop production and *Livestock Breeding* sub-area which includes the indicators of livestock production. Sub-areas are further divided into narrower sub-areas where there are individual indicators.

Apart from the area of *Agriculture and Fishery*, information on agriculture can be found in the following database areas as well: *Prices, National Accounts* and *Employment and Earnings*. In the area of *Prices,* the indicators of *producer price indices of agricultural and fishery products* (for the period from 1999) and the *average annual purchase prices of agricultural products* (1994 to present) can be found in the database. In the area of *National accounts* within the *Gross Domestic Product* and *Gross Value Added* indicators, one can find data on the share of all activities, including agriculture, in gross domestic product of Serbia

on an annual and quarterly basis, data on the gross value added in agriculture at constant and current prices and growth rates of gross value added of agriculture, by years and quarters. Data on employment in agriculture can be found in the area of **Employment and Earnings**, within the indicator *Employed persons aged 15 and over by NACE Rev2 sections[6]*. In addition, data on employment in agriculture can be found in the Agriculture Census data.

In order to retrieve the required data, the user is able to select first area, then sub-area and finally the desired indicator. The offered characteristics vary depending on the indicator and can be qualitative - type of production, agriculture area, type of products, and numerical - the value in Euros, the area in hectares and other. The user has the option of selecting the type of data to be displayed (absolute and / or relative indicators, value and / or quantitative data, base and / or chain indices, total yield, yield per unit, area in hectares, number of cattle at the beginning and / or at the end of the year), territories of observation (Republic of Serbia, Vojvodina, Central Serbia and narrower territorial units) as well as the way to display the results (name, code, code and name). After selecting the desired option, the required report is generated from the database and is displayed in a table. After receiving the report it is possible to save data in specific formats in the application, such as .xls, .xml or .pdf, noting that the number of records is limited to 100, 000.

### The Possibilities of Using Database in the Analysis

By choosing different numerical and qualitative characteristics, time period of observation and the territory, it is possible to obtain a large number of structure series and time series for agriculture indicators in the database. Depending on the indicators, the database provides a choice of data to be generated. For example, for the *Livestock Balance* indicator in the **Livestock Breeding** sub-area, the following data are available: the number of cattle at the end of the year, the number of cattle at the beginning of the year, breeding, purchase, selling, slaughtering and mortality. For the **Crop Farming** sub-area (which is at the same time an indicator because this sub-area is not broken down in details by indicators, but the production of any agricultural product in particular is seen as a category of *crop production* qualitative characteristic), the following data are available: harvested area in hectares, number of fruit trees in thousands, number of grapevines in millions, total yield in tons and yield per unit in kilograms. The criteria for selecting the data will depend on which agricultural crops is observed.

The length of the period in which it is possible to observe individual indicators differs. For some indicators (price index) data are available starting from 1990s, for some from 2001 (the calculation of gross domestic product, gross domestic value added by activities), while for some indicators there are data available even from 1947. For most agricultural products in **Crop Farming** sub-area data are available from 1947. For example, it may be concluded what was the wheat production in the first years after World War II, where it can be observed that over time harvested area under wheat was divided in more than halves

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6    NACE Rev. 2 is the Statistical Classification of Economic Activities in the European Community, Rev. 2

from 1947 till today (from 1,035,237 ha in 1947 to 480,539 ha 2012), and the total yield almost doubled (from 1,076,370 tons in 1947 to 1,910,914 tons in 2013). Long time series allow comparisons and analysis of trends and dynamics of the observed phenomena over a longer period of time. The production of other crops and how the production changed over time can also be analyzed, as well as factors of influence for a longer period of time within which there is a possibility of some comparisons by age, etc.

Table 1. shows the grain production in Serbia in 1947 and 2012 - harvested area, total yield and yield per unit in kilograms. The table is an output report from the database according to the requested parameters.

**Table 1.** Production of Grains in the Republic of Serbia in 1947 and 2012

| | Harvested Area, ha | | Total Yield, t | | Yield per Unit, kg | |
|---|---|---|---|---|---|---|
| REPUBLIC OF SERBIA [1] | | | | | | |
| Crop farming | 1947 | 2012 | 1947 | 2012 | 1947 | 2012 |
| Wheat | 1,035,237 | 480,539 | 1,076,370 | 1,910,914 | 1,039 | 3,977 |
| Barley | 85,032 | 77,335 | 97,520 | 266,383 | 1,146 | 3,445 |
| Corn | 1,286,243 | 1268,544 | 2,533,110 | 3,532,602 | 1,969 | 2,785 |
| Oats | 127,686 | 29,541 | 109,340 | 66,059 | 856 | 2,236 |
| Rye | 55,737 | 3,934 | 51,900 | 9,567 | 931 | 2,432 |
| Source: Statistical Office of the Republic of Serbia | | | | | | |
| [1] From 1999 – N/A AP Kosovo and Metohija | | | | | | |

*Source:* Statistical Office of the Republic of Serbia, 2013;

Graph 1. shows trends in the production of grains, for each year in the period 1947-2014.

**Graph 1.** Production of Grains in the Republic of Serbia 1947-2014
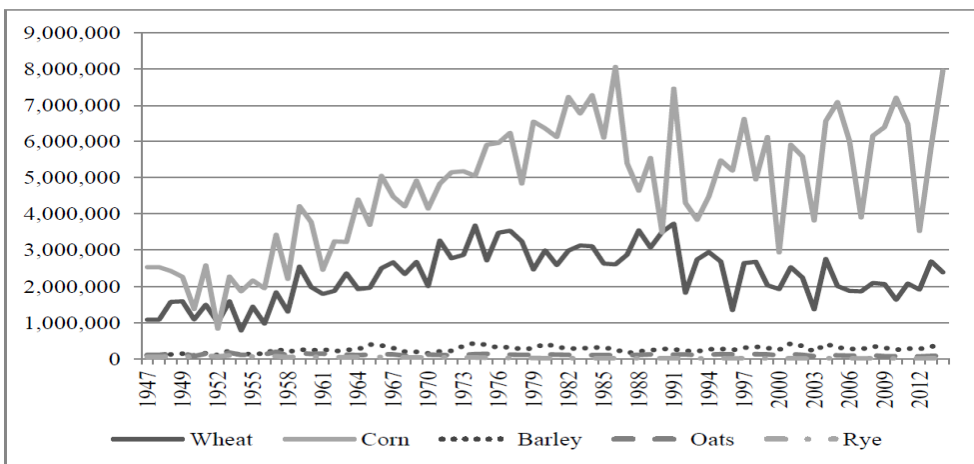


*Source:* Statistical Office of the Republic of Serbia, 2014;

Graph 1. clearly shows that grains production is dominated by two cultures, wheat and corn, while the production of other grains is on a much lower level. It may be noted that the production of maize and wheat had a growing trend until early 1990s, and further on it continues to fluctuate with a tendency of fall. The reasons for these fluctuations in the production of two major crops were the following: the disintegration of the Socialist Federal Republic of Yugoslavia caused market loss, subsidized production was abolished, reduction of livestock also affected reduced production of corn and wheat, and there was a collapse of rural cooperatives which also influenced the decrease in production.

Graph 2. shows the trends and dynamics in livestock production based on data for the *Livestock Balance* indicator in **Livestock Breeding** sub-area, for the period 1947- 2013 (data for 2013 are the latest available data). It shows the number of heads at the end of the year - cattle, pigs and sheep, without poultry, for which data in the database has existed only since 1997.

**Graph 2.** Livestock Balance - the number of heads at the end of the year, the Republic of Serbia, 1947 – 2013, in thousands
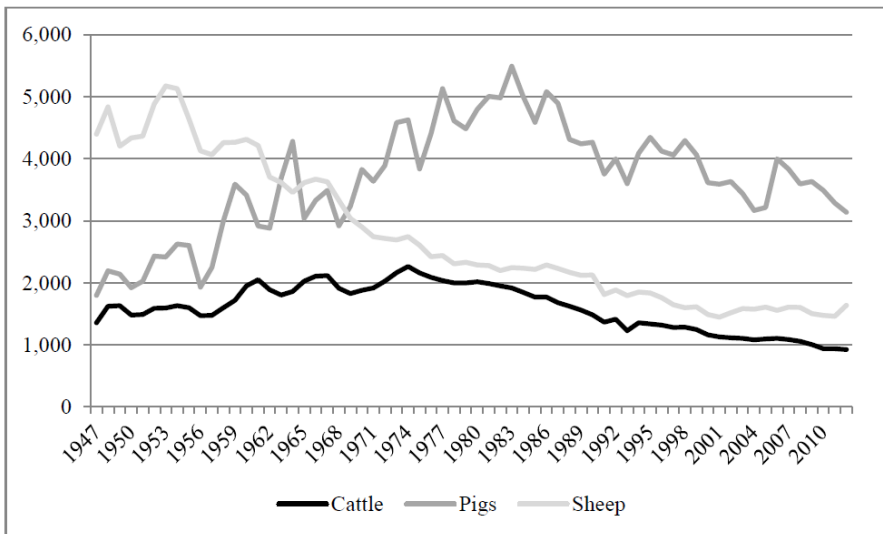


*Source:* Statistical Office of the Republic of Serbia, 2013;

Based on these data we can see that in the first decades after the World War II the number of heads of cattle and pigs increased, while the number of sheep decreased. Since the Census of Agriculture in 1960, as explained in (Popović, 2014), there have been three different periods. In the first period, until mid-1980s, production increased, primarily due to an increase in the number of pigs. Since the mid-1980s the reduction of the number of cattle has been expressive both due to a decrease in the number of pigs and heads of cattle. The total number of cattle heads in Serbia continued to fall until the mid-1990s. Since the second half of the 1990s, this negative trend of decline in the total number of cattle heads has continued concluding that a substantial impact on the reduction was caused by a decline in the number of cattle.

As it is possible to view the indicators in the database simultaneously according to several different qualitative and numerical characteristics, there is a large potential for analysing the observed phenomena. For example, consider farms (agricultural holdings) structure by their economic size and by particular type of agricultural production. *Farms by economic size* is an indicator within the **Census 2012** sub-area, narrower sub-area **Land**[7]. *Farms by economic size* indicator is possible to view simultaneously according to farm economic size (numerical characteristic), type of crops that are grown (qualitative characteristic) and legal status (also qualitative characteristic). Agricultural holdings by economic size in the database are classified into 14 classes ranging in the interval from 0-2,000 Euros up to 3,000,000 Euros and more. As for crops that are grown, farms can be seen according to the production of certain types of grains, or the production of some other products (legumes, industrial crops, fruits and vegetables). Categories of farms legal status characteristic are: family farms, legal entity or entrepreneur. Regarding the type of data, it is possible to obtain the number of farms and farm area in hectares for this indicator. It is also possible to get detailed information by regions and cities in Serbia.

Based on the results of the 2012 Census, the average value of family farms in the Republic of Serbia amounts to 4,990 Euros, while the average economic size of farms for legal entities and entrepreneurs amounts to 204,775 Euros (Cvijanović et al., 2014). Here we shall consider farms by economic size dealing exclusively with the production of grains and the structure of these farms according to their legal status. After selecting the characteristics and data types, one can get the required data which are presented in Table 2.

**Table 2.** Number of Farms under Grains by Economic Size of Farms, Republic of Serbia, 2012

|  | Total | Family Farms | Legal Entity | Entrepreneur |
|---|---|---|---|---|
| **Number of farms by economic size** | | | | |
| **REPUBLIC OF SERBIA** [1] | | | | |
| **TOTAL** | 458,196 | 457,193 | 940 | 63 |
| **0-2,000** | 158,576 | 158,447 | 119 | 10 |
| **2,000-4,000** | 113,959 | 113,894 | 59 | 6 |
| **4,000-8,000** | 102,096 | 102,022 | 65 | 9 |
| **8,000-15,000** | 49,775 | 49,682 | 82 | 11 |
| **15,000-25,000** | 17,258 | 17,200 | 55 | 3 |
| **25,000-50,000** | 10,491 | 10,403 | 84 | 4 |
| **50,000-100,000** | 4,484 | 4,382 | 91 | 11 |
| **100,000-250,000** | 1,126 | 1,010 | 112 | 4 |
| **250,000-500,000** | 218 | 138 | 77 | 3 |

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7    Economic size of agricultural holdings is an average gross value of agricultural production at manufacturer price and is expressed in Euros.

| | Total | Family Farms | Legal Entity | Entrepreneur |
|---|---|---|---|---|
| **Number of farms by economic size** | | | | |
| **REPUBLIC OF SERBIA** [1] | | | | |
| **500,000-750,000** | 51 | 11 | 39 | 1 |
| **750,000-1,000,000** | 32 | 2 | 30 | 0 |
| **1,000,000-1,500,000** | 49 | 1 | 47 | 1 |
| **1,500,000-3,000,000** | 41 | 1 | 40 | 0 |
| **3,000,000-** | 40 | 0 | 40 | 0 |
| [1] From 1999 – N/A AP Kosovo and Metohija | | | | |

*Source:* Statistical Office of the Republic of Serbia, 2010;

In addition to the *Farms by economic size* indicators, there are the following indicators for farms in the database: *Farms by type of farming, Farms by agricultural size of farm, Farms with different crops by agricultural size of farm, Irrigation farms*. Provided that it is possible to cross all existing numerical and qualitative characteristics for indicators, there are many possibilities for the analysis of agricultural holdings in the Republic of Serbia, their economic size as well as the number and area of farms under different agricultural products.

### The Results of the 2012 Agriculture Census in the Database

The 2012 Agriculture Census was conducted in the period October 1 to December 15, 2012, in accordance with the Law on 2012 Census of Agriculture[8]. The Census was conducted by the Statistical Office of the Republic of Serbia and it was financially supported by the European Union which took part in the costs of the Census. The main objectives of the Census were to get a comprehensive review of the national agriculture structure, compiling internationally comparable data base on agriculture, providing statistical data on agriculture for the purpose of formulating policies for agricultural development and the formation of the Statistical Register of agricultural holdings, the general improvement of agricultural statistics in Serbia, ensuring international comparability of data and harmonization with EU standards. From the perspective of users and data providers, "Data collected by the Census of Agriculture will contribute to the acquisition of knowledge about the real situation in the agriculture of the Republic of Serbia. It is of great importance for all future users of aggregated data, particularly for data providers - the list of units who will be able to plan agricultural production better, to apply for national and European funds to support agriculture and gain knowledge about which agricultural branch should be invested in." (Statistical Office of the Republic of Serbia, 2013).

The Census of Agriculture surveyed 937,210 households and 4,200 legal entities and

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8    Before The 20102 Agriculture Census, the last comprehensive agricultural census for the territory of the Republic of Serbia was conducted in 1960.

entrepreneurs. The most important results of the 2012 Agricultural Census are shown in the Table 3.

**Table 3.** Basic Indicators of Agriculture in the Republic of Serbia, in 2012

| Basic Indicators, Republic of Serbia, 2012 | |
|---|---:|
| Number of agricultural households | 631,552 |
| Agricultural land area, ha | 3,861,477 |
| Number of cattles | 908,102 |
| Number of pigs | 3,407,318 |
| Number of sheep | 1,736,440 |
| Number of goats | 231,837 |
| Number of poultry | 26,711,220 |
| Number of beehives | 665,022 |
| Number of own double-axle tractors | 410,894 |
| Number of households members and full-time employees on farms, who are engaged in agricultural activity | 1,442,628 |

*Source:* Statistical Office of the Republic of Serbia, 2010;

Data from the Census of Agriculture are available in the database of the Statistical Office of the Republic of Serbia in the area of ***Agriculture and Fishery***, sub-area ***Agriculture Census***, narrower sub-area ***2012 Census***. Within ***2012 Census*** sub-area, 2012 Census data are classified into the following narrower sub-areas: ***Land***, ***Livestock and Bees***, ***Labour Force and Other Activities***, ***Farm Management*** and ***Production Method in Agriculture***. The ***Land*** sub-area provides information on the farms and agricultural land. ***Livestock and Bees*** sub-area is divided into several narrower sub-areas: ***Cattle***, ***Cows***, ***Pigs***, ***Sheep***, ***Goats***, ***Poultry*** within which there are detailed data on livestock fund and farms where cattle is grown. The ***Labour Force and Other Activities*** sub-area provides information on the labour force in agriculture, the labour force by gender and type of production as well as data on the type of production in agriculture and specialization in the production of certain agricultural products. In the ***Farm Management*** sub-area one can find data on the ways of managing farms, managers training, agricultural equipment, the type of tenure in agriculture. In the ***Production Method in Agriculture*** sub-area there is a large number of narrower sub-areas: ***Type of Processing, Soil Conservation, Animal Grazing, Animal Housing, Manure Storage and Treatment Facilities*** and ***Manure Application***, and within which there is a large number of indicators.

## Agriculture Development Indicators

In addition to data on agricultural production, economic indicators and indicators of achieved agricultural development are of great significance for the analysts. According to "Agriculture", the Bulletin of the Statistical Office of the Republic of Serbia[9], the most important economic indicators in agriculture are *the share of agriculture in*

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9    The bulletin "Agriculture" was published until 2010, but is no longer published.

*GDP* and *the share of agriculture in export and import*, and indicators of agricultural development *are physical volume index of agricultural production, the number of companies, agricultural cooperatives and farms, purchase of agricultural products and the number of employees in agricultural activities* (Statistical Office of the Republic of Serbia, 2010). Nowadays, some of these indicators are available in the database, while others can only be found in the publications of the Office.

For example, data on gross value added of agriculture (gross value added, gross domestic product share and growth rates) can be found in the database within the area of **National Accounts** within the indicator *Gross Domestic Product* and *Gross Value Added by Activities*. Export and import can be found in the Office publication Monthly Statistical Bulletin, for agriculture, forestry and fishery, in millions of $ as well as the corresponding indices. In the database, however, in the area of **External Trade**, there are no data on export and import of agricultural products, but the export and import of products are shown according to Standard International Trade Classification – *SITC*. It is a hierarchical, economic classification of products according to the level of production, and not by economy sectors. Information on the sale and purchase of agricultural products of agriculture, forestry and fishing can also be found in the publication Monthly Statistical Bulletin but not in the database in the area of **Domestic Trade**, as might perhaps be expected.

Data on employment in agriculture can be found in the database, both in the Census of Agriculture, and within the area of **Employment and Earnings** (Employed persons by sector). In addition to these indicators, according to (Simović et al., 2012), share of the agricultural population in the total population and the share of active agricultural population in the agricultural population are also important for analysis. The share of agricultural population in the total population is covered by the Census of Population, Households and Dwellings, which was conducted in Serbia in 2012, and the data have been published in special publications – Census Atlas (Statistical Office of the Republic of Serbia, 2014).

The database does not include the indices of physical volume of production in agriculture, probably the most important indicator of production, which is now only found in the Statistical Yearbook of the Statistical Office of the Republic of Serbia. Thus, significant economic indicators of agriculture - agricultural production indices, the share of agriculture in import and export and data on purchase and sale of agricultural products are not available in the database. Mainly, these are data obtained by calculation methods and analysis. In addition to these indicators, the database would be significantly enriched by some economic indicators of agriculture that Statistical Office of the Republic of Serbia does not calculate and publish for now. These are financial indicators such as data on the agricultural budget share in the budget of the Republic of Serbia and various financial indicators which are currently only a subject of individual author calculations and a result of individual research efforts. Furthermore, these financial indicators are presented by some state institutions dealing with the analysis in this area. For example, the share of the agricultural budget in the national budget is

given in (Veselinović, Drobnjaković, 2014) and in (Radović, 2009), while the financial indicators of companies in the agricultural sector are analyzed in (National Agency for Regional Development, 2012). Data on investment in agriculture till the beginning of the global economic crisis can be found in (Pejanović, Milić, 2008), where data source was the Bulletin of the Statistical Office of the Republic of Serbia "Investments of the Republic of Serbia"[10], while the direct foreign investment data can be found in (Kapor, 2009), where data sources were the National Bank data on direct foreign investment and UNCTAD (United Nation Conference on Trade and Development). When Serbian authors deal with investment in agriculture, they refer to the budget data, for example in (Miletić et al., 2012), while commercial banks data on the amounts of subsidized short-term and long-term loans to agriculture have not been consolidated in the literature. In fact, those data on investment in agriculture and its availability in the database would be of great importance for the analysis of the situation and tendencies in the development of Serbian agriculture.

### Results and Discussion: How to Improve the Availability of Data in the Field of Agriculture

In the previous parts of the Paper we described the technical characteristics of the Database and explained the options of accessing, filtering and downloading data from the Database. The indicators of agriculture that are available in the Database were listed and the possibilities of using Database were analyzed. Subsequently, the question was raised whether these possibilities could be improved. It was hypothesized that it was possible to improve the database by improving the existing performances. Another hypothesis was that the latest developments in information technology could be applied in re-designing the Database. One improvement has been proposed in the previous part of the Paper: it is necessary to enrich the Database with data which can only be found in the Office printed publications, as well as data obtained by calculation methods and analysis, such as the indicators of the agricultural development and various financial indicators. Another advancement option refers to technical improvements that is, to the improvement of the methods of data storage and access to the Database through re-designing Database.

Recently, the rapid advancement of information and communication technologies, as well as the growing number of demands of researchers involved in new issues and analyses have raised the problem of access to necessary information. Certainly one should not expect the ability to access all data in the database, but it is possible to improve getting the required outputs. This refers to the possibility of querying of the database where filtering data will be allowed by using one or more of the conditions and aggregate functions, which together would provide a display in multiple dimensions. When it comes to the queries of the database, it is understood that users through web-enabled applications should be provided such controls, which will provide input

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10  The Bulletin is no longer published but data on agricultural investment can be found in the Office press releases "Investment of the Republic of Serbia" which are published annually.

requirements and criteria in the simplest possible way. The conditions and criteria that are entered this way, as well as possible options for using aggregate functions should then be generated in the SQL code that is passed to the database and will return a response, namely the output results to the user, as defined in (Silberschatz et al., 2011). Multi-dimensionality in the database should primarily provide direct support to analysts in setting up various queries, in order to obtain results, as shown in (Riordan, 2006).

The first step towards improving the storage system and accessing data would be the definition of existing opportunities in the sphere of information technologies. Given the fact that the access to the data of the Statistical Office of the Republic of Serbia Database is provided via Internet, meaning web application, it is necessary to think about improvement in the direction of using modern trends in the area of information technologies based on the web.

Web based applications are basically very demanding systems. Data management is one of the more complex tasks of these systems as it is typically done with quite a number of data. The challenge of managing data in databases varies in different scientific disciplines. While in some disciplines management problem relates to the organization of data on a large scale, in other scientific disciplines problems arise from the growing complexity of data and asking questions about them. Each of the challenges (large volume of data, rapidly changing environment, need for a better model structure and the use of complex queries) significantly complicates database design. These are the problems that make database administrators work with data in an explorative manner so that the defined query depends on the preceding one thus linking queries together and the answers provided by queries are immediately available. This means that data processing is rarely accessed off-line as well as the analysis of "Big Data" approach (Heinis et al., 2011).

Recently, so-called Cloud systems for storing a large amount of data have been increasingly used and developed. The term "Big Data", a relatively new concept, refers to data whose setting is extensive and so complex that traditional data processing is no longer adequate and sufficient. Among the challenges of "Big Data" returns, inter alia, are analysis, data collection, sharing, visualization, but primarily data storage. It is because of the problem of a large number of data storage and a large number of users accessing data via web that Cloud founded databases operating on the Cloud computing platform should be emphasized.

In relation to the above, it is possible that a large number of data stored by the Republic Statistical Office and keep increasing, will be stored in the Cloud SQL Server database management system. Cloud SQL Server supports SQL Azure – relational database service. Cloud SQL Server supports the use of database partitions as well as its replications. Transactions made over database are always limited to a single partition unless the reading of SQL query is not done on a separate isolation level (Agrawal et al., 2015).

Another specific use of "Big Data" refers to a new multidisciplinary scientific field – Visual Analytics which defines visualization, interactive data analysis and data management (Fekete, Silva, 2012).

In general, statistical database is a collection of data using queries which take general characteristics of some data sub-groups allowing for responses to information details about data. Queries of these databases almost always use aggregate functions and they are called *statisticalsumqueries* (Jonsson, Krokhin, 2008). Working with these databases almost always carries certain specifics because sometimes it is necessary to protect the presentation of certain types of data or present data only for some cases. This sort of statistical queries brings about the problem of data access security. Many examples of such databases include database perturbation (Liew et al., 1985), as well as statistical queries for getting answers, but also the limitation of the queries themselves.

Statistical databases whose access is possible via Internet and which have a similar or the same data review as the Statistical Office of the Republic of Serbia can be viewed via website: https://data.un.org/. According to the given sites it is possible to compare data availability to the Office data availability and it is also possible to notice how many sites there are that are provided by advanced search and data calculation from the selected country database. However, the analysis of such data availability in the world would be the topic of another paper.

## Conclusion

The Statistical Office of the Republic of Serbia Database is certainly a very rich with data, and when it comes to agriculture, it is also rich with the 2012 Census data. A special emphasis in this Paper is given to data in the area of agriculture that can be obtained through the web application as a way to access the Database. We have displayed the areas and sub-areas of agriculture offered by this application, listed the available agricultural indicators and showed the possibilities of using Database. Basically, the objective of the Paper was to point to the great benefit of the existence of this kind of access to data stored in the Database, but also to the possible methodological and technical improvements of application via which we access the database.

The proposed methodological and technical improvements refer to the re-design of Database based on the modern cloud founded databases that exist in the world nowadays. We suggested the transformation of database towards Cloud SQL Server database management system. In addition, the application of achievements offered by Visual Analytics would improve visualization, interactive data analysis and data management.

In addition to these technical improvements, when it comes to information in the field of agriculture, it was proposed to enrich the Database with data that are currently available only in the Office printed publications. Attention has also been paid to the fact that through the application that access the database one cannot obtain calculated indicators, i.e., data obtained by the methods of calculation and analysis. Also, the indicators of agricultural development and various financial indicators are not available in the Database. Although some of these indicators can be calculated or they exist in written publications of the Office, the possibility of obtaining time series of these indicators from the databases would be of great importance and benefit to analysts.

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# SERIJE POLJOPRIVREDE U BAZI PODATAKA REPUBLIČKOG ZAVODA ZA STATISTIKU SRBIJE [11]

*Jelena Radović – Stojanović[12], Aleksandra Zečević[13], Zorica Kojčin[14]*

## Rezime

*Ciljevi ovog rada bili su da se istraži koji se podaci o poljoprivredi mogu pronaći u Bazi podataka Republičkog zavoda za statistiku Srbije i kakve su mogućnosti za primenu Baze podataka u istraživanju i analizi poljoprivrede. Baza podataka Republičkog zavoda za statistiku fizički predstavlja normalizovanu bazu podataka formiranu u DBMS SQL Serveru. Metodološki pristup temi rada odnosi se na modeliranje i način korišćenja Baze podataka. Objašnjene su opcije pristupanju, filtriranju i preuzimanju podataka iz Baze podataka. Opisane su tehničke karakteristike Baze, nabrojani su indikatori poljoprivrede, analizirane su mogućnosti korišćenja Baze podataka. Ispitano je da li ove mogućnosti mogu da se unaprede kroz poboljšanje načina skladištenja i pristupa podacima. Zaključeno je da su poboljšanja moguća, i to obogaćivanjem Baze podataka podacima iz oblasti poljoprivrede koji su za sada raspoloživi samo u* štampanim *publikacijama Zavoda, a zatim, kroz metodološka i tehnička poboljšanja, redizajniranjem Baze podataka po ugledu na cloud zasnovane baze podataka. Takođe, primena dostignuća novog multidisciplinarnog naučnog polja – Vizuelne analitike poboljšala bi vizuelizaciju, interaktivnu analizu podataka i upravljanje podacima.*

***Ključne reči:*** *baza podataka, indikatori poljoprivrede, serije strukture, vremenske serije, Srbija*

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# THE IMPORTANCE OF ROMANIAN MOUNTAIN TOURISM FOR THE NATIONAL ECONOMY

*Ungureanu Adrian[1]*

## Abstract

*Why is mountain tourism so important? Here is a question which the author tried to answer to, bringing into account some scientific arguments to support my point of view. First of all, the Carpathians have a variety of large areas of wildness, therefore, of many balanced ecosystems which acomodate all or almost all species and habitats. Their greatest value lies in the fact that they have existed and they still exist in a natural way, and their normal cycle of life flows as close to normal as possible. So, in full symbiosis with these ecosystems, winter sport tourism represents a niche that Romania does not fructify enough.*

*Information base has formed scientific publications of Romanian and foreign authors related to the problem under consideration and the supplies statistics tourist potential of INS, data reports county division of statistics from 2004 to 2014 and other official documents in Romania, Regional Development Ministry materials and public administration, as well as forecasts, author's calculations and estimates.*

***Key words:*** *mountain tourism, accomodation structures, mountain resorts.*

**JEL:** L83, Q26, Q56

## Introduction

In the classification of types of tourism, mountaneering owns an important place because mountain was always one's favourite place for recovering, resting and adventure, or other socio-cultural needs. The mountain area has drawn the attention of investors and tourism organizers, due to the opportunities for an effective development of tourism activities, thus, nowadays we can talk about the existence on a global scale of a complex, diverse and very attractive offer that suits all people's tastes and types. The importance of mountain areas in the holiday demand has raised concerns of experts who want to exploit this touristic destination in the most efficient manner. (Firoiu, 2002).

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Along with the growth of tourism in the last decades, mountain caught the attention of investors and promoters of this form of tourism, because of its great ability to create oportunities for economical activities with good results. The effects of mountain tourism development regarding economical and social areas are seen as being very important (Olaru, 2011).

The same thing applies to the environmental impact of mountain tourism, becoming at this time the obvious necessity to promote a sustainable development in mountain areas and to intensify protective measures. The demand for mountain tourism not only experienced an increasing trend worldwide but also major changes in terms of encouraging driving, influenced by various economical, socio-demographic, psychological, and political factors. These two main and interdependent facts that form the essence of mountain tourism' evolution, represent the diffusion of mountain tourism on a social level and the extension of massifs arrangements. (Erdeli, Gheorghilaş, 2006).

Tourist activity, at today's complexity level, involves many aspects and current problems of today's society, from sustainable development (and the associated concept of "responsible tourism") to territorial and social cohesion, being not only a revenue generating economic activity but also the means to develop and revive areas that have lost their economic competitiveness (Neacu, Negu, Vlăsceanu, 2014).

## Methodology and data sources

To make a proper forecast for the next five years of the number of overnights and total arrivals, three adjustment methods will be used, the linear trend method, average time index method and average absolute change. After comparing the coefficient of variation obtained for every method with the 5% limit on the data shown above, the method with the lowest value will be chosen for the forecast.

Information base has formed  scientific publications of Romanian and foreign authors related to the problem under consideration and the supplies statistics tourist potential of INS, data reports county division of statistics from  2004 to 2014 and other official documents in Romania, Regional Development Ministry materials and public administration, as well as forecasts, author's calculations and estimates.

## The tourism potential in mountain resorts

Winter sports generate a tourism flow of approximately 330 million visitors which return revenues up to $40-55 billion annually (Taylor, Yang, Strom, 2007) and are practiced on all five continents. Skiing as a past-time activity came to be around the turn of the last century in more than in one place of the Alpine countries, but it is in 1908 that in Briançon – Montgènevre is organized the first International Ski Competition and in 1927 in the ski resort of Chamonix the first cable transportation ever – started functioning (Popescu, 2010).

The mountain has always been a special attraction to people since ancient times, which was considered the dwelling of the Gods, but then, with the passing of time, the interest

has revolved mostly around the admiration for beautiful and unique landscapes developed under this landform; the high altitudes, the abrupt difference of level, the rocks form, saddles, color, gaps, caves, specific vegetation and fauna, clean waters rich in minerals, and also an invigorating climate with important remedies for respiratory and circulation diseases and movement makes the mountain area a tourist location extremely visited for leisure holidays. (Efros, Cheia, 2013).

Shape mountain areas, which includes the Carpathians range area, carried out at altitudes by a few hundred meters at 2,544 m, with an average altitude of 950 m, a high degree of fragmentation, imposed by the many mountain depressions, deep valleys and low forests, a situation that encouraged both the conduct settlements, as well as an intense movement of people (Turnock, 1999).

Mountain Areas is overlapping almost 100% with the Carpathian Mountains. The average elevation value of the Carpathian Mountains is 1,136 m, and the highest values of altitude are over 2,500 meters. Agricultural area present in Mountain region is around 2,802,000 ha. Out of this area, in 2007, only 1,290,000 ha (46%) was under commitment, but is estimated that in 2015 will be under commitment around 2,520,000 ha (90%) and this threshold is unlikely to be higher because of eligibility criteria that are referring to plots and farm sizes. Due to natural restrictive condition (slope and altitude), Carpathian Mountains encounter obstacles in farming, with a negative consequence (a shorter period of vegetation period and supplementary costs). Also, the mountain regions are characterized by a low productivity and depopulation (Antonescu, 2014).

The Carpathians represent the highest geographical unit from Romania, being considered central, both as a layout, but also as a geographical skeleton for the rest of the natural geographical units whose evolution, in the recent geological periods, was closely connected to that of the mountains, their physical and geographical characteristics being strongly influenced by the Carpathian sector. The layout of the Carpathian sector in the Romanian territory is quite unique, the mountain arc including the Eastern and Southern Carpathians, and also the lower and less compact sector of the Western Carpathians (Lesenciuc, Boengiu, Huupau, 2013).

The Eastern Carpathians represent the most extensive group of Romanian Carpathians, with an area of 34,500 km² (more than 50% of Romanian Carpathian range area) and with a width of between more than 150 km, in the North, and 80 km, in the bending sector. The age living in these mountains is attested by the paleolithic vestiges of cultures Oaş Depression from Râşnov, Sita Buzău, etc. Much more various are the traces of neolithic settlements and also from the Bronze age. Dacian existence in Piatra Neam (Petrodava), Rasnov (Cumidava) and Covasna highlights the continuous presence in the Middle Ages, the population being organized in unions of rural communities and countries ( Barsei Country, Maramures Country, Oas Country, Nasaud Country, etc.). (Cândea, Bran, 2001)

The Southerners Carpathians have an area of 14,040 km² (21% of the mountain area in Romania) and extend to a length of 250 km, in the East-West direction between Prahova Valley, and Timiş-Cerna tectonic corridor. They are divided into groups such as: Bucegi

Mountains, Fagaras Mountains, Parang Mountains, Retezat Mountains, which include massifs and some depressions. They have been formed in the Alpine orogeneza (cretacic medium and superior) and are composed of crystalline schists and Mesozoic sedimentary rocks. (Cândea, Bran, 2001)

The Western Carpathians are carried out in the west valleys between Some and Barcau in the North, and the Danube, in the South, occupying an area of 17,714 km$^2$ (about 27% of Romanian Carpathians area). It represents the most fragmented and the lowest sector, with an average altitude of 1,650 m and a maximum of l, 849 m owned by Cucurbata Mare Mountain. Their subdivisions are The Apuseni Mountains, the Banat Mountains and The Poiana Ruscă Mountains . (Cândea, Bran, 2001)

In the exploitation of mountain resources there are important the following aspects:

- · Landscape looks different, giving originality and the attractiveness of mountain massifs;
- · Embossed with average height (800-1,600m), attractive tourism effort, outdoor activities;
- · The nature wilderness for the most part;
- · A refundable financial aid relatively vast and an assurance of snow at low altitudes (1,000-1,500m), required by practicing sports winter;
- · Population keeping traditions, traditional houses of quality and an important cultural heritage;
- · Tourist potential complex, because of natural resources and recreation are being developed many forms of tourism. (Erdeli, Gheorghilaş, 2006).

The mountain area is characterized by a great variety of tourist resources. The mountain relief impresses through altitude, spectacular cliffs, picturesque ridges and a variety of genetic types of relief: karsts (keys, valleys, caves, steepness, and defiles); volcanic (craters, cones, trays); on conglomerates (sphinxes, mushrooms, towers); massive relief of high mountains (ridges, steep peaks, impressive edges), glacial (glacial amphitheatres, glacial valleys, stony ridges) (Slusariuc, Bîcă, 2015).


**Evolution of accommodation structures in mountain resorts**

Exploiting tourism heritage mountain resorts in Romania involves in addition to natural resources, anthropogenic and means appropriate materials, able to ensure fulfilment of requirements tourists throughout the period of their stay. These means are known under the name of the techno-material, which conceals a series of miscellaneous structures: units of accommodation and food, means of transport and leisure facilities (Stănciulescu, Micu, 2009).

The basic material of mountain tourism is partly outdated, the absence of modernisations affects the quality of service offered to tourists in the area (Arsene, 2009). The network of units of receipt in the mountain resorts is unevenly spread, emphasizing greater

concentrations hosted in Prahova and Brasov counties. In the construction of mountain resorts a special attention has been given to hotels (which take various forms - hotels, chalets, boarding houses, holiday houses, etc. ) and catering, as well as specific fittings winter sports. These components term a functioning system which reflect concepts and ways of adapting to the conditions specific morphological and climatic space mountain, characterized by and refer to a sort of fragility, which may influence the values and the opportunities and thus, undermine the attractiveness of tourist arrangements. (Dezsi, 2006).

According to the study carried out, the number of units of accommodation in mountain area of Romania in  2014 has increased at 1,609 approximately 26.25 % of the total number of units of accommodation in Romania. Throughout the period in question, 2004-2014, the number of defective units of accommodation in mountain resorts experienced a growth trend, from 850 units in 2004 to 1,609 units of accommodation in 2014.

**Chart 1.** Evolution of accommodation structures in the Romanian mountain resorts, 2004-2014



| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Establishments of touristic reception in mountain resorts | 850 | 828 | 973 | 978 | 1010 | 1052 | 1038 | 1154 | 1376 | 1497 | 1609 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B
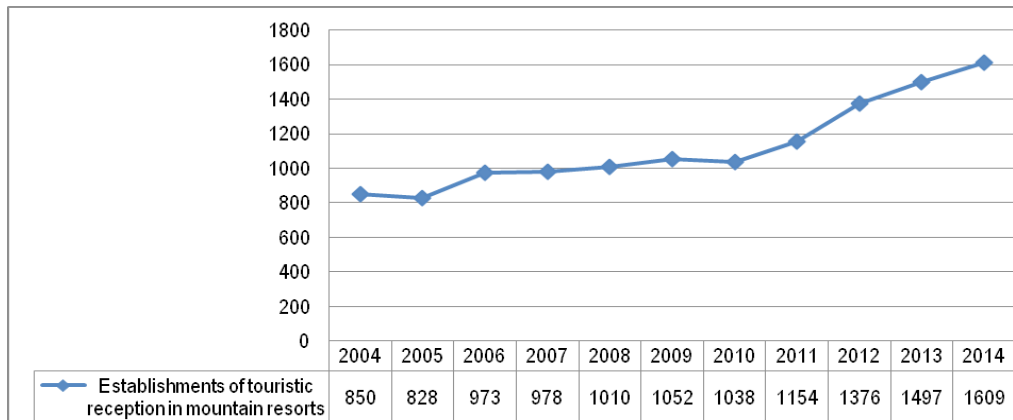
**Table 1.** Evolution of accommodation structures in the Romanian mountain resorts, 2004-2014

| Year | Absolute indicators | | | Relative indicators | | | | Annual average | | | |
| | Level indicators | Absolute changes | | Index dynamics | | Growth rate | | Y | Δ | I | R |
| | Accommodation structures in the Romanian mountain resorts | Δi/1 | Δi/i-1 | Ii/1 | Ii/i-1 | Ri/1 | Ri/i-1 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2004 | 850 | 0 | | | | 0 | | | | | |
| 2005 | 828 | -22 | -22 | 0.97 | 0.97 | -0.03 | -0.03 | | | | |
| 2006 | 973 | 123 | 145 | 1.14 | 1.18 | 0.14 | 0.18 | | | | |
| 2007 | 978 | 128 | 5 | 1.15 | 1.01 | 0.15 | 0.01 | 1,124.090909 | 75.900 | 0.975 | -0.025 |
| 2008 | 1,010 | 160 | 32 | 1.19 | 1.03 | 0.19 | 0.03 | | | | |
| 2009 | 1,052 | 202 | 42 | 1.24 | 1.04 | 0.24 | 0.04 | | | | |
| 2010 | 1,038 | 188 | -14 | 1.22 | 0.99 | 0.22 | -0.01 | | | | |
| 2011 | 1,154 | 304 | 116 | 1.36 | 1.11 | 0.36 | 0.11 | | | | |
| 2012 | 1,376 | 526 | 222 | 1.62 | 1.19 | 0.62 | 0.19 | | | | |
| 2013 | 1,497 | 647 | 121 | 1.76 | 1.09 | 0.76 | 0.09 | | | | |
| 2014 | 1,609 | 759 | 112 | 1.89 | 1.07 | 0.89 | 0.07 | | | | |
| | | | | | | | | | | | 12,365 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

For the period under consideration, the number of units of accommodation in the mountain resorts of Romanian knew a downward trend of growth, within a fairly short period, of 10 years, the number of increasing by 107% (2014 reported to 2004).

In order to make an assessment of the evolution trend in the following perspective of the accommodation structures, we used the criterion based on the average change:

**Table 2.** The calculation algorithm needed to adjust the number of accommodation units through the average growth method($y_t$), 2004-2014

| Year | $y_t$ | $Δ_{t/t-1}$ | t-1 | $Y_t = y_1 + (t-1)Δ$ | $(y_t - Y_t)^2$ |
|---|---|---|---|---|---|
| 2004 | 850 | 0 | 0 | 0 | 0 |
| 2005 | 828 | -22 | 1 | 925.9 | 9,584.41 |
| 2006 | 973 | 145 | 2 | 1,001.8 | 829.44 |
| 2007 | 978 | 5 | 3 | 1,077.7 | 9,940.09 |
| 2008 | 1,010 | 32 | 4 | 1,153.6 | 20,620.96 |
| 2009 | 1,052 | 42 | 5 | 1,229.5 | 31,506.25 |
| 2010 | 1,038 | -14 | 6 | 1,305.4 | 71,502.76 |
| 2011 | 1,154 | 116 | 7 | 1,381.3 | 51,665.29 |
| 2012 | 1,376 | 222 | 8 | 1,457.2 | 6,593.44 |
| 2013 | 1,497 | 121 | 9 | 1,533.1 | 1,303.21 |
| 2014 | 1,609 | 112 | 10 | 1,609 | 0 |
| Total | 12,365 | | | | 203,545.85 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

| | |
|---|---|
| Δ | 75.9 |
| ☐ | 1,124.090909 |
| Standard deviation σ | 136.0300268 |
| Coefficient of variation υ | 12.10% |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

The value of 12,10% of the coefficient of variation suggests that the arithmetic average () of the cronologic series - tourists reception structures for tourists accommodation, has a high degree of interest.

**Table 3.** Previsions of the number of accommodation units in mountain resorts between 2015-2020

| Year | t-1 | $Y_t = y_1 + (t-1)Δ$ |
|---|---|---|
| **2015** | 11 | 1,684.9 |
| **2016** | 12 | 1,760.8 |
| **2017** | 13 | 1,836.7 |
| **2018** | 14 | 1,912.6 |
| **2019** | 15 | 1,988.5 |
| **2020** | 16 | 2,064.4 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

The previsions in the dynamics of the number of establishments regarding tourists accommodation in mountain resorts between 2015-2020, reveals a constant trend ascending. The trend presents a favorable situation for mountain tourism as a whole and is due to both investments, as well as valorisation of the potential of mountain tourism.

**Chart 2.** The evolution of accommodation units in mountain resorts in all accommodation units, between 2004-2014



| | Anul 2004 | Anul 2005 | Anul 2006 | Anul 2007 | Anul 2008 | Anul 2009 | Anul 2010 | Anul 2011 | Anul 2012 | Anul 2013 | Anul 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ponderea | 21.79 | 19.59 | 20.66 | 20.84 | 20.87 | 20.65 | 19.88 | 23.07 | 23.64 | 24.91 | 26.25 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B
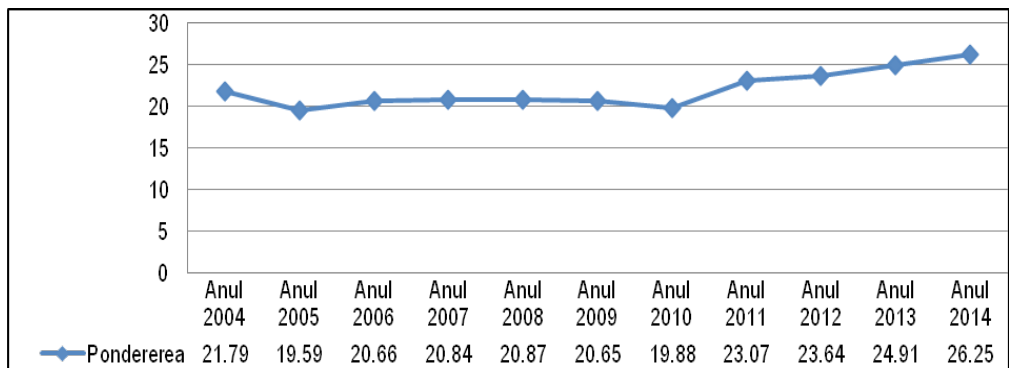
The increase in the number of accommodation units from the Romanian mountain resorts also determined an increase of total structures in their accommodation. In the analysis of the data from the above chart, it is observed that the share accommodation structures in the mountain resorts  has been increased steadily and highlighted. If, at the level of 2004 the share registered a value of 21.79 percent in 2014, reaches maximum value of 26.25%.

**Chart 3.** The share of tourist reception establishments, by types of structures in 2004 - (%)



Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B
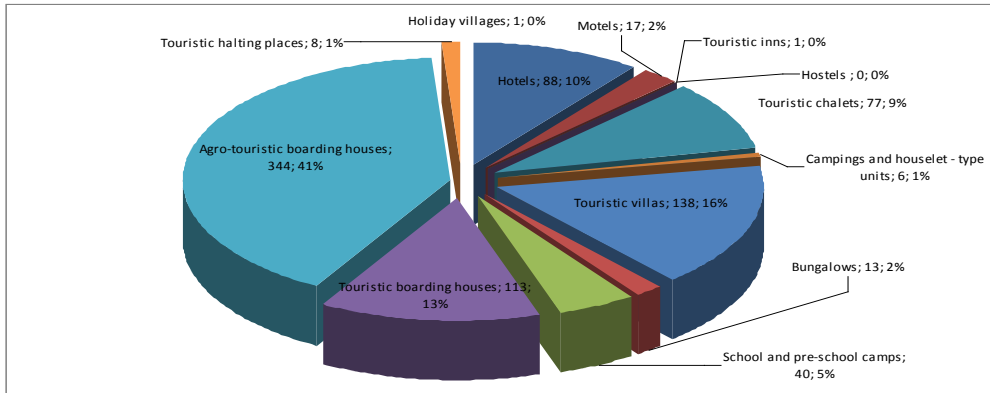
Regarding the share of tourist attraction's facilities, the types of structures in mountain resorts, the first position is held by million Euro are meant for boarding and lodging rural tourism which, along with the tourism integrated 63% of the total accommodation structures of 2014. The evolution in number of the units of accommodation, shows that between  2004 and 2014, the number of touristic boarding houses has grown considerably, from 457 (approximately 53 %) in 2004 to 1042 (about 63 %) - see graphs 3 and 4.

**Chart 4.** The share of tourist reception establishments, by types of structures in 2014 - (%)



Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

Even though the number of hotels has increased from 88 in 2004 to 180 in 2014, their weightings in the total of structures of the facilities in mountain resorts, increased by only one percent, from 10% to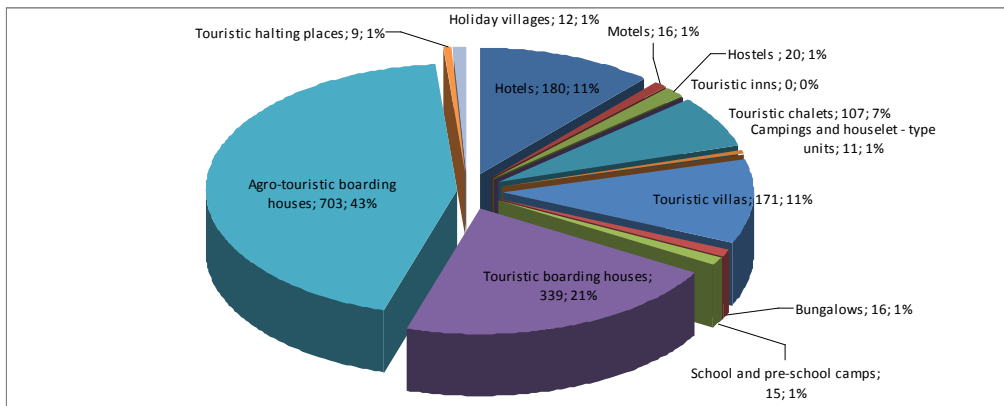 11 %. Another visible change is also recorded by touristic villas, which have decreased from 16% in 2004, to 11 % in 2014. The percentage relatively large held by tourist villas is due to the fact that the investments, and the costs of their maintenance are lower.

**Chart 5.** The evolution trend of the number of hotels in the mountain resorts, 2004-2014
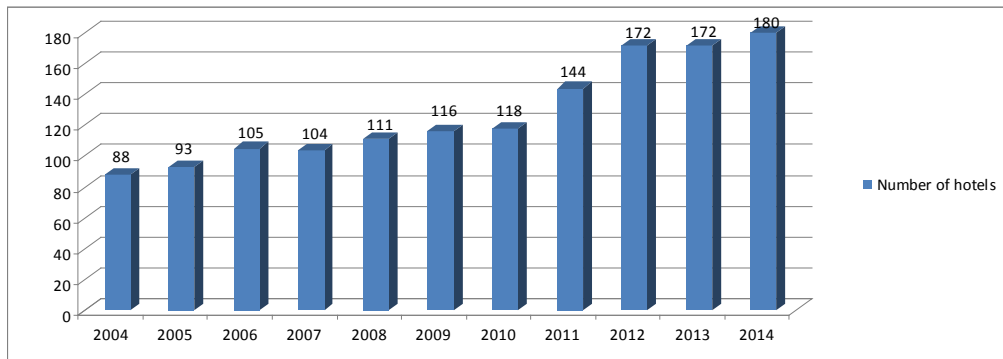
Generally, for the proper conduct of tourism activity, but in particular for mountain areas, the accomodation structures like hotels are the most important ones, because they give tourists safety they need along with an adequate price for touristic services offered. (Marin-Pantelescu, 2009).

With a view to assess downward trend in the number of hotels from the mountain resorts for the period 2015-2020 we've used the criterion based on average change obtaining a value of 8.86% of the coefficient of variation, a fact that suggests the arithmetic mean ($\square$) of the series historical record - number hotels, has a very high degree of representativeness.

**Table 4.** The calculation algorithm needed to adjust the evolution trend of the number of hotels through the average growth method ($y_t$), 2004-2014

| Year | $y_t$ | $\Delta_{t/t-1}$ | t-1 | $Y_t = y_1 + (t-1)\Delta$ | $(y_t - Y_t)^2$ |
|------|-------|------------------|-----|---------------------------|------------------|
| 2004 | 88 | 0 | 0 | 0 | 0 |
| 2005 | 93 | 5 | 1 | 97.2 | 17.64 |
| 2006 | 105 | 12 | 2 | 106.4 | 1.96 |
| 2007 | 104 | -1 | 3 | 115.6 | 134.56 |
| 2008 | 114 | 10 | 4 | 124.8 | 116.64 |
| 2009 | 116 | 2 | 5 | 134 | 324 |
| 2010 | 118 | 2 | 6 | 143.2 | 635.04 |
| 2011 | 144 | 26 | 7 | 152.4 | 70.56 |
| 2012 | 172 | 28 | 8 | 161.6 | 108.16 |

| | | | | |
|---|---|---|---|---|
| **2013** | 172 | 0 | 9 | 170.8 | 1.44 |
| **2014** | 180 | 8 | 10 | 180 | 0 |
| **Total** | 1,406 | | | | 1,410 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101A

| | |
|---|---|
| Δ | 9.2 |
| ☐ | 127.8181818 |
| Standard deviation σ | 11.32174095 |
| Coefficient of variation υ | 8.86% |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101A

**Table.5.** Previsions of the number of tourist reception establishments in mountain resorts, 2015-2020

| Year | t-1 | $Y_t = y_t + (t-1)Δ$ |
|---|---|---|
| **2015** | 11 | 189.20 |
| **2016** | 12 | 198.40 |
| **2017** | 13 | 207.60 |
| **2018** | 14 | 216.80 |
| **2019** | 15 | 226.00 |
| **2020** | 16 | 235.20 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101A

In accordance to the preview from the table above, for the period 2015-2020, there has been an upward trend, for the dynamics of the number of hotels. The number of hotels will increase the next years, which represents an advantageous situation for the Romanian mountain tourism. This increase can be traced to people's desire to feel the convenience of a hotel with all the facilities,the renovation of the technico-material base for tourism as well as a diversification of the Romanian mountain tourism offer.

**Chart 6.** The evolution trend of the number of guesthouses and agrotouristic hotels in the mountain resorts, 2004-2014



| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tourist boarding houses | 113 | 147 | 184 | 186 | 205 | 198 | 206 | 258 | 285 | 327 | 339 |
| Agro-tourist boarding houses | 344 | 288 | 386 | 416 | 428 | 463 | 432 | 459 | 592 | 646 | 703 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101C
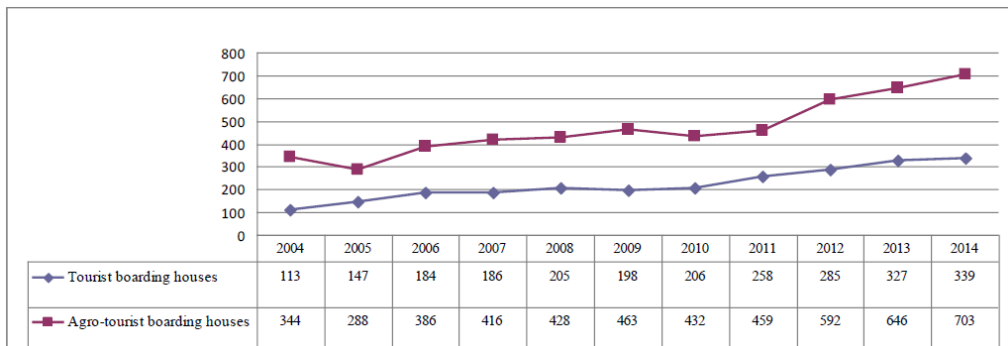
The increase in the number of units of accommodation over the period which has been analyzed, it is due to,on one hand the appearance of new types of touristic structures (tourist and boarding houses, hotels for youth, hostels) and, on the other hand an increasing number of structures classified to higher categories (3-5 stars).

**Chart 7.** The share of accommodation units on categories of comfort in 2004 - (%)



Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101C
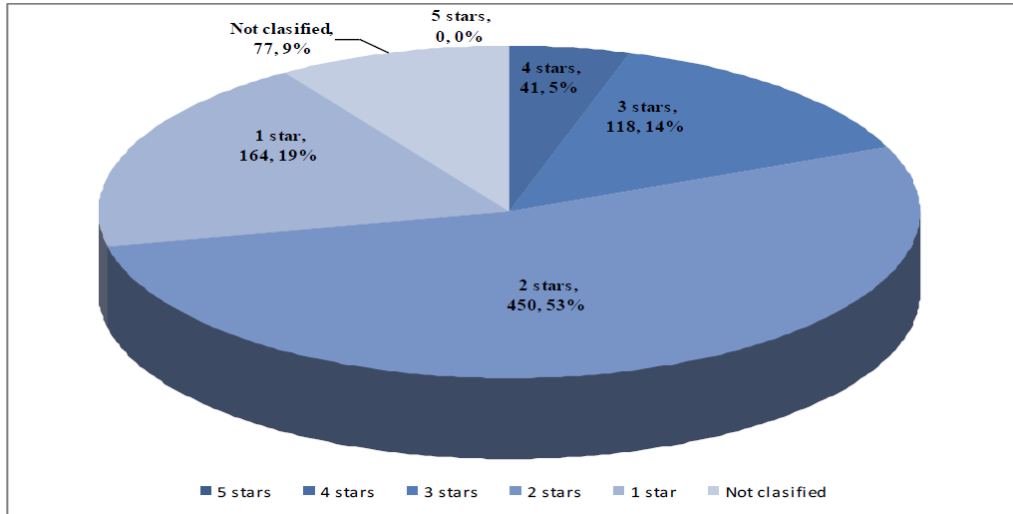
The current image of Romanian mountain tourism is also offered by the capacity of the accommodation corcerning the category of comfort. If in Europe there is an emphasis on the accommodation structures classified to 4 and respectively 5 stars, in Romania in 2004 were preffered the accommodation structures of the lower categories. According to the data supplied by INSSE and processed in the present work, it is seen that in 2004 the share was owned by the accomodation structures of 2 stars (53 % ), which together with those of 3 stars (14 %) and respectively a star (19 %) totals 86 %. It should be noted that in the base year of the analysis undertaken, in the Romanian mountain resorts, there was not even a single unit of accommodation classified to 5 stars.

**Chart 8.** The share of accommodation units on categories of comfort in 2014 - (%)



Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101C
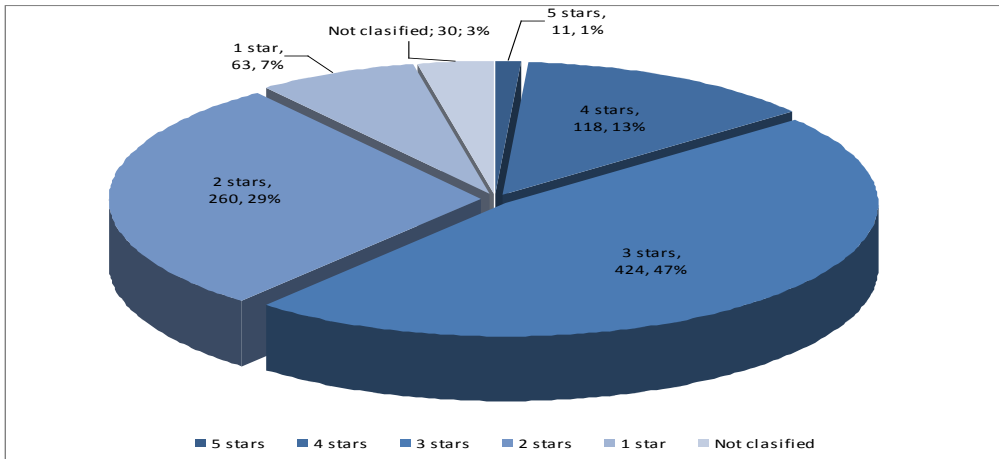
From the point of view of the degree of comfort, in 2014 there is a strong concentration of establishments and the number of accomodation in lower categories, i.e. units of 3 and 2 stars (see charts 7 and 8). This situation may be explained by the units antiquity and by the advanced degree of wearing. To these shortcomings there are teamed up the absence of modernization works and the maintenance of the units already in existence. For the mountain tourism a highpoint represents the rises in the period 2004-2014 to the higher categories.

For instance, to 4 and 5 stars categories, there has been a significant increase, from 5% in 2004, to 14% in 2014. In the case of 4 and 5 stars categories, it is to be noticed an increase in the proportions both in the number of units and in the number of accomodation. By analysing available data, the most significant proportion in the accomodation structures by category of comfort (in mountain resorts) in 2014, it is held by the units of 2, respectively 3 stars, which together cover 76% of the total. The weighting of each category of tourist structures facilities is presented in the chart no. 8.

The situation is slightly different if it is analyzed the ability of accommodation in operation. So, the period 2004-2014 was marked by a loss of up and down movements, from the accommodation capacity of 32,554 in 2004, to 50,996 in 2014, as shown in the following table.

**Table 6.** The evolution of accommodation capacity in use , 2004-2014 - (mii locuri-zile)

| Year | Absolute indicators | | | Relative indicators | | | | Annual average | | | |
| | Level indicators | Absolute changes | | Index dynamics | | Growth rate | | | | | |
| | Accommodation capacity in the Romanian mountain resorts | $\Delta_{i/1}$ | $\Delta_{i/i-1}$ | $I_{i/1}$ | $I_{i/i-1}$ | $R_{i/1}$ | $R_{i/i-1}$ | $Y$ | $\Delta$ | $I$ | $R$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2004 | 32,554 | 0 | | | | 0 | | | | | |
| 2005 | 33,196 | 642 | 642 | 1.02 | 1.02 | 0.02 | 0.02 | | | | |
| 2006 | 32,233 | -321 | -963 | 0.99 | 0.97 | -0.01 | -0.03 | | | | |
| 2007 | 31,448 | -1,106 | -785 | 0.97 | 0.98 | -0.03 | -0.02 | | | | |
| 2008 | 32,763 | 209 | 1,315 | 1.01 | 1.04 | 0.01 | 0.04 | 37,822.09 | 1,844.2 | 0.98 | -0.02 |
| 2009 | 35,395 | 2,841 | 2,632 | 1.09 | 1.08 | 0.09 | 0.08 | | | | |
| 2010 | 35,426 | 2,872 | 31 | 1.09 | 1.00 | 0.09 | 0.00 | | | | |
| 2011 | 38,571 | 6,017 | 3,145 | 1.18 | 1.09 | 0.18 | 0.09 | | | | |
| 2012 | 45,427 | 12,873 | 6,856 | 1.40 | 1.18 | 0.40 | 0.18 | | | | |
| 2013 | 48,034 | 15,480 | 2,607 | 1.48 | 1.06 | 0.48 | 0.06 | | | | |
| 2014 | 50,996 | 18,442 | 2,962 | 1.57 | 1.06 | 0.57 | 0.06 | | | | |
| | | | | | | | | | | | 416,043 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR103C

The number of accommodation capacity in the Romanian mountain resorts in the period 2004-2014, can be seen as being fluctuant, recording in 2014 a high point of 157% compared with 2004, and the minimum value was noted in 2007, 97%, as compared to 2004. During the period 2004-2014, in the mountain resorts, tourist accommodation capacity has been on an annual average of 37,822.09 places, an increase of 1, 844 positive environmental places, thus representing an annual relative progress of 2%.

**Chart 9.** The evolution of accommodation capacity in use, 2004-2014 - (mii locuri-zile)



Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR103C
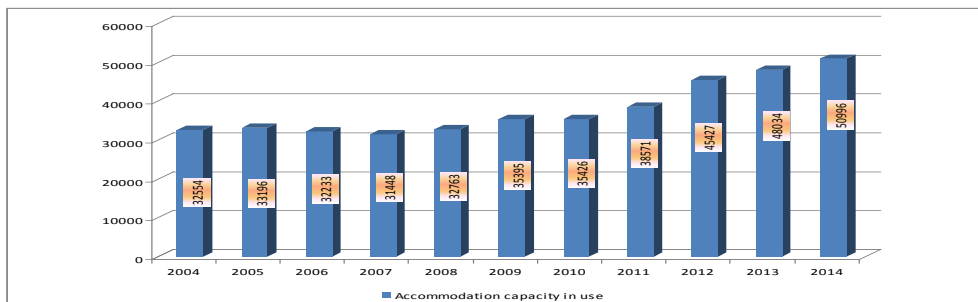
**Table 7.** The calculation algorithm needed to adjust the evolution trend of accommodation capacity in use through the average growth method ($y_t$), 2004-2014

| Year | $y_t$ | $\Delta_{t/t-1}$ | t-1 | $Y_t = y_1 + (t-1)\Delta$ | $(y_t-Y_t)^2$ |
|------|-------|------------------|-----|---------------------------|----------------|
| 2004 | 32,554 | 0 | 0 | 0 | 0 |
| 2005 | 33,196 | 642 | 1 | 34,398.2 | 1,445,284.84 |
| 2006 | 32,233 | -963 | 2 | 36,242.4 | 16,075,288.36 |
| 2007 | 31,448 | -785 | 3 | 38,086.6 | 44,071,009.96 |
| 2008 | 32,763 | 1,315 | 4 | 39,930.8 | 51,377,356.84 |
| 2009 | 35,395 | 2,632 | 5 | 41,775 | 40,704,400 |
| 2010 | 35,426 | 31 | 6 | 43,619.2 | 67,128,526.24 |
| 2011 | 38,571 | 3,145 | 7 | 45,463.4 | 47,505,177.76 |
| 2012 | 45,427 | 6,856 | 8 | 47,307.6 | 3,536,656.36 |
| 2013 | 48,034 | 2,607 | 9 | 49,151.8 | 1,249,476.84 |
| 2014 | 50,996 | 2,962 | 10 | 50,996 | 0 |
| **Total** | **416,043** | | | | **273,093,177.2** |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR103C

| Δ | 1,844.2 |
|---|---------|
| □ | 37,822.09 |
| Standard deviation σ | 4,982.63 |
| Coefficient of variation υ | 13.17% |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR103C

**Table.8.** Previsions of the number of accommodation capacity in use in mountain resorts, 2015-2020

| Year | t-1 | $Y_t = y_1 + (t-1)\Delta$ |
|------|-----|---------------------------|
| 2015 | 11 | 52,840.20 |
| 2016 | 12 | 54,684.40 |
| 2017 | 13 | 56,528.60 |
| 2018 | 14 | 58,372.80 |
| 2019 | 15 | 60,217.00 |
| 2020 | 16 | 62,061.20 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR103C

In accordance with the preview from the table above, for the period 2015-2020, there has been an upward trend, the dynamics of accommodation places in the mountain resorts. The number of accommodation places will increase the next few years, which means a favorable situation for the Romanian mountain tourism.

In conclusion, the accomodation offer available in the Romanian mountain tourism must be diversified and upgraded. For this purpose, there are necessary, however, several investments in this domain based on uniform strategies developed at the central level and implemented at the local level. In this respect, tourism supply must be designed to meet tourist demand.

## The tourist circulation indicators in the Romanian mountain resorts

The tourist circulation analysis implies the knowledge of evolution of some key indicators, namely: the number of tourists who come in the mountain resorts, the number of overnight stays, the tourist's stay, the density of tourist attraction.
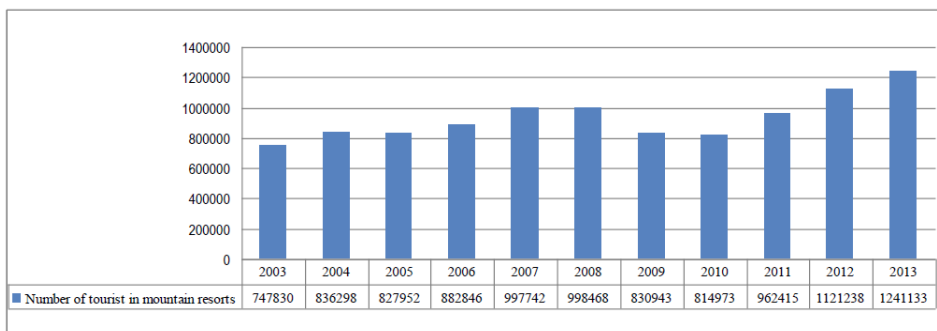
### *Number of tourists*

The number of tourists who prefer the Romanian mountain resorts can be fluctuant, recording in 2013 the maximum of 166% compared with 2003, and the minimum value has been registered in 2010, as being 109% compared with 2003.

**Table 9.** The evolution of the number of tourists in accommodation units in the mountain resorts, 2003-2013

| Year | Absolute indicators | | | Relative indicators | | | | Annual average | |
|---|---|---|---|---|---|---|---|---|---|
| | Level indicators | Absolute changes | | Index dynamics | | Growth rate | | $Y$ | $\Delta$ |
| | Number of tourists in accommodation units in mountain resorts | $\Delta_{i/1}$ | $\Delta_{i/i-1}$ | $I_{i/1}$ | $I_{i/i-1}$ | $R_{i/1}$ | $R_{i/i-1}$ | | |
| 2003 | 747,830 | 0 | | | | 0 | | | |
| 2004 | 836,298 | 88,468 | 88,468 | 1.12 | 1.12 | 0.12 | 0.12 | | |
| 2005 | 827,952 | 80,122 | -8,346 | 1.11 | 0.99 | 0.11 | -0.01 | | |
| 2006 | 882,846 | 135,016 | 54,894 | 1.18 | 1.07 | 0.18 | 0.07 | | |
| 2007 | 997,742 | 249,912 | 114,896 | 1.33 | 1.13 | 0.33 | 0.13 | 932,894.363 | 49,330.3 |
| 2008 | 998,468 | 250,638 | 726 | 1.34 | 1.00 | 0.34 | 0.00 | | |
| 2009 | 830,943 | 83,113 | -167,525 | 1.11 | 0.83 | 0.11 | -0.17 | | |
| 2010 | 814,973 | 67,143 | -15,970 | 1.09 | 0.98 | 0.09 | -0.02 | | |
| 2011 | 962,415 | 214,585 | 147,442 | 1.29 | 1.18 | 0.29 | 0.18 | | |
| 2012 | 1,121,238 | 373,408 | 158,823 | 1.50 | 1.17 | 0.50 | 0.17 | | |
| 2013 | 1,241,133 | 493,303 | 119,895 | 1.66 | 1.11 | 0.66 | 0.11 | | |
| | | | | | | | | 10,261,838 | |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

**Chart 10.** The evolution of the number of tourists in mountain resorts, 2003-2013



| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of tourist in mountain resorts | 747830 | 836298 | 827952 | 882846 | 997742 | 998468 | 830943 | 814973 | 962415 | 1121238 | 1241133 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

During the period between the years 2003-2013, the number of Romanian tourists who chose the Romanian mountain resorts represented an annual average of 49,330.3 persons per year. To assess the downward trend, for the following period (2015-2020), of the number of tourists' arrivals in the mountain resorts in our country, it was used the criterion based on average growth:

**Table. 10.** The calculation algorithm needed to adjust the evolution of tourist arrivals through the average growth($y_t$), 2003-2013

| Year | $y_t$ | $\Delta_{t/t-1}$ | t-1 | $Y_t = y_1 + (t-1)\Delta$ | $(y_t - Y_t)^2$ |
|------|-------|-------|-----|-------|-------|
| 2003 | 747,830 | 0 | 0 | 0 | 0 |
| 2004 | 836,298 | 88,468 | 1 | 797,160.3 | 1,531,759,561 |
| 2005 | 827,952 | -8,346 | 2 | 846,490.6 | 343,679,690 |
| 2006 | 882,846 | 54,894 | 3 | 895,820.9 | 168,348,030 |
| 2007 | 997,742 | 114,896 | 4 | 945,151.2 | 2,765,792,245 |
| 2008 | 998,468 | 726 | 5 | 994,481.5 | 15,892,182.25 |
| 2009 | 830,943 | -167,525 | 6 | 1,043,811.8 | 45,313,126,013 |
| 2010 | 814,973 | -15,970 | 7 | 1,093,142.1 | 77,378,048,195 |
| 2011 | 962,415 | 147,442 | 8 | 1,142,472.4 | 32,420,667,295 |
| 2012 | 1,121,238 | 158,823 | 9 | 1,191,802.7 | 4,979,376,886 |
| 2013 | 1,241,133 | 119,895 | 10 | 1,241,133 | 0 |
| **Total** | **10,261,838** | | | | **164,916,690,097,25** |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

| | |
|---|---|
| $\Delta$ | 49,330.3 |
| $\square$ | 932,894.3636 |
| Standard deviation $\sigma$ | 122,443.564 |
| Coefficient of variation $\upsilon$ | 13.13% |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

**Table. 10.** Previsions of the number of tourist arrivals in mountain resorts, 2015-2020

| Anii | t-1 | $Y_t = y_1 + (t-1)\Delta$ |
|------|-----|-------|
| 2014 | 11 | 1,290,463.30 |
| 2015 | 12 | 1,339,793.60 |
| 2016 | 13 | 1,389,123.90 |
| 2017 | 14 | 1,438,454.20 |
| 2018 | 15 | 1,487,784.50 |
| 2019 | 16 | 1,537,114.80 |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR101B

In accordance to the preview from the table above, for the period 2014-2019, it turns out that there is an upward trend of the number of arrivals in the mountain resorts.

### Number of overnight stays

In the evolution of the overnight stays number in the Romanian mountain resorts between 2003 and 2013, we can see a large variation. In the data provided by the National Institute of Statistics and processed in Table no. 12, we can see that the number of overnight stays reached a maximum value of 2,678,493 in 2013.

**Table 12**. The evolution of the number of tourists overnight stays in Romanian mountain resorts, 2003-2013

| Year | Absolute indicators | | | | Relative indicators | | | | Annual average | |
| | Level indicators | Absolute changes | | Index dynamics | | Growth rate | | | | |
| | Number of tourists overnight stays in Romanian mountain resorts | $\Delta_{i/1}$ | $\Delta_{i/i-1}$ | $I_{i/1}$ | $I_{i/i-1}$ | $R_{i/1}$ | $R_{i/i-1}$ | $Y$ | $\Delta$ |
|---|---|---|---|---|---|---|---|---|---|
| 2003 | 1,876,226 | 0 | | | | 0 | | | |
| 2004 | 2,060,351 | 184,125 | 184,125 | 1.10 | 1.10 | 0.10 | 0.10 | | |
| 2005 | 2,012,496 | 136,270 | -47,855 | 1.07 | 0.98 | 0.07 | -0.02 | | |
| 2006 | 2,062,047 | 185,821 | 495,51 | 1.10 | 1.02 | 0.10 | 0.02 | | |
| 2007 | 2,217,780 | 341,554 | 155,733 | 1.18 | 1.08 | 0.18 | 0.08 | | |
| 2008 | 2,245,756 | 369,530 | 27,976 | 1.20 | 1.01 | 0.20 | 0.01 | 2,111,846.364 | 80,226.700 |
| 2009 | 1,858,068 | -18,158 | -387,688 | 0.99 | 0.83 | -0.01 | -0.17 | | |
| 2010 | 1,772,859 | -103,367 | -85,209 | 0.94 | 0.95 | -0.06 | -0.05 | | |
| 2011 | 2,020,048 | 143,822 | 247,189 | 1.08 | 1.14 | 0.08 | 0.14 | | |
| 2012 | 2,426,186 | 549,960 | 406,138 | 1.29 | 1.20 | 0.29 | 0.20 | | |
| 2013 | 2,678,493 | 802,267 | 252,307 | 1.43 | 1.10 | 0.43 | 0.10 | | |

Source: Own calculations based on https://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=ro&ind=TUR103C

As far as the number of tourists' overnight stays in the Romanian mountain resorts is concerned, the indicator is as well characterized by the same fluctuating evolution between 2003 and 2013. The minimum number of Romanian tourists' overnight stays was recorded in 2010 (1,772,859 overnight stays), specifically 905,634 less overnight stays than in 2013 (when there were recorded 2,678,493 overnight stays).

## Conclusions

The Romanian mountain area represents a domain of national interest, that has a significant economic, social, cultural and not lastly an environmental potential. The Romanian mountain area has a total of 71,341km², namely 30 % of the national territory (238,391 km²). In the mountain area there are 3,270,793 inhabitants, representing approximately 20% of the population in the country (Erdeli, Gheorghilaş, 2006).

The Romanian mountain tourism has proved over time that it is a matter of competitive force on the domestic market, but too little present on the external market. From the multiple analyzes resulted that the opportunities of development are not far from being exhausted. To achieve this goal, the diversification and the increase of quality of supply must be taken as absolutely necessary. It must be noted the need for further transforming the Romanian mountain tourism, from a tourism concentrated in the coming months of the colder season, in a continue manifestation all year round, considering the fact that foreign tourists have made a tradition of coming in Romania, in particular during winter holidays. The mountain tourism in our country integrates all the elements necessary to develop, becoming an economic success by attracting foreign tourists (Neacsu et al., 2011). If the Romanian tourists prefer accommodation units of low comfort, it is not the way things are for foreign tourists, because they first choose to accommodate in units of 5 stars, followed by the 4 stars, the other categories of comfort being of no interest. Accommodation services providers will have to understand that attracting foreign tourists represents a desideratum, in this respect would have to be increased the degree of comfort of accommodation facilities.

One great advantage of the mountain tourism in our country consists of short distances from urban centres, which could reduce the time of travel. Unfortunately, small distances of travel are not supported by the general quality of infrastructure. A major problem of the Romanian tourism in general, as well as the mountain tourism in particular, consists of the lack of motorways or express roads and by default the low speed of travel. This inconvenience is doubled by the bad organization of the network of railroad, where, in addition to poor quality of services we also confront ourselves with very low travel speeds. According to the data supplied by CFR, the average driving speed of passengers' trains is of 45 km/h).

The Carpathians have allowed building a network of railways and road transport which connect localities situated outside the Carpathians' area with it. The mountain area is crossed by 38 primary and subsidiary railways, and some are related to the international routes. Road transport routes are much more and they get up into areas less accessible to the railway lines. The Carpathians are crossed by 4 European roads, the other being mostly updated, enabling access to the tourist resorts and objectives, but there is also a series of forest roads and marked paths to get to the areas where the update was not possible. The most spectacular roads in the Carpathians and a great deal of tourist interest are Transfăgără□anul in the Făgăra□ Mountains and Transalpina in the Parâng Mountains. In a world where tourism is one of the most powerful sectors, Romania is still looking for another place.

 Having a unique mountain tourism potential, both from the point of view of its natural attractions but also from a cultural - historical point of view, Romania is compelled to

special attention to the policies and strategies of promotion. At one time, mountain tourism has entered in the shadow in the last period, being promoted in particular other forms of tourism, namely seaside tourism and bath tourism. Mountain tourism development should be dealt with in the light of the three directions, namely: financing, marketing, and education. In the first place, financing means providing a tax relief for tourism, allocating funds to promote treatments, at the same time, accessing the European funds and encouraging private investments in this sector. In respect of the marketing strategies is preferred the insurance of continuity both at macro-economic level as well as at the micro-destinations regardless of politics and changing governments.

Regarding education, the training programs are a requirement for the employment in this sector. A satisfied customer is a potential constant customer. There is no education for the "service" at present. In the approach of new marketing strategies should be taken into account the development of the educational system for tourism. Reviving the mountain tourism and acquiring new customers must be traced to a strategy of development by bringing together all those involved and interested in managing the valuable mountain potential of Romania.

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# SPECIFICS OF CORPORATE MANAGEMENT IN AGRIBUSINESS IN TRANSITIONAL CONDITIONS

*Nada Vignjević-Djordjević[1], Predrag Jovićević[2], Stefan Kocić[3]*

## Summary

*Corporate governance in agribusiness describes an agency problem resulting from separation of ownership from control in modern corporations and represents a huge cost to the shareholders. The agency problem is regulated by legal protection of minority shareholders, by constituting the Board of Directors as a Supervisory authority to monitor managers and an active agribusiness market for corporate control in agribusiness (against hostile takeover). These mechanisms are regulated by regulations on securities (at the federal level), corporate law (at the state level), and the corporate statutes, regulations and other Contracting Rules (at the company level). These regulations, laws and decrees actually define distribution of power between shareholders and managers. Such techniques of defense against takeover can be beneficial to shareholders, if managers use them to strengthen the bargaining power and increase the selling price of an agribusiness company. However, if managers use it for preservation of position and for the achievement of personal interests these regulations do not contribute to the realization of shareholders' interests.*

***Keywords:*** *Corporate governance, agency problems, shareholders, agribusiness.*

**JEL:** G32, Q13

## Introduction

The main hypothesis of this study is that quality of corporate governance in agribusiness affects the pricing of shares in the capital market. Stock price is the most important indicator of business of agribusiness joint stock companies because it points to their success and market valuation of the corporation. It is necessary to emphasize that there

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are factors of stock price movement that act at the corporate level and at the level of the economy as a whole, that is, factors that agribusiness corporations have an influence on, and external ones which can't be influenced (Porter, Hatherley, Simon, 2002.). This is the primary reason why the relationship between stock price and cause for those changes are in some cases clearly visible, while in others it is very difficult to link the factors and determine the direction of influence, whether they are external or internal factors of corporate governance in agribusiness.

Still all of the researches that this paper relies on have emphasized the importance of quality of corporate governance in agribusiness for economic performances of corporations and for listing of shares on the capital market. Economic performances of companies depend on the mechanisms of corporate governance, be it on legal protection of shareholders, competitive environment of corporations, ownership structure, corporate regulations, decisions made at shareholders' meetings, board composition, corporate financial policy or hired managers (Chauffour, Maur, 2011).

## Methodology and data used

Governing structure of an agribusiness corporation is not an exogenous value, so in many cases it is difficult to draw causal conclusions. For this reason, the GIM have not set the demand on the direction of causality in agribusiness between corporate governance and business performance (http://www.ecgi.org/). Corporate governance is a variable that can be explained by variations in the performance of operations that are not already built into the market price of the company or other indicators (*Berglof, Claessens, 2004)*.

Index correlations with yield management, firm value and agency costs can be explained in several ways.

1) One explanation, which was given by results of a study, points that corporate governance regulations which reduce shareholders' rights directly create additional expenditure to the shareholders (Shileifer, Vishny, 1997). If the market underestimates these additional costs, the return on stocks may be lower than expected and the value of the firm at the beginning of the observation period could be too high. Higher agency costs might also point to lower operational business performance.

2) Alternative explanation is that managers understand that the future performance of the company will be weak, while investors can't predict that. In this case, managers can create management regulations to protect themselves from blame but these regulations do not always contribute to the creation of additional exclusive agency costs.

3) The third explanation is that corporate governance regulation themselves don't have certain power, but are rather a symptom or a signal of higher agency costs - a signal which is not adequately incorporated into the market price of the shares of a corporation.

Research is on the example of Central European and Balkan countries, based on a study of about 24 different corporate governance regulations in agribusiness for about 150 companies a year, from the September of 2000 to December of 2005 (http://www.standardandpoors.com). While constructing the management index, the authors have given each firm one point in which there is a regulation that restricts shareholders' rights (which represents an increase of power for managers) (Volk, 2010). The advantage of this index is its transparency and the fact that it can easily be re-calculated, even though it doesn't accurately expresses the relative importance and impact of certain regulations. The authors have not made conclusions on the impact of regulations on the wealth of shareholders or the efficiency of operations, but rather only studied the effect of a given regulation on the balance of power in an agribusiness corporation, while constructing the Index (shareholders-managers).

## Quality of corporate governance and equity prices

U.S. researchers Paul Gompres, Joy Ishii, and Andrew Metrick (Gompers, Ishii, Metrick, 2001) tried to elucidate the relationship between quality of corporate governance and equity prices. Their research was focused on internal mechanisms of corporate governance and the relation of mechanisms with the indicators of performance of corporations. Namely, they studied the influence of corporate governance regulations, which ensured defense against hostile takeover on shareholders' rights. They used 24 corporate governance regulations to formulate an indicator of the "Governance Index" (hereinafter referred to as G), in the early nineties, and studied the relationship between this index and company's performance in the future, during the nineties. This research found that there is a strong link between corporate governance and yield per share.

Mass occurrence of hostile takeovers of companies during the eighties has contributed to the adoption of a number of regulations for defense against hostile takeovers in many firms.[4] At the time, the U.S. enacted new legislations which provided firms additional protection against hostile takeovers. This resulted in large differences between the U.S. corporate governance structures which was characterized by the difference in yield. It turned out that corporations whose shareholders had weaker rights made considerably lower yields, had lower value on the capital market, weaker operating performances, higher cost of capital, and they were often in the line of fire by hostile takeovers.

## Mechanisms of corporate governance in agribusiness and functioning of the market against hostile takeover

Resulting inefficiencies are agency strategy costs of dispersed control referred to as corporate governance cost in agribusiness of capital dispersed control. These costs are proportionally tied to costs of acquisition. Institutions of corporate governance in firms

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4   Acceptance of regulations was actually the response of firms on the waves of takeovers. Defensive regulations against hostile takeovers and other corporative regulations which were adopted have decreased shareholders' rights.

with dispersed control tend to create conditions for effective functioning of the market against hostile takeover. It is important that allocation of formal control rights is in accordance with the rights on cash (one share equals one vote). Another important prerequisite for an efficient market against hostile takeover are high standards of information disclosure, which enable better evaluation of stock prices and activating the market against hostile takeover at a time when a potential attacker notices the inefficiency of a firm's management and set the goals that can be realized through hostile takeover. Reduction of these costs of capital is the primary goal of corporate governance (Shileifer, Johnson, 2004). Corporate control in agribusiness market has contributed to the survival of corporations, despite restrictions imposed by investment, finance and manager's decisions on payment of dividends.

Competitiveness on the product market i.e. the corporation's output directly leads to the failure (bankruptcy) of firms which are unable to meet the demands of this market. Therefore, many studies, as a measure of success of corporations are using sales growth at a certain time period. In addition, competition in the product market is an important factor of management discipline that operates poorly, although the time frame for evaluation of mechanisms of action is very long (Kay, Edwards, Duffy, 2004). Thus, promoting competition on the product market provides a solution in the long run. The influence of this mechanism in the discipline of corporate governance in agribusiness depends on government activities on promoting competitive environment in agribusiness, thus strength of competition in the product market can act as a disciplining mechanism which reduces agency costs (Hunya, 2000).

Ability to repay debt and credit ratings, by rating of institutions which assess businesses of corporations is an important signal to investors about the quality of corporate governance. Best-known agencies that provide this information are Moody's and S & P (http://www.moodys.com/). Many investors are guided by assessments of these agencies when investing in international capital markets.

Threat of bankruptcy is an important external mechanism of corporate governance in agribusiness which puts pressure on corporate managers to operate responsibly. The threat of bankruptcy exists if managers choose the wrong business policy (in most cases transfer the control to creditors) and it represents one of the main external mechanisms of corporate governance (Shleifer, Johnson, 2004).

These arguments emphasize that managers are aware that optimal operating requires constant maximization of share capital in the situation when product, labor, and takeover markets are fully competitive. Thus, competition is an essential ingredient of corporate governance in agribusiness which even works without the owner's interference in the operation and supervision of the company. However, since the real world markets are not fully competitive, it can be expected that only the competition, as the most important disciplining mechanism of corporate governance in agribusiness can act in the direction of improving quality of corporate control. Systems of corporate governance which represent additional disciplining mechanisms of corporate governance, become

relevant when the fact that the agency problem is not the only market imperfection is accepted (La Porta, Lopez de Silanes, Shleifer, Vishny, 2001). Without the discipline on competitive markets, the agency problem can be optimally solved by complete contracts in which all of the rights and responsibilities of managers would be specified in detail. Since these types contracts can't be achieved in market conditions without higher costs, the theoretical framework still assumes the existence of imperfect markets and incomplete contracts.

## Evaluation and measurement of the quality of corporate governance in agribusiness in the Central European and Balkan region

Only recent research papers attempted to explain the relationship between the quality of corporate governance and corporate stock prices in the capital market of agribusiness. Studies typically involve developed countries, although there are attempts to define the quality of corporate governance indicators of agribusiness in developing countries and transition economies (Bubić, Hajnrih, 2012). However, the main obstacle is the lack of up to date information, precise methodologies and indicators for specific, key terms. There are econometric studies in this area, for the U.S., Germany, Switzerland, Norway, Finland, therefore, mostly for high-income countries. Among the first attempts to define causal link between corporate governance and equity prices there is an research conducted in 2001. by Gompres, Ishii and Metrick, the NBER[5] researchers and professors at Harvard and the University of Pennsylvania. Further attempt to define the internal and external mechanisms of corporate governance and equity prices relation in the U.S. was done in an econometric research by Cramers and Nair, professors at the University of New York from April 2004. Main data source for the authors was IRRC[6], which publishes detailed provision listings for each firm.

In December 2004 Brown and Caylor, state university professors from Georgia, formulated a new index, Gov-Score, which they used to explore the link between corporate governance and firm performance. In Europe, among the first papers, is an attempt of Norwegian researchers Bohren Oyvind and Bernt Arne Odegaard to evaluate the association of corporate governance and economic performance of companies listed at the Norwegian capital market in late 2001. Researchers from ECGI[7] Drobetz Wolfgang, Andreas Schillhofer and Heinz Zimmermann, have proven the connection between corporate governance and the expected return per share for Germany in 2003. All these studies had similar limitations. The problem, in part, was the fact that corporate governance in agribusiness is a new and unexplored academic area with undeveloped theoretical base. Another problem was the fact that the high-quality data is very difficult to find. Therefore it's not surprising that there is no way to tell which factors maximize the value of corporate governance systems (Shleifer, Johnson, 2004).

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5    National Bureau of Economic Research - National Bureau of Economic Research

6    Investor Responsibility Research Center

7    European Institute for Corporate Governance

Corporate management describes the agency problem which is caused by separation of ownership from control in modern agribusiness corporations and is a huge cost to the shareholders (Mihajlović, 2014). In the U.S., the agency problem is regulated with legal protection of minor shareholders, by forming the Board of Directors as a supervising authority which controls the managers and by an active market for corporate control (hostile takeover). These mechanisms are governed by securities regulation (at the federal level), corporate laws (at the state level), and the corporate statutes, contract regulations and other rules (at company level). These regulations and laws actually define the power distribution between shareholders and managers.

If managers used hostile takeover defense techniques to strengthen the bargaining power and increase the selling price of the company, these techniques would be beneficial to shareholders However, if managers use them to preserve their own positions and as an tool to achieve their own personal interest, the provisions do not contribute to the interests of shareholders (Kroupova, Cervena, Antouskova, 2009). GIM analysis is complementary approach with previous research in this area. GIM is focused on the relationship between a large number of corporate governance provisions in agribusiness, which are determined internally, and on long-term company performance. Their analyzes were done based on literature that examines the impact of national legislation on the value and performance of firms ( La Porta, Lopez de Silanes, Shleifer, Vishny, 2000).

Companies usually sought to apply as many of the provisions, as they could, in the nineties. From a total of 180 correlation pairs (**(24*15)/2 =180**) established between the provisions of Corporate Governance in agribusiness, 99 pairs are positive, of which 60 are statistically significant. In contrast, from 81 negative correlations there are only 20 statistically significant. This indicates that the there may be significant differences in the distribution of power between shareholders and managers.

The influence of certain corporate governance provisions in agribusiness on the business efficiency and shareholders' wealth is not fully understood. However, despite the debate in the international literature on the effect of poison pills, it is clear that the poisoned pill provides additional leverage to the existing management to resist the actions of major shareholders. If management uses this power reasonably, corporation's wealth will increase. If management uses poison pills in order to achieve personal gain, the value of shares of the corporation will drop. Thus, it is clear that the poisoned pill increases the power of managers and weakens control rights of large shareholders. Other provisions act in a similar fashion and, in most cases are tools that management uses to resist shareholder activism. While most existing provisions indicate an active role of management and an attempt to restrict the rights of shareholders, there is an exception in the case of two clauses: "secret ballot" and "cumulative voting". These provisions are made because of shareholder pressures. Voting by secret ballot or a "vote of confidence" in some agribusiness companies requires the appointment of a third party which will count the votes and it is implied that management is prohibited to learn how each shareholder have cast it's vote. Cumulative voting allows shareholders

to concentrate their votes, so that a large number of minority shareholders can provide greater impact (Megginson, William, Netter, Chahyadi, 2006). These provisions are generally demanded by shareholders with the possibility to be recalled after proposing by managers. In contrast to the secrecy of voting, none of the other 22 provisions have clear and strong support of shareholders or certain opposition from management. Provisions for cumulative voting and secret voting increase shareholders' rights. Therefore, during the construction of G for the firm in which these provisions do not exist, one point is added.

Categorization of two regulations in agribusiness, prohibiting green mail and golden parachute, seems ambiguous. Green mail is a situation where a potential hostile attacker of the company, who bought the majority stakes, gives up from takeover by selling the packet of shares to the management of the company which was the subject of takeover by exorbitant, high price.

Shares are purchased from corporate invaders, at a price which is significantly higher than the current market price of shares of the corporation, so that the threat of takeover would be canceled. The existence of this regulation provides additional power to management, when the attacker has accumulated a large number of shares in the share capital (Sheshinski, Lopez Calva, 1999). Thus, the regulation which prohibits the use of green mail reduces the power of managers and increasing shareholder rights. However, green mail is a profitable business for the attackers, so the green mail ban would make the large accumulation big "offensive" participations less profitable, ex ante. The presence of green mail ban is positively correlated with 20 out of 23 regulations and besides that is significantly positively correlated in eight regulations, and not significantly negatively correlated with any regulation. Because many companies have started to use green mail regulation as a defense against takeovers, GIM supports the view that the regulations prohibiting green mail reduce shareholder rights. Golden parachute is a clause in the contract of employment (signed by managers) which provides large cash payments to directors, board members in the case of termination of employment or transfer to another position or in the event of a hostile takeover. This is to protect the top management of the company from hostile takeovers because firing a director would make it very expensive. Although such payments could discourage a hostile takeover by increasing the costs necessary for takeover, it does not prevent the creation of mergers. While the impact of this regulation on the position of management and shareholders' wealth is vague and ambiguous, more important effect is the reduction of shareholders' rights.

In this case, the "right" is the possibility of controlling shareholders at no additional cost for firing the management (Pistor, Martin, Gelfer, 2004). Golden parachutes, as well as regulations prohibiting green mail are highly correlated with all other regulations of defense against hostile takeovers. Of the 23 pairs of correlations with other regulations, 19 were positive, and 11 of these positive correlations were statistically significant, and only one negative correlation was statistically significant. Therefore, GIM seen as a golden parachute restrict the rights of shareholders.

**Table 1:** Values which the management index (G) can have

| | Management index: | Portfolio: | Above-average yield portfolio | 2005 return on 1$ invested for a year 2000 portfolio | Number of firms in the year 2000 portfolio | Number of firms in the year 2005 portfolio |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1. | G < 5 | Corporate | 0.29* | 7.07 $ | 150 | 215 |
| 2. | G = 6 | | 0.22 | | 119 | 169 |
| 3. | G = 7 | | 0.24 | | 158 | 186 |
| 4. | G = 8 | | 0.08 | | 165 | 201 |
| 5. | G = 9 | | -0.02 | | 160 | 197 |
| 6. | G = 10 | | 0.03 | | 175 | 221 |
| 7. | G = 11 | | 0.18 | | 149 | 194 |
| 8. | G = 12 | | -0.25 | | 104 | 136 |
| 9. | G = 13 | | -0.01 | | 84 | 106 |
| 10. | G > 14 | Managerial | -0.42* | 3.39$ | 85 | 83 |

Source: The work of authors

Column 1 shows ten characteristic values can have G.

Column 2 shows the two extreme portfolios that are analyzed in the study of GIM.

Column 3 and 4 shows above-average returns that can be realized by the portfolio which consists of stocks of firms with ten different values of G.

Column 5 and 6 show the number of firms which were surveyed in the 2000 and 2005 research and the values of G and that the company had in the years observed.

Management index (G) is the sum of points for each individual clause (or in case of existence or absence of any regulation) and is ranked from 0 to 24. GIM have divided the values of G into ten groups whose values range from G < 5, then each individual value for G from G = 6 to G =13, and end with G > 14.

We have isolated two extreme portfolios: management and shareholders. Managerial portfolio (Portfolio Management) includes firms with the weakest protection of property rights (which corresponds to the highest power manager) and has values of G > 14. These are companies which have more than fourteen corporate governance regulations. Shareholder portfolio includes firms with the strongest protection of property rights (corresponding to the weakest manager power) and has values of G < 5. Therefore, firms with a higher index number (lower part of the table) are located in the "Portfolio Management" and it means they have "highest managerial power" or "weakest shareholder rights"; firms with the lowest value index (upper part of the Table 1) located in "Stock portfolio" which means they have "the lowest manager power " or "strongest shareholder rights." It was noted that of the ten largest companies in the "Stock portfolio" in the year 2000, six remained in the stock portfolio in the year 2005, three have dropped out of the portfolio and have G = 6, and one is missing from

the sample. "Portfolio Manager" was more active, with only two of the ten companies with the highest market capitalization, which remained in the same portfolio, the four companies have dropped out of the portfolio with G = 13 and three companies have dropped out of the sample observations through mergers or emission of additional species shares (class of stock). If we consider the entire sample of firms is observed that of all the companies that were in the Stock and managerial portfolio in the year 2000, 31% remained in the same portfolio in the year 2005.

## Conclusion

The privatization process, which marked the last quarter of the last century, is an effective method of improving the performance of state agribusiness enterprises and government decisions which are driven by developed and developing countries. Healthy corporate structure is a fundamental prerequisite for the success of privatization, both from the standpoint of the government, which wants to sell an agribusiness company, and in terms of potential investors.

In the process of privatization governments generally seek to achieve the same goals: 1) to increase government revenues, 2) to reduce government interference in economic trends, 3) to strengthening economic efficiency, 4) increase competition and 5) provide the development of domestic capital markets.

Numerous studies have confirmed that privatization leads to increased production, improved efficiency and increase of investment in capital and payments of dividends. The roots of corporate governance of agribusiness in developing countries and transition economies lies in privatization initiatives that have strengthened since the end of the seventies and eighties of the twentieth century.

In addition, the scandals associated with corporations withdrew the improvement of corporate governance issues, in developing countries, transition economies and developed economies. This is corporate control in agribusiness due to the center of interest of the international business community and international financial institutions.

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# SPECIFIFIČNOSTI KORPORATIVNOG UPRAVLJANJA U AGROBIZNISU U TRANZICIONALNIM USLOVIMA

*Nada Vignjević-Djordjević[8], Predrag Jovićević[9], Stefan Kocić[10]*

## Apstrakt

*Korporativno upravljanje u agrobizniszu opisuje agencijski problem koji nastaje odvajanjem vlasništva od kontrole u modemoj korporaciji i predstavlja veliki trošak za akcionare. Agencijski problem se reguliše pravnom zaštitom malih akcionara, uspostavljanjem funkcije odbora direktora kao nadzomog organa koji kontroliše menadžere i aktivnim poljoprivrednim tržištem za korporativnu kontrolu (neprijateljsko preuzimanje). Ove mehanizme reguliše regulativa hartija od vrednosti (na saveznom nivou), korporativni zakoni (na državnom nivou), i korporativni statuti, ugovorne odredbe i druga pravila (na nivou firmi). Ove regulative, zakoni i odredbe zapravo definišu raspodelu moći između akcionara i menadžera. Ovakve tehnike odbrane od preuzimanja mogu biti od koristi za akcionare, ukoliko ih menadžeri koriste da bi ojačali pregovaračku moć i povećali prodajnu cenu agrobiznisa. Međutim, ukoliko ih menadžeri koriste radi očuvanja sopstvenih pozicija i ostvarenje ličnih interesa, odredbe ne doprinose ostvarenju interesa akcionara.*

***Ključne reči:*** *Korporativno upravljanje, agencijski problem, akcionari, agrobiznis.*

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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: 2011-2014. ***This segment is not obligatory within the paper***.

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## Introduction

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**Table 5.** The distribution cost of packaged goods from Subotica to retail-store objects

| Indicators | Period | | | Total |
|---|---|---|---|---|
| | **Month 1** | **Month 2** | **Month 3** | |
| Distance crossed (km) | 12.926 | 11.295 | 13.208 | 37.429 |
| Fuel consumption (litre) | 3.231 | 2.823 | 3.302 | 9.356 |
| Value of fuel consumption (RSD) | 242.378 | 211.790 | 247.653 | 701.821 |
| Total time spend on touring (hour) | 314 | 266 | 417 | 997 |
| Value of total time spend on touring (RSD) | 47.048 | 39.890 | 62.570 | 149.508 |
| Number of tours | 98 | 77 | 102 | 277 |
| Toll value (RSD) | 0 | 0 | 0 | 0 |
| Number of pallets transported (piece) | 1.179 | 976 | 1358 | 3.513 |
| Total weight transported (kg) | 602.600 | 429.225 | 711.116 | 1.742.941 |
| Vehicle maintenance costs (RSD) | 203.858 | 164.970 | 224.806 | 593.634 |
| Lease costs (RSD) | 480.938 | 454.214 | 565.784 | 1.500.936 |
| Total sum (RSD) | 974.222 | 870.864 | 1.100.813 | 2.945.899 |

*Source:* Petrović, 2012;
*Note:* Values within the table are calculated without Value Added Tax (VAT)

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*Anđela Marković[2], Petar Petrović[3], Mirko Mirković[4]*

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## Introduction

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**Table 5.** The distribution cost of packaged goods from Subotica to retail-store objects

| Indicators | Period | | | Total |
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| | Month 1 | Month 2 | Month 3 | |
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| Total sum (RSD) | 974.222 | 870.864 | 1.100.813 | 2.945.899 |

*Source:* Petrović, 2012;
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## Literature

1. Marković, A. (godina izdanja): *Naslov knjige,* Izdavač, Mesto i Zemlja izdavača.

2. Petrović, P., Mirković, M. (godina izdanja): *Naslov poglavlja u knjizi,* u knjizi – Naslov knjige, ch. br. x, str. xxx–xxx, Izdavač, Mesto i Zemlja izdavača.

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